

**HEALTH LITERACY AND HEALTH BEHAVIOUR IN THE CONTEXT
OF ONE HEALTH APPROACH IN MOROGORO, TANZANIA:
PERCEPTIONS, ATTITUDES, CONNECTIONS, AND REALITIES**

BY

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DECLARATION

I, Mikidadi Idd Muhanga, do hereby declare that the work presented in this thesis is entirely my own and carried out with the help of those people mentioned in the acknowledgements. It has not been previously submitted to this or any university for the award of a degree of Doctor of Philosophy or any other qualifications.

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CERTIFICATE OF APPROVAL

This thesis submitted by **Mikidadi Idd Muhanga** is approved in fulfilling the requirements for the award of the degree of Doctor of Philosophy in Population Studies of the University of Zambia.

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ABSTRACT

Quality population is a parameter for economic development. *Inter alia*, health determines the quality of a population. Evidently, attaining optimal health calls for collaboration between humans, animals, and environmental health professionals plus understanding the consequences of humans, animals and environment interactions on health. Attaining good health faces numerous challenges, health literacy inclusive. Realizing this, the government of Tanzania has put numerous efforts to improve health services and educate people to become health literate. Despite the efforts, health impairing behaviours (HIBs) some resulting in zoonotic diseases and varying preferences among Tanzanians in terms of health-seeking sources have been reported. A cross-sectional study was conducted in Morogoro urban and Mvomero districts in Tanzania to assess health literacy (HL), its influence on health behaviour (HB) and healthcare-seeking behaviour (HCSB), attitudes of people on HIBs and its influence on health behaviours (HBs). Focusing on One Health Approach (OHA), this study specifically: - (i) assessed HL, (ii) analyzed HBs and HCSBs, (iii) assessed attitudes of the people on HIBs, (iv) assessed determinants of HL, HB, and HCSB, (iv) identified and assessed collaborative efforts and strategies towards attaining optimal health, (v) determined linkages between HL, HB and HCSB, and, (vi) assessed stakeholders initiatives in building public health capacity, developing HL and empowering people to manage their health. Data were collected using a structured questionnaire from 1440 respondents obtained through multistage sampling procedure, 80 FGDs participants and 16 key informant interviewees. Health Literacy assessment tool and a Likert scale were used to assess HL and attitudes towards HB, while an index of score gauged HBs. IBM-SPSS v.20 analysed quantitative data while qualitative data were organised into themes on specific objectives to back up findings. The study revealed, about one-third of the respondents (32.9%) with adequate HL, moderate HL (30.8%) and inadequate HL(36.3%); 40% had health-enhancing behaviours and 60% with health impairing behaviours, 58.8% preferred formal and 41.2% informal health care sources, 30% had unfavourable attitudes towards health impairing behaviours, attitudes significantly associated with behaviours ($p<0.001$). Ordinal logistic regression indicates that health-related discussions engagement ($p<0.005$), health behaviour ($p<0.001$), interaction with medical professionals ($p<0.001$), political influence on health ($p<0.001$), local authorities involvement on health ($p<0.001$) and marital status ($p<0.004$) to determine health literacy. Health behaviour determinants were one health concern ($p<0.001$), health literacy ($p<0.001$), local authorities involvement in health ($p<0.001$), prior knowledge ($p=0.045$) and political influence on health ($p<0.003$). Marital status ($p<0.001$), service characteristics ($p<0.001$) and the effectiveness of health services ($p<0.001$) determined healthcare seeking. Only 5% were aware and 3.8% identified collaborative efforts and strategies on OHA. There were significant associations (health literacy*health behaviour, $p<0.001$; health literacy*healthcare seeking, $p<0.05$; health behaviour*healthcare seeking, $p<0.03$). Only 30% perceived stakeholders' initiatives on health and related aspects to be effective. An alternative hypothesis that *Health literacy does not differ significantly among individuals exhibiting HEBs and those with HIBs under OHA* was confirmed ($F=795.206$, $p<0.001$) and null hypothesis rejected. Much as low HL and ineffective efforts on health education were observed, positive attitudes towards HIBs also contributed to the observed HBs. This study recommends strengthening efforts to enhance health information dissemination through health education focusing on culture as the context that informs behaviours.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACP	African –Caribbean and the Pacific
AHRQ	Agency for Healthcare Research and Quality
AIDS	Acquired Immune Deficiency Syndrome
ANOVA	Analysis of Variance
AVMA	American Veterinary Medicine Association
CI	Confidence Interval
EU	European Union
FAO	Food and Agriculture Organization
FAS	Family Affluence Scale
FGD	Focus Group Discussions
FHCSF	Formal Health care Seeking Source/Facility
HB	Health Behaviour
HEBs	Health Enhancing Behaviours
HIB	Health Impairing Behaviours
HBM	Health Belief Model
HCSB	Health Care Seeking Behaviour
HISB	Health Information Seeking Behaviour
HIV/	Human Immuno Virus/
HL	Health Literacy
HLI	Health Literacy Index
HLS-EU	Health Literacy Survey -European Union
IEC	Information Education and Communication
IHCSF	Informal Health care Seeking Source/Facility
IOM	Institute of Medicine
KAP	Knowledge, Attitudes and Practices
LGAs	Local Government Authorities
MDGs	Millennium Development Goals
NAAL	National Assessment of Adult Literacy
NBS	National Bureau of Statistics
NIMR	National Institute of Medical Research
NWPH	North West Public Health
OHA	One Health Approach
OWOH	One World-One Health
REALM	Rapid Estimate of Adult Literacy in Medicine
SDGs	Sustainable Development Goals
SES	Socioeconomic Status
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
SUA	Sokoine University of Agriculture
TADS	Transboundary Animal Diseases
TOFHLA	Test of Functional Health Literacy in Adults

TV	Television
UN	United Nations
UNZA	University of Zambia
URT	United Republic of Tanzania
URT-GHI	United Republic of Tanzania-Global Health Initiative
US	United States
WB	World Bank
WHO	World Health Organization

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Definition of Terms

Concepts in social sciences are context-sensitive; they denote different things to different people and at different times and places. There is a lot of subjectivity and objectivity in the study of social sciences (Muhanga, 2007). In undertaking this study, some terms that are used in day to day conversations have been specifically used. For this study, the following terms are conceived as follows:

One Health Approach (OHA)

One Health refers to the collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and the environment. The approach among others recognises health as one and there is no dividing line between humans, animals and environmental health. This calls for joint/collaborative efforts in the control of infections transmissible to man and animals.

Health Literacy (HL)

HL refers to an individual's "ability to gain access to, understand and use health information" for promoting and maintaining health (Nutbeam, 2000). In this study, this aspect has been operationalized by observing how easy or difficult it is for individuals to access, understand, appraise and apply related health-related information (on diseases prevention, health care, and health promotion) in making health decisions in the context of the One Health Approach.

Health behaviour (HB)

HB includes all those practices or behaviours associated with establishing and retaining a healthy state, plus aspects of dealing with departure from that state (WHO, 1995: 4). It includes any actions undertaken by an individual which have the potential to influence health. HBs are actions taken by a person to maintain, attain, or regain good health and to prevent illness. Health behaviours are classified as health-enhancing and health impairing.

Health Impairing behaviours (HIBs)

Health impairing behaviours are all those practices or behaviours which have harmful effects on health or otherwise predispose individuals to diseases.

Health Enhancing behaviours (HEBs)

Health enhancing behaviours are all those practices or behaviours when an individual engages with they convey health benefits or otherwise protect individuals from the diseases.

Health care-seeking behaviour (HCSB)

HCSB in this study refers to the health care service sources utilization. It is being operationalized as an individual's preference over certain health care service source(s).

Realities

Literally connotes truths, facts, and evidence. In this study, this concept signifies the empirical findings or the actual state of the affair concerning what has been found in the study area in connection with the variables studied.

Perceptions

This concept in this study has been used to represent individuals' views, opinions, insights, and observations on the variables studied. In this study self-perceived/self-reported or self-rated HL, HB and stakeholders initiatives were analyzed based on perceptions.

Attitudes

In the context of this study, attitudes connote individual self-evaluation of certain HBs including their beliefs about the outcome of such behaviours/practices on health.

Connections

This concept in this study denotes influence, associations, linkages, and relationship among variables studied.

CHAPTER ONE

INTRODUCTION

1.0 Background Information

Good health is a cornerstone of development in all societies (World Bank, 1993; Lennock and Ehrenpreis, 2003; URT, 2003a; URT, 2003b; IMF, 2004; URT, 2007a; WHO, 2010; WHO, 2012a; 2012b; Levin-Zamir *et al.*, 2017). This is due to the fact that health status of society can affect all other sectors in that particular society; (i.e politics, social and the economic aspects) (Baruch and Clancy, 2000; Sayah and Williams, 2012; Edwards *et al.*, 2012; Sørensen, *et al.*, 2015). On the other hand, the society, politics and the economy of a particular society can impact health status in a given society respectively (Edwards *et al.*, 2012; Sayah and Williams, 2012). Good health determines the quality of a population. Quality population is a crucial parameter for economic development (URT, 2003b; URT, 2007a; Lutz, 2014). It is evident that good health boosts labour productivity, educational achievement and income and hence lessens poverty (Udoh and Ajala, 2001; Bloom, *et al.*, 2004). Ill-health and diseases are definitely considered as barriers to economic growth and subsequently to national development worldwide (Bloom and Canning, 2000; Bloom *et al.*, 2001; Strittmatter and Sunde; 2011; WHO *et al.*, 2013). It is therefore apparent that attaining development goal calls for improving the health status of a nation's population; however, it is obvious that there are several challenges in attaining good health (Ratzan and Parker, 2000; Byrne, 2004; Mamdani and Bangser, 2004; Kaseje, 2006; Sanders and Chopra, 2006).

Health Literacy (HL) is recognised as one of the prominent challenges towards attaining good health (Paasche-Orlow and Wolf, 2007; Muhanga and Malungo, 2017a). HL, or the degree to which individuals have the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions, plus the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (Ratzan and Parker, 2000; TARSC, 2009; Berkman *et al.*,

2010a; U.S. Department of Health and Human Services, 2010), is an important predictor of health outcomes and health care utilization (DeWalt *et al.*, 2004; Sudore *et al.*, 2006). It is apparent that at the core of HL is an attempt to improve people's access to health information and their capacity to use it effectively; HL is critical to empowerment. HL affects a person's ability to access and use health care, to interact with providers, and to care for himself or herself (Paasche-Orlow and Wolf, 2007; AHRQ, 2007). Evidence exists on how limited HL impacts on health, health outcomes, health care costs and health care utilization (Weiss, *et al.*, 1992; Gazmararian, *et al.*, 2003; Nielsen-Bohlman, *et al.*, 2004; Weiss and Palmer, 2004; Weiss *et al.*, 2005). All this evidence has not taken explicitly into account the interactions of humans, animals, and the environment.

For good health to be attained, HL has to be taken into the context of the fact that there is an inextricable link between human health, animal health and environmental health (Mbugi, 2012; CDC, 2018; Muhanga and Malungo, 2018a; 2018b). For instance, livestock production makes the greatest contribution to greenhouse emissions, which are responsible for climate change. Intensive animal production practices also provide for easy transmission of infectious diseases (Kayunze *et al.*, 2012). The methane produced under intensive production system also significantly contributes to climate change. The exploitation of wildlife, wildlife trade and increasing contact of wildlife and livestock also contribute to the emergence of infectious diseases. These activities all have economic incentives underpinning them, with infectious disease emergence and spread, and environmental degradation being unintended consequences (Jones *et al.*, 2008; Mumba *et al.*, 2014). It, therefore, remains imperative for veterinarians, human health and other sectors professionals to work in close collaboration at the same time a high level of HL under One Health Approach promoted among people to enable them to maintain good health (Mbugi *et al.*, 2012). Poor health impacts negatively on the quality of population; economic development cannot be attained in the absence of quality population. Quality population is a source of labour and consumers of various products and services and hence a crucial parameter for economic development (URT, 2007a; URT, 2007b).

It is against this background that the study empirically assessed HL and its influence on HBs and HCSB plus people's attitudes on HBs and HCSB. It also assessed the government's efforts to educate people to become health literate on the human, animal and environmental interface in Morogoro, Tanzania. In this study, self-perceived/ self-reported or self-rated HL, HB and stakeholders' initiatives were analyzed (perceptions). Individual self-evaluation of certain HBs including their beliefs about the outcome of such behaviours/practices on health (attitudes) and the linkages/associations between HB, HL, HCSB (connections) were assessed. The levels of HL, health influencing practices/behaviours and the preferences for health care service sources (HCSB) in the study area (realities) were established in the interface of humans, animals and the environment in Morogoro, Tanzania.

1.1 Health Literacy: A Global Overview

The usage of the concept of 'HL' had its origin in the United States and Canada, though now widely used internationally, not only in health care but also within the public health context (Paasche-Orlow, 2009; Pleasant, 2013). It is evident (Tappe and Galer-Unti, 2001; Parker *et al.*, 2003; Robbins, 2003; Paasche-Orlow *et al.*, 2005; Porr *et al.*, 2006), that HL is being explored within different disciplines and with different approaches, *inter alia*, including observing the role of health educators in promoting HL, public HL for lawyers, health communication, the prevalence of limited HL, and HL as an empowerment tool for low-income mothers.

HL has increasingly been receiving substantial attention from various international including health professional organizations (European Commission, 2007; United Nations Economic and Social Council, 2009; U.S. Department of Health and Human Services, 2010; WHO, 2012a). HL is overtly declared as an aspect of priority action in the European Commission's Health Strategy 2008-2013 (European Commission, 2007). Currently, HL forms part of various European policy documents: European Commission White Paper is known as 'Together for Health' (Kickbusch and Maag, 2008), the Vilnius Declaration on Sustainable Health Systems for Inclusive Growth in Europe, resulting from the agreement by health ministers of the European Union (Pleasant and Kuruvilla,

2008; The Lithuanian Presidency (2013), the WHO- Regional Office for Europe popular strategy entitled Health 2020 strategy (European Commission, 2007) and various WHO publications, including Health literacy: the solid facts (WHO, 2012a; Kickbusch *et al.*, 2013). It has been noted that information about the status of health literacy in Europe remains scarce regardless of rising attention on the concept among European health policymakers. Evidently (Sorensen; 2012; 2015) little has been documented concerning population data on HL levels for the European Union (EU). The literature indicates various initiatives in other parts of the world with respect to HL including in the United States (Nielsen-Bohlman *et al.*, 2004; Kutner *et al.*, 2006; Sudore, *et al* 2006; Rudd, *et al* 2007; Berkman *et al.*, 2010b), Australia (Barber *et al* ., 2009, Adams *et al* ., 2009; Muscat *et al.*, 2016), Korea (Lee *et al* ., 2009), Japan (Ishikawa *et al.*, 2008), the UK (Ibrahim *et al.*, 2008), Israel, Italy, Ireland (IOM, 2013) and Switzerland (Wang and Schmid, 2007) among others. Undeniably, before the HLS-EU by the European Health Literacy Project, little data about health literacy existed at national and cross-national levels in Europe. Through HLS-EU, a European health literacy network was established and health literacy was measured in Europe (IOM, 2013). The research and discussions on health literacy are ongoing across the world now. However, it can be observed that most of the research and discussions have not taken into account the fact that attaining optimal health for humans, animals and the environment calls for collaborative efforts between humans, animals, and the environmental professionals plus understanding of humans, animals and the environment interactions and its consequences on health. Hence, it is inevitable for HL to focus in this context. The types of Health Literacy strategies and approaches around the world are summarised in Fig.1.

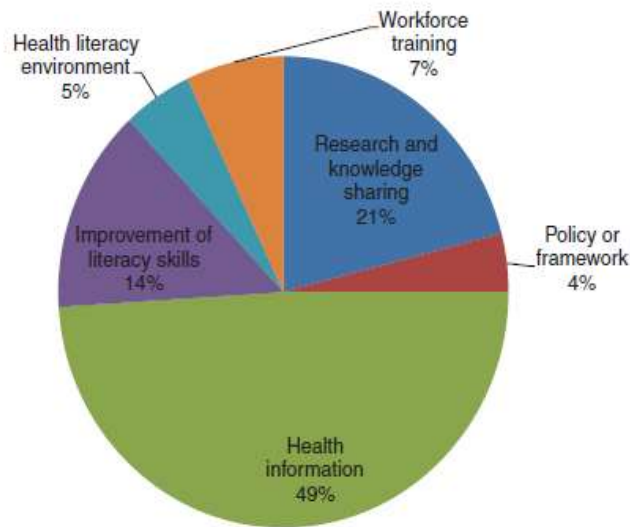


Figure 1: Types of Health Literacy strategies and approaches around the world
Source: Dunbar, (2012) as cited in IOM (2013: 48)

1.2 Health Literacy in Africa: An Overview

Very scanty information on HL is reported from this part of the world and there are almost no comprehensive studies concerning HL in Africa. In most countries in Africa, national overall initiatives for HL have not yet been institutionalized; there is no governmental policy related to health literacy (WAHO, 2009; IOM, 2013); population-wide data has not been documented, and even national health data sets have not so far included this variable. Limited information reporting population-wide HL in Africa are mostly from studies which used DHSS information (Schrauben and Wiebe, 2015; 2017). All in all, some initiatives are reported from Zambia (Davies *et al.*, 2009; Ministry of Health Zambia, 2012) South Africa (Marimwe and Dowse; 2017), Kenya, Zimbabwe, Nigeria (IOM, 2013). Several other infant initiatives are documented in the 2009 report on Health Literacy Capacities in East and Southern Africa (TARSC, 2009). Despite these initiatives being at infancy stages, none of them seems to take on board the fact that attaining optimal health for humans, animals and the environment calls for collaborative efforts between humans, animals and the environmental professionals plus understanding of humans, animals and the environment interactions and its consequences on health.

1.3 Health Literacy in Tanzania: An overview

The situation in Tanzania is not different from the rest of Africa, where very little has been researched and also documented on HL. There are no health data sets with HL variable. No evidence exists in the literature on having HL researched and documented adequately in Tanzania. What exists is very limited. For example, a study by Stone *et al.*, (2011) dealt with the evaluation of the utility of IEC materials for increasing patient HL and how patients perceive such materials on HIV/AIDS. Freer (2015) conducted A Comparative Study of Health Literacy and How Rural Communities Understand Hypertension Information in Uganda and Tanzania.

Despite having very limited studies on HL, still none of the few available has focused on OHA which takes into account the interface of the interaction of animals, humans and the environment. This, however, does not point out to the fact that the place and relevance of HL are not recognised by health policymakers, researchers and practitioners in Tanzania. Studies by Kambarage, *et al.*, (2003) and Karimuribo *et al.*, (2007) indicate the value of public health education programs and how they could impact on public health outcomes under One Health Approach. Despite the situation in Tanzania, it can be observed that there are several policy landmarks which are encouraging comprehensive HL initiatives. These policies include the National Health Research Priorities (2006-2011) which has listed health information being among priorities (NIMR, 2013), One Health Strategic Plan (2015 – 2020) which recognises the fact that attainment of optimal health for humans, animals and the environment requires collaborative efforts between various stakeholders from humans, animals and the environment health-related matters (CDC, 2018); National eHealth Strategy (2012–2018) which supports improved multi-way communication and sharing of information among clinicians, patients, and caregivers within the health sectors and across partner agencies (Ministry of Health and Social Welfare, 2013). Together with these policies, the National Health policy of 2007 aims at creating awareness in individual citizens of responsibility for personal health and health of their family (URT-MOH, 2007).

1.4 Problem Statement

Developing HL among people has been thought to be very important across the world, given the clear association between low HL and poor health outcomes (DeWalt *et al.*, 2004; Sudore *et al.*, 2006, Berkman *et al.*, 2010; U.S. Department of Health and Human Services, 2010; Kambarage *et al.*, 2003), and it's potential to reduce these outcomes. Numerous research efforts have demonstrated that patients with low HL experience poor adherence to medical regimes; poor understanding of the complex nature of their health; a lack of knowledge about medical care and conditions; poorer comprehension of medical information; low understanding and use of preventive services; poorer overall health status; and earlier death (Weiss *et al.*, 1992; Davis *et al.*, 1996; Baker *et al.*, 1997; Doak *et al.*, 1998; Baker, *et al.*, 1998; Bennett *et al.*, 1998; Moon *et al.*, 1998; Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999; Gazmararian *et al.*, 1999a; Kalichman *et al.*, 1999; Nichols-English, 2000; Nielsen-Bohlman *et al.*, 2004). Because of this, several national and international organizations have promoted HL as a research priority (IOM, 2004; AHRQ, 2007; WHO, 2009). Undeniably, low HL results in poor health which affects the quality of the population and it is irrefutable that it can impact negatively any nation's development. Quality population is a crucial parameter for economic development as it provides labourers and consumers of various products and services.

In realisation of the global initiatives and the importance of HL towards national development based on its influence on health outcomes, the government of Tanzania has put in place numerous efforts. These efforts have aimed at improving health services and educating people to become more health literate i.e. to cultivate the knowledge and skills needed to access, understand and use health information, thus enabling and encouraging them to make healthier lifestyle choices (to achieve positive health outcomes for both humans and animals) (URT, 2003a). Despite the efforts, there has been a notable increase in health impairing behaviours (URT, 2007a:11-12; URT, 2007b:34) which sometimes resulted into a higher prevalence of infectious diseases (including zoonotic ones i.e. Tuberculosis, Rabies, *Taenia solium* infestation, Human Brucellosis, etc) (see for example Kassuku *et al.*, 1999; Cleaveland *et al.*, 2002; Minja,

2002), and varying preferences for Tanzanians in terms of seeking healthcare services ranging from traditional healers, self-treatment, and no treatment instead of going to the hospital (Good and Kimani, 1980; Atkinson *et al.*, 1999; McCombie, 2002; URT, 2003b).

It can be observed that the government's efforts (URT, 2003a; 2007a, 2007b) have not realized their intended targets; but what is not empirically known is why these efforts have not realized the intended targets. It remains unclear whether people disregarded information provided through various governments efforts hence did not change their behaviours or the efforts were not effective enough to bring such behavioural changes. Likewise, it is not known whether adequate health and related information were disseminated in various outlets in educating people to become more health literate. It is also not known to what extent people are health literate in the study area; which institutions have been disseminating such information; how effective such institutions have been; and if such information has been presented in a plain language for lay or common people to understand. It is further not known how the interactions between health professionals and patients have managed to facilitate much of health information exchange; how these efforts have enabled people to access, understand and use information in ways which promote and maintain good health; and to which extent such information has managed to improve people's HL and consequently HBs. It is furthermore not known what type/kind of attitudes, beliefs, and perceptions people have on certain health-related practices that have impeded behavioural change.

Adequate health information adds to people knowledge on health-related matters can lead to educating people to become more health literate. In absence of adequate health information, people are likely to have a poor understanding of the complex nature of their health and diseases (symptoms, prevention, and care) plus the outcomes of health-related practices they run into in their daily lives, hence failing to make healthier lifestyle choices. Much as that remains uncontested; there is much that can account for the differences in health behaviours (Wilkinson, 1999; Dutta-Bergman, 2005; Marmot and Airhihenbuwa, 1995; 2007). Lack of clear health communication (Berkman *et al.*,

2011; Sheridan *et al.*, 2011) is cited as a blockade towards health information contributing to HL hence the behavioural change. Others are arguing, knowledge has to be accompanied by attitude change. Airhihenbuwa, (2007:177) argues that “improved knowledge and a change in attitude are the twin engines that generate expected outcomes in behaviour”. Obviously, efforts towards improving health services and educating people to become more health literate to cultivate the knowledge and skills needed to access, understand and use health information, thus enabling and encouraging them to make healthier lifestyle choices in Tanzania (URT, 2003a; URT, 2007a:11-12; URT, 2007b:34) and Africa, in particular, have partly and significantly been relying on the dissemination of fact-based pamphlets, the placement of posters, and mass radio broadcasts (Mboera *et al.*, 2007; URT, 2007a; 2007b; Freer, 2015:16; URT; 2017). These efforts have always had in mind that an individual is “a rational being that, when given the correct knowledge, will make the rational choice of positive behaviour change” (Freer, 2015:16). It is, however, worthwhile to note that there are countless aspects which can preclude an individual from making a “rational” choice or even receiving the information. Other studies (Freudenberg, 2000; Freer, 2015) have identified the systemic issues of poverty, structural constraints, and culture among such precluding factors. Freer (2015:16) argues that “culture is the context that informs behaviours”. Airhihenbuwa (1995, 2007) points out that to effectively address health behaviour within an African context, understanding health within the cultural identity of Africans such that any education intervention is anchored in African ways of knowing is inevitable. The PEN-3 model assumes that health beliefs and actions can be best understood within the context of culture, history, and politics (Airhihenbuwa, 1995; 2007). This review concludes that there are health behavioural changes drivers together with or beyond knowledge. This study investigated these aspects to provide empirical answers, hence filling the information gap on these aspects.

A study by Kambarage *et al.*, (2003) points out that the interaction between humans and animals can result in several consequences including diseases such as human Brucellosis originating from both traditional and dairy animals. This study reports a total of 50000 detected cases, however claiming that there are several disease incidences undetected,

unreported or underreported without pointing out to any empirical reasons for those undetected, underreported and unreported cases. Scholz *et al.*, (2008) among other factors link low awareness being partly the reason for the undetected, underreported and unreported cases incidence. Low awareness by itself indicates apart from other factors lack of information on the interaction between animals and humans and how such interactions impact on health. Lack of a holistic systems approach to understanding health across all species fails to recognise that human and animal health are inextricably linked (Schwabe, 1984; Rweyemamu *et al.*, 2012). Absence of working cooperation between physicians and veterinarians (Rweyemamu *et al.*, 2013) is said to have contributed to this. Karimuribo *et al.* ., (2007) also report on the incidences of human brucellosis in northern Tanzania. The study has been concerned with the need for public health information awareness creation to arrest the situation, among others, the study recommended for an urgent need to develop public health education programmes and to build disease diagnostic capacities. It is obvious that there is a gap on awareness on human and animals' interaction plus its consequences and lack of public health education (which partly constitutes HL) together with limited working cooperation between physicians and veterinarians. Despite pointing out to the issues related to low awareness (Scholz *et al.*, 2008) and the need for public health information awareness creation (Karimuribo *et al.*, 2007) these studies have not empirically studied HL. Other studies (Karimuribo, *et al.*, 2007; Scholz *et al.*, 2008) indicate this situation, existing literature has scantily documented on HL related studies in Tanzania. There is no evidence in the literature on having HL researched and documented adequately in Tanzania. What exists is very limited. For example, Stone *et al.*, (2011) evaluated the utility of information, education and communication (IEC) materials for increasing patient HL and how patients perceive such materials on HIV/AIDS. Also, Freer (2015) conducted a Comparative Study of Health Literacy and How Rural Communities Understand Hypertension Information in Uganda and Tanzania. Several studies have measured HL; however, most of these are based on the developed world; (Baker, *et al.*, 2002; Gazmararian, *et al.*, 2003; Wolf, *et al.*, 2010; Edwards, *et al.*, 2012; Sorensen, *et al.*, 2012; Sun, *et al.*, 2013; Sorensen, *et al.*, 2015). Still, none of these has focused on

OHA, or taken into account of the fact that attaining optimal health for humans, animals and the environment calls for collaborative efforts of various professionals plus an understanding of humans, animals and the environment interactions and its consequences on health. Apparently, HL is context-specific, i.e. its function, acquisition, and application should be studied and understood in the light of distinct contextual conditions (Nutbeam, 2000; Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009). It is obvious that public health and clinical settings may each require a different research approach to HL (Nutbeam, 2000; Peerson and Saunders, 2009; Sorensen *et al.*, 2012).

This is an indication that the reality concerning HL, HBs, and HCSB, how effective the government of Tanzania efforts are perceived in educating people to become more health literate is not known, likewise how HL has influenced this situation observed (with respect to HBs). Furthermore, it is not known how the observed HBs connects to the levels of HL, if the efforts have been effective how and why people continue with the observed HBs, how people evaluate their HB (attitudes), how do they perceive (self-rate) their accessing and understanding of HI, also their HBs. It is worthwhile to note that no comprehensive studies have been undertaken on this aspect in Tanzania. This study, therefore, fills the knowledge gaps existing in previous studies (Kambarage *et al.*, 2003, *et al.*, 2007; Scholz *et al.*, 2008) and it also provides an empirical explanation with respect to the observed problematic HBs (URT, 2003a; 2007a; 2007b) by empirically establishing what contributed to this situation. Given that, the study has contextualized HL in the interface of humans, animals and the environment in Tanzania which represents a different reality from these other studies.

In realization of the above, the study empirically assessed the degree to which individuals have the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions in the context of the interface of humans, animals, and the environment. The study further assessed how such capacities have created impacts on influencing individuals' HBs and HCSBs reflecting on OHA. Also, this study assessed the collaborative efforts of professionals

from veterinary and medical disciplines working to empower people to access health information and improve their capacity to use it effectively. The study further assessed the initiatives of the government and development partners in Tanzania on formulating sensitisation programmes to raise public awareness and HL and how such efforts have impacted on HL by examining the health effects of low HL on health behaviour and consequently on healthcare-seeking behaviour which impacts on health status/living. It is against that background that this study established the realities in terms of HL status, HBs and attitudes of the people towards health impairing practices in the study area through those individuals' self-reporting or self-rating approach (perceptions) and how HL influences HBs (connection) under OHA. The study further analysed the efforts by the government of Tanzania in educating people to become health literate towards healthier lifestyle choices.

1.5 Justification for the Study

This study is in line with various international and national conventions including the Sustainable Development Goals (SDGs), goal number three that calls for ensuring healthy lives and promoting well being for all at all ages towards sustainable development by 2030 (Osborn *et al* ., 2015; UNDP, 2016). It is obvious; that, the realization of the other 16 SDGs– greatly depends on better health. HL can contribute towards better health much as it is a powerful social determinant of health.

Cognizant of the importance of health information which partly forms HL, health information has been listed under medium priority under Tanzania's National Health Research Priorities, 2006-2011 (NIMR, 2013). Tanzania Development Vision (TDV) 2025 also identifies health as one of the priority sectors. Among TDV's main objectives is to achieve high-quality livelihood for all Tanzanians (URT, 2007a; 2007b). This study is also in line with Tanzania's National Research and Development Policy (URT-MoCST, 2010), NIMR Act of 1979 (NIMR, 2013) and Tanzania National Health Policy of 2007 (URT, 2003a, 2007a), which clearly spells out the need for health and related researches towards national development.

Several initiatives and studies have raised awareness on the importance of HL to health, increased uptake of healthy behaviours and health care which have drawn attention to the need for measures of HL, see for example AHRQ, (2007) and URT, (2011a) based on evidence that there is a relationship between HL and health outcomes. The study contributes to this important aspect which impacts on health outcomes. Evidence also exists on how incomplete national health datasets without HL measurements are in most countries, Tanzania inclusive. HL is very central to making effective decisions on health-related aspects and a very important and powerful tool for improving health. The study bridges this gap.

The study contributes significantly to initiatives of improving health and well being of citizens as it is obvious that there is a need for Tanzania to considerably make advance in governance, health, and healthcare systems, to avoid the risk of overwhelming an already-fragile social service system and eroding future economic gains. Advancement in health and healthcare systems needs substantial investment in research in health aspects, HL inclusive.

HL promotes empowerment, which in turn is vital for achieving the internationally agreed health and development goals as well as the emerging threats such as from the pandemic influenza, climate change, and non-communicable diseases. This calls for deeper understanding, application, and investment in HL under the One Health Approach. Due to increased interactions between humans, animals and the environment the world is registering several observations on how such interactions are affecting the health of each other for this reason then need for measures to counteract.

Findings from the study provide inputs into policymaking processes, research, and academic-related activities in Tanzania given the fact that the variable under this study is scantily researched and documented in Tanzania. It is evident that national health data sets in Tanzania have not documented this important variable.

1.6 Purposes and Significance of the Study

This study assessed the level of HL, exhibited HBs and the health source preferences among people plus its determinants and how they influence each other in the study area following observed problematic HBs and varying preferences in terms of health-seeking despite the efforts by the Tanzanian government to educate people to become health literate. This study assessed the initiatives of the government and other development partners in Tanzania on formulating sensitisation programmes on HL and how such efforts have impacted on HL and consequently HB. The study investigated empirically what prompted the observed HBs after all these efforts.

The study adapted the HL assessment tools/measurements and applied them in the context of Tanzania to reflect the Tanzanian socio-economic and environmental conditions and hence developed a context-specific approach to measure HL under the One Health Approach (OHA), an approach that recognises the inextricable interaction of humans, animals and the environment plus its consequences on health.

Understanding how health literate people are in the context of OHA could facilitate the attainment of optimal health for humans, animals, and the environment. This is because health literacy is a powerful social determinant of health. A health literate individual stands a good chance of managing his/her health very well. The findings from the study could assist to fill a gap in national health data sets which lacked measurements in HL and provide baseline information towards the formulation of HL interventions and programs.

The study has developed a tool specifically for measuring HL in the context of the interaction of humans, animals, and the environment. Other studies can be conducted to assess HL in other areas of Tanzania and beyond using this tool. These studies will fill the gap in the national health research which at the moment has had very little on the HL aspect. This particular tool has taken into account the fact that HL is context-specific, i.e. its function, acquisition, and application should be studied and understood in the light of distinct contextual conditions.

Identified and assessed collaborative efforts and strategies of health professionals and various related professionals (i.e environmental, wildlife and other interested parties) to attain optimal health for people, animals, and the environment can set a background on understanding the extent to which OHA is being practised. This can then enable scaling up of such practices wherever there is a need for that. The fact that optimal health for a respective health sub-sector requires an understanding of humans, animals and environment interactions and its consequences on health is acknowledged by policymakers in the humans, animals and the environment health subsectors. The understanding by those policymakers in health-related sub-sectors will help in creating appropriate policy and institutional frameworks that will promote collaborative working relationship and programmes. Recently, the government of Tanzania issued her One Health Strategic Plan (2015-2020), what has been documented by this study conducted in Morogoro, Tanzania established reality on what has so far been realized since that strategic plan was put in place.

Findings from the study will add value to the already existing debates among scholarly and policy literature on one health and population. This study is premised within the subject of the population in general and health in particular. It adds to the theoretical literature on the existing nexus among HL, HB, health and its influence on the quality of the population. Indeed, the findings contribute to the resource base available for training the next generation of scholars on population and one health, HL and HB.

The study specifically contributes to the body of knowledge by proposing an HL-HB-HCSB Nexus Analytical Framework for further studying the connections that exist between HL, HB, and HCSB in other contexts. This analytical framework is very vital at this particular moment when the need for educating people to become more health literate is very pertinent.

1.7 Objectives of the study

1.7.1 Overall Objective of the Study

This study assessed HL levels and its influence on HB and healthcare-seeking behaviour (HCSB) plus attitudes of people on HB under One Health Approach (OHA) in selected wards in Morogoro urban and Mvomero districts in Morogoro, Tanzania.

1.7.2 Specific Objectives

This study specifically:-

- (i) Assessed HL under OHA among the people in the study area
- (ii) Analysed HB and HCSB under OHA
- (iii) Analysed individuals' attitudes on HIBs under OHA.
- (iv) Assessed determinants of HL under OHA
- (v) Assessed determinants of HB under OHA
- (vi) Assessed determinants of HCSB under OHA.
- (vii) Identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary) and other interested parties — to attain optimal health for people, animals, and the environment.
- (viii) Determined the linkage between HL, HB, and HCSB under OHA.
- (ix) Assessed stakeholders' initiatives in building public health capacity
- (x) Assessed stakeholders' initiatives in developing HL and empowering people to manage their health.

1.7.2.1 Research Questions

- (i) How health literate are the people in the study area with a reflection on OHA?
- (ii) Which practices or actions people have been involving themselves impacting on their health and from which sources do they prefer to seek health care?
- (iii) How do individuals evaluate their practices or actions impacting negatively on health under OHA?
- (iv) Which factors have the potential to influence HL under OHA?
- (v) What factors have the potential to influence HB under OHA?
- (vi) Which factors have the potential to influence HCSB under OHA?

- (vii) What are the collaborative efforts and strategies of various stakeholders — to attain optimal health for, people, animals, and the environment and how effective are such efforts in the study area?
- (viii) What are the linkages among HL, H, and HCSB under OHA?
- (ix) Are there initiatives in building public health capacity in the study area?
- (x) Are there any initiatives (by the government or non-governmental organisations) in developing HL and empowering people to manage their health and how effective are such initiatives?

1.7.2.2 Hypotheses for the study

1. Null: Health literacy does not differ significantly among individuals exhibiting health-enhancing behaviours and those with health impairing behaviours under OHA.
2. Alternative: Health literacy differs significantly among individuals exhibiting health-enhancing behaviours and those with health impairing behaviours under OHA.

1.8 Chapter Summary

This study assessed HL levels, HB and HCSB under OHA in Morogoro, Tanzania. Additionally, this study assessed the influence of health literacy (HL) on health behaviour (HB) and healthcare-seeking behaviour (HCSB), and the attitudes of people on health impairing behaviours (HIBs). The study is informed by problematic nature of HBs observed through existence of HIBs sometimes resulting into a higher prevalence of infectious diseases (including zoonotic ones) and varying preferences for Tanzanians in terms of seeking healthcare services (instead of going to hospital) despite the efforts of the government of Tanzania aimed at improving health services and educating people to become more health literate by promoting the knowledge and skills needed to access, understand and use health information, thus enabling and encouraging them to make healthier lifestyle choices. In the context of limited empirical information on what hindered government's efforts to have realized its anticipated targets, there is the need to understand and situate the efforts of the government to educate people to become health literate, given the influence of HL on health and consequently the impact of health over the quality of population, an important parameter in economic development.

The study is theoretically guided by PEN-3 model which acknowledges the potentiality of health education in empowering People, Extended Family and Neighborhood (PEN) to make informed health decisions appropriate to their roles in their families and communities. It further acknowledges the presence of Perceptions, Enablers, and Nurturers (PEN) within a cultural context, that may facilitate or hinder personal, family, and community motivation to change, based on the degree to which health beliefs, attitudes, and actions are influenced and mediated, or nurtured, by extended family, kin, friends, peer, and the community. The model assumes that there is Cultural Empowerment reflected in Positive Behaviour, Existential Behaviour and Negative Behaviours (PEN). Examining and understanding these aspects within their cultural, historical, and political context before attempting to change them is the only way that health education efforts can succeed. Other theories have been adapted/adopted to explain other specific variables under specific objectives of this study.

1.9 Organization of the Thesis

This thesis is organised into six chapters. Chapter One provides an introduction, background information about health, health behaviour and healthcare-seeking behaviour under One Health Approach at the global, regional and national level plus problem statement, study objectives and hypotheses for the study. Chapter Two is on the literature review and theoretical framework. Chapter Three covers the methodology for the study, which clarifies the key methods for field investigation used in this study. Chapter Four provides a general overview of the findings. Chapter Five discusses the findings in relation to other studies. Chapter Six presents conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Theoretical Literature Review

2.1 Tanzania: Geographical Overview

The United Republic of Tanzania is the largest country in East Africa, found between latitude 1° S - 12° S and longitude 29° W and 41°E with a total area of about 947,300 sq. km. (land coverage 885,800 sq. km. and water coverage 61,500 sq. km.) Tanzania lies south of the equator bordered by Kenya and Uganda to the North; Rwanda, Burundi, the Democratic Republic of Congo, and Zambia to the West; and Malawi and Mozambique to the South. Administratively, Tanzania Mainland is divided into 25 regions, and Zanzibar is divided into 5 regions. Each region is subdivided into several districts (URT, 2007b; URT, 2014a; MoHCDGEC *et al.*, 2016).

Tanzania has a wealth of inland water, with numerous lakes and rivers. It is a home to Lake Tanganyika, Africa's deepest, longest freshwater lake and the world's second deepest lake, which runs along the western border. Lake Victoria, the world's second-largest lake which drains into River Nile and flowing into the Mediterranean Sea, is also found in Tanzania. The Rufiji River is Tanzania's largest river which drains into the Indian Ocean and the Kagera River which empties into Lake Victoria. The Great Rift Valley is Tanzania's most unique geological feature, which resulted out of geological faulting throughout Eastern Africa and is connected with volcanic activity in the north-eastern regions of the country. The Great Rift Valley has the western branch (running through Lakes Nyasa, Tanganyika, and Rukwa) and the Eastern branch ending in northern Tanzania, (which holds Lakes Natron, Manyara, and Eyasi. Tanzania mostly lies 200 metres or above sea level and much of the country is above 1,000 metres except for a narrow belt of 900 square kilometres along the coast. In the North, Mount Kilimanjaro rises to 5,895 metres—the highest point in Africa. A long dry spell spreading from May to October, followed by a period of rainfall between November and May characterize the climatic feature for most of the country. The peak rainy season is

expected between March to May, for the coast and nearby Mount Kilimanjaro, while short periods of rain experienced between October to December. Western Tanzania (particularly nearby Lake Victoria) is reported to have rainfall well distributed all over the year, reaching its peak between March and May (MoHCDGEC *et al*, 2016:1).

2.2 An overview of the Economy of Tanzania

Tanzania has a mixed economy mainly comprising agriculture, mining, and industrial sectors. Agriculture involves crop growth, animal husbandry, forestry, fishery, and hunting. The agricultural sector in Tanzania is a key driver of social and economic development in the country. The sector generates 26.8 per cent of the GDP, 24 per cent of exports, employs over 75 per cent of the rural population where the majority of the poor reside (URT- MAFSC, 2014a). In 2015, the agricultural sector growth declined to 2.3 percent compared with growth of 3.4 percent in 2014 (NBS *et al.*, 2015). In the current economy, activities in the service industry account for 52 percent of the gross domestic product (GDP). Tanzania's manufacturing sector is still small and spread-out, with no specific industrialisation pattern. Up to 2006, it contributed to about 8.5 percent of GDP, before rising to 9.9 percent in 2008. Its performance in recent years has shown impressive trends: fast annual growth rates, exports, and capacity utilisation (URT, 2012). There is a strong interrelationship between agricultural sector performance and the growth and employment generation of the industrial sector, and other key sectors. However, the sector is dominated by small scale subsistence farmers characterised by low productivity (URT- MAFSC, 2014a). Tanzania's economy is reported to have continued to post impressive growth with a rate of more than 6 per cent over the past year, "with a GDP growth rate of 6.5 per cent during 2011/12 and manageable fiscal and current account deficits (URT, 2014b; World Bank, 2017).

2.3 Human Demographical Parameters

According to URT (2013), the latest 2012 census recorded the population of Tanzania at 44.9 million, the life expectancy at birth standing at 62 years and projected population being 50.1 million as of 2016. Tanzania population growth rate has declined from 3.3 per cent in 1967 to 2.7 per cent in 2012. Tanzania Mainland shows a decline from 3.2

per cent in 1967 to 2.7 per cent in 2012, whereas, in Tanzania Zanzibar, the growth rate increased from 2.7 per cent in 1967 to 3.1 in 2002 and then declined to 2.8 per cent in 2012 Census (NBS, 2006; URT, 2011b).

Tanzania is still sparsely populated despite its population having increased four times its earlier size in the past four decades. Despite the dispersed population, density is high in some parts of the country and has been increasing over time. The average population density was reported to stand at 51 persons per square kilometre by 2012 (NBS *et al.*, 2016). The population of Tanzania has continued to be predominantly rural despite the increase in the proportion of urban residents over time, from 6 percent in 1967 to 30 percent in 2012 (NBS *et al.*, 2016). The average household size in Tanzania remained almost constant between 2002 and 2012 Censuses. Average household size was found to be 4.9 persons per household in 2002 and 4.8 in 2012, with variations among regions.

2.4 Health, Population Policies, and Programmes: An Overview

Over the last decade, the global health agenda has converged around proposals for the construction of policies and interventions towards greater equity. Despite the great diversity in their historical and institutional contexts, developing countries face similar health care challenges, including inequity regarding access to services and quality medicines, the prevention, and control of communicable and non-communicable diseases, and the strengthening of capacities in scientific and technological development. Realization of the fact that universal access to health care and medicines has an impact on poverty and social inclusion has led to the formulation and implementation of diverse interventions to improve the provision, access, and quality of health services and products (International Policy Centre for Inclusive Growth, UNDP, 2016).

Globally, population policies have intended to provide a framework and guidelines for the integration of population variables in the development process. The priority focus of new population policies for the 21st century is considered to be on human capital development in particular education and health (Lutz, 2014; Lutz and Kebede, 2018).

Cognisant of the fact that domestic and global health are indivisible and that no country can protect the health of its citizens in isolation from the rest of the world, the government of Tanzania has formulated the health, population policies and programmes in line with global health and population agenda.

2.4.1 National Population Policy (2006) in Tanzania

The National Population Policy was adopted in 1992 by the government of the United Republic of Tanzania. In 2006, the policy was reviewed to provide room for numerous national and international developments which emerged during the time which had a direct bearing on population and development (URT-Ministry of Planning, Economy and Empowerment, 2006). Among others, the revised policy intended to provide a framework and guidelines for the integration of population variables in the development process. Specifically, the guidelines addressed issues related to- (i) determining priorities in population and development programmes, (ii) strengthening the preparation and implementation of socio-economic development planning, and (iii) coordinating and influencing other policies, strategies, and programmes that ensure sustainable development. The prime concern of the revised 2006 Tanzania's National Population Policy has been to improve the standard of living and quality of life of the population in the country. The central goal of the policy is to direct development of other policies, strategies, and programmes that ensure sustainable development of the people.

The 2006 National Population Policy had specific goals which focused on: (i) attainment of gender equity, equality, women's empowerment, social justice, and development for all, (ii) sustainable development and eradication of poverty, (iii) harmonious interrelationships among the population, resource utilisation, and the environment, and, (iv) increasing and improving availability and accessibility of quality social services (URT-Ministry of Planning, Economy and Empowerment, 2006).

It can be noted that this particular policy among others intended to provide room for numerous national and international developments which had a direct bearing on population and development. As explained in sub-sections 1.0 and 1.3 that quality population is a crucial parameter for economic development (URT, 2003b; URT, 2007b;

Lutz, 2014) and evidently (DeWalt *et al.*, 2004; Sudore *et al.*, 2006). Among other factors, the quality of a population is determined by good health, which is significantly influenced by HL. In this context, the 2006 National Population Policy is one of the policy landmarks that can encourage comprehensive HL initiatives much as it focuses on several national and international developments having a direct bearing on population and development.

2.4.2 Tanzania Development Vision 2025

Tanzania Vision 2025 (formulated in 1998) offers direction and philosophy for long-term development to be attained by 2025. Health is identified by the vision as one among priority sectors contributing significantly to a higher quality of livelihood for all Tanzanians. This is expected to be accomplished through numerous strategies that will accomplish health service goals including (i) access to quality primary health care for all, (ii) access to quality reproductive health service for all individuals of appropriate ages, (iii) reduction in infant and maternal mortality rates to three-quarters of 1998 levels, (iv) universal access to clean and safe water, (v) life expectancy comparable to the level attained by typical middle-income countries, (vi) food self-sufficiency and food security, and, (vii) gender equality and empowerment of women in all health parameter (URT, 2007b; MoHCDGEC *et al.*, 2016).

Similarly, these policies explained in sub-sections 1.3 and 2.4.1 are setting policy landmarks that can encourage comprehensive HL initiatives. This is because Tanzania Development Vision 2025 identifies health as one among priority sectors contributing significantly to a higher quality of livelihood for all Tanzanians.

2.4.3 Big Results Now Initiative

In an attempt to transform the country to a middle-income economy, the government of Tanzania has put up many efforts. As part of such efforts, the government of Tanzania, beginning of the 2013/2014 financial year, has put in place its development outlook—The Big Results Now (BRN) initiative. The National Key Result Area (NKRA) in health care was introduced in the Big Results Now approach in 2014. This health-related key result area joined other key result areas adopted by the Government of Tanzania (GOT)

in 2013. The goal was to enhance the implementation of the 5-Year Development Plan 2011/12–2015/16 and Vision 2025. The health care NKRA is the eighth area under the Big Results Now programme. BRN activities constitute the core of the Health Sector Strategic Plan (HSSP) IV and are fully integrated. The twenty-two (22) initiatives listed in the health care NKRA will continue beyond June 2018 (MoHCDGEC *et al.*, 2016).

Big Results Now Initiative together with the discussed programs and policies under those subsections complement each other towards setting policy landmarks that can encourage comprehensive HL initiatives. Obviously, any investment geared towards attaining optimal health for humans, animals and the environment has to take into consideration HL issues among others.

2.4.4 Tanzania Health Policy of 2007

Various successes and challenges in the health sector in Tanzania are outlined in the Health Policy of 2007. The vision of this policy is having a healthy society, with improved social wellbeing contributing effectively to personal and national development. The mission is to provide basic health services in accordance with geographical conditions, which are of acceptable standards, affordable, and sustainable. The policy prioritises the provision of health services to those most at risk and satisfies the needs of citizens to increase the lifespan of all Tanzanians. Specifically, it targets: (i) reducing morbidity and mortality to increase the lifespan of all Tanzanians by providing quality health care, (ii) ensuring that basic health services are available and accessible, (iii) preventing and controlling communicable and non-communicable diseases, (iv) sensitising the citizens to preventable diseases, and (v) creating awareness in individual citizens of responsibility for personal health and health of their family, (vi) improving partnership among the public sector, private sector, religious institutions, civil society, and community in the provision of health services (URT-MoH, 2007).

Among others, the document looks at health policies and statements in the following areas:

- Non -communicable diseases: Promote healthier lifestyles and adequate treatment

- Maternal and child health: Reduce maternal and child mortality in line with MDGs
- Reproductive health: Make services available, especially for youth and men
- Health education and advocacy: Get across the message that every individual can improve his or her health status
- Environmental Health: Promote a sustainable healthy environment for the whole community
- Traditional medicine and traditional midwives: Increase coordination and partnerships
- Cells and genome: Develop proper use of technology of genetic engineering
- Control of food, medicines, other: Ensure foods are safe and meet defined standards
- Coordination in the health sector: Participatory, transparent, and sustainable system for all stakeholders
- Human resources development: Provide sufficient staff with the required skills mix

In connection with what policies, programs, and initiatives are targeting, the Tanzania Health Policy of 2007 is likewise setting policy landmarks that can encourage comprehensive HL initiatives. This policy, among others, is targeting at creating awareness in individual citizens of responsibility for personal health and health of their family. It also focuses on health education and advocacy that is getting across the messages that every individual can improve his or her health status. These are very important aspects of the creation of a health literate society. These foci and the targets of the Tanzania Health Policy of 2007 connect very well with what Sørensen *et al.*, (2012) claim what it takes to be a health literate individual. That is placing one's health and that of one's family and community into context, understanding which factors are influencing it, and knowing how to address them. An individual with an adequate level of HL can take responsibility for his/her health as well as one's family health and community health.

The policy is further specifically targeting at preventing and controlling communicable and non-communicable diseases. The focus of the policy on non -communicable diseases is on promoting healthier lifestyles and adequate treatment. It also has another focus on environmental health explicitly on promoting a sustainable healthy

environment for the whole community (URT, 2007a; 2007b). The implications of the focus and targets of the policy partly indicate that there is a need for collaborative efforts for professionals from various sectors for such interventions to be effective. Obviously, if non -communicable diseases have to be dealt with and sustainable healthy environment to be promoted, the need for humans, animals, and environmental professionals to work together is inevitable. Promoting healthier lifestyles requires raising people awareness which partly can be done by HL. Implicitly, this policy connects very well with Tanzania's One Health Strategic Plan (2015–2020). One Health Strategic Plan recognises the need for shared commitment to enhance collaboration among human, animal, and wildlife health sectors to reduce the burden of zoonotic diseases (CDC, 2017; 2018).

2.4.5 One Health Strategic Plan (2015–2020)

Tanzania's 5-year *One Health Strategic Plan* (2015–2020) is the country's first national One Health strategic plan developed using a multisectoral approach and has drawn expertise from various sectors reflecting a shared commitment to enhanced collaboration among human, animal, and wildlife health sectors to reduce the burden of zoonotic diseases (CDC, 2017; 2018). The plan is a whole-of-government guiding document aimed at summarizing operations and activities among various stakeholders. It also aims to create and maintain active collaboration between the sectors for the prevention and control of zoonotic diseases to ensure that there are timely preparedness and a consistent and coordinated response should a zoonotic event occur. To achieve this, the plan established a "One Health Coordination Unit (now referred to as the One Health Coordination Desk)," which continues to evolve, enhance, and refocus One Health programmes to meet existing and impending challenges. To support the unit, a One Health Steering Committee comprising permanent secretaries of participating ministries under the PS PC and four technical working groups (TWGs) were created, including Training, Advocacy, and Communication; Research and Development; Surveillance; and, Preparedness and Response (CDC, 2017; 2018).

This strategic plan on One Health is very important in the sense that it sets a formal/institutionalized entry towards creating and maintaining active collaboration between the sectors for the prevention and control of zoonotic diseases. It is worthwhile to note that the lack of participatory health policy that focuses on multi-sectoral contributions has been previously cited to be a major hurdle towards One Health practices (Mbugi *et al.*, 2012:2). This policy is intending to address these issues.

In conclusion, it can be observed that despite having no Tanzania overall institutionalized national initiatives for HL. Several policy landmarks are encouraging comprehensive HL initiatives. These policies recognise that for optimal health to be realised collaborative efforts are inevitable.

2.5 Health Literacy, Health and Quality of Population: Connections

There is a complex connection existing between health and demography. Studies (Leone, 2010; Grundy and Murphy, 2015) indicate how valuable health issues are to demographers. The health of a population is connected to an organised effort to protect and improve the health of a community. There is a significant contribution from demographers in these common efforts. The usual topics shared by demographers, epidemiologists and other health specialists comprise low birth weight, infant mortality, suicide, and contraception among others. These messages are very much connected to HL.

Moreover, demographers have significantly invested in the social questions which emerged at the end of the 20th century, including gender inequality and age discrimination. For instance, they produced significant work on “missing” females in developing countries. They became the main data providers for monitoring United Nations policies in terms of human rights, such as gender, ageing or disability mainstreaming, through participation in survey programmes such as the Generations and Gender Programme (Robine and Jagger, 2007) and implementation of specific ageing or disability surveys at national or international levels. Health is always an important

component of these surveys and monitoring health systems or health service access are often used to highlight inequalities between socially advantaged and disadvantaged.

More demographic motivations such as population ageing, the lengthening of life and the emergence of extremely old persons also led the demographers to take a greater interest in population health. The introduction of health in the life table, allowing the years lived and the life expectancy to be decomposed in different kinds of years according to available health information, is an example of this new interest. Henceforth, the calculation of life expectancy is completed in many countries by the calculation of disability-free life expectancy or by the calculation of life expectancy in good perceived health (example for the UK see Breakwell and Bajekal, 2006). The Chinese Longitudinal Healthy Longevity Survey (Yi, 2004) is a good example of the new demographic surveys aiming at providing health and functioning data at the national level. Such surveys allow disability-free or active life expectancy to be calculated and the prevalence of functional dependency of the oldest old to be estimated. By this means, health expectancy as a measure of population health became a major topic in demography.

The connection between health literacy, health behaviour, health and quality of population on national development is very clear. This connection is very well articulated both explicitly and implicitly in various Tanzanian national health, population and development policies and programmes (see 2006 Population Policy, Vision 2025, and 2007 National Health Policy). A population is a source of labour for the production of goods and services and is responsible for the consumption of various products. The size, structure, distribution, and quality of a population are among the important parameters for economic development (URT, 2007a; 2007b). For this to be effective, a particular population has to be healthy and for that matter, optimal health can be attained if people are health literate. Health-literate individuals who can have the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions, plus the cognitive and social skills which determine the motivation and ability to gain access to, understand and use

information in ways which promote and maintain good health (Ratzan and Parker, 2000; WHO, 2009; TARSC, 2009; Berkman *et al*, 2010; U.S. Department of Health and Human Services, 2010).

A well-elaborated discussion on how HL, HB, health, and quality of population are connected towards national development has been covered on sub-sections 1.0, 1.3, 2.4.1, 2.4.2, 2.4.4, and 2.4.5. The discussion has reflected a lot on the health, population and related policies and programs in Tanzania.

2.6 Humans, Livestock and Wildlife Interface in Tanzania: Consequences, Intensity, and Interventions

Human-wildlife conflict (HWC) has a history that is as old as human civilization, yet currently, the phenomenon poses a serious environmental challenge for human society. Both due to their bio-geographical and social characteristics, developing regions of the world particularly seem to be vulnerable to this problem (Anand and Radhakrishna, 2017). Innumerable studies (Dickman 2010; Gebreyes *et al.*, 2014) have reported the consequences, intensity, and interventions on humans, livestock and wildlife interface at the global level. Though the impacts of zoonotic EIDs in less developed countries (LDCs) are excessively high, they are still a major concern globally. The impacts are highly felt in LDCs due to the existence of risk factors such as a high rate of population growth, lack of infrastructure and skilled-manpower capacity to tackle disease outbreaks, and lifestyles in which daily life depends on animals (Gebreyes *et al.*, 2014). Southern and East African countries are rich in ecosystems where humans, livestock and wildlife populations are in close proximity and serviced by the ecosystem services such as water, land and fauna resources. In the course of mingling, there are possibilities of sharing pathogens which consequently may lead to outbreaks of zoonotic agents in the concern populations.

In Tanzania, various studies were conducted in the past decade which determined the presence of zoonotic agents, the burden in individual populations, the dynamics and

drivers of disease transmissions at the human-livestock-wildlife interfaces (Kazwala, 2016).

Tanzania's economy mainly depends on agriculture, a sector that employs about 85 percent of its population. Livestock production, which has been increasing in the past years, is limited by disease occurrence (e.g. FMD) and large areas that are infested by tsetse flies especially in wildlife protected zones in the country (Picado *et al.*, 2011). Tanzania is endowed with a large number of animal resources that contribute to the wellbeing of the people through the provision of food, employment, transportation, animal by-products, draught power, and manure. According to Tanzania's 2007/2008 livestock census (NBS, 2012), the country has a total of 2,329,942 households raising livestock. Tanzania ranks third in Africa in terms of cattle population after Ethiopia and Sudan with 21,280,875 cattle, 15,154,121 goats, 5,715,549 sheep, and 1,584,411 pigs. Yet, livestock diseases are threatening the survival of this important resource for the survival of a large number of households. The contribution of livestock sub-sector to total Gross Domestic Product (GDP) has been recorded to be 4.7 per cent and grew at a rate of 4.2 per cent, according to the 2007/2008 livestock census (NBS, 2012). Out of the livestock share of GDP of 4.7 per cent, 40percent comes from dairy cattle, 30percent from beef cattle and the remaining 30percent from shoats, pigs, poultry and game production. This sub-sector contribution is considered far below what would have been expected and most shortcomings can be attributed to the presence of animal diseases that affect production and impact on local and international trade of animals and animal products (NBS, 2012). Of all Transboundary Animal Diseases (TADS), FMD was ranked first (Otte *et al.*, 2004).

Studies (Kambarage *et al.*, 2003; Karimuribo *et al.*, 2007; Kayunze *et al.*, 2012) report several consequences which are resulting from the interaction between humans and animals including diseases such as humans brucellosis, rabies originating from both traditional and dairy animals. A report by ILRI as cited by Grace *et al.*, (2012) has identified zoonoses as main obstacles to poverty alleviation, affecting a significant number of livestock keepers. The report estimated that there are over 2,500,000,000

cases of human illness and 2.7 million deaths annually due to the top 56 zoonoses. Also, the report estimated this group of diseases infected more than one in seven of the livestock found in less developed countries.

2.7 Definition of Health

Health can be understood from both Mechanical/Medical Conceptualization and an Ecological (Holistic) Model or Framework (Dahlgren and Whitehead, 1991; Capra, 1997; Naidoo and Wills, 2000).

2.7.1. Mechanical / Medical Conceptualization

Health is the absence of diseases, and ill health is the presence of diseases. The causation of disease presence or non-presence, and hence of a state of ill health or health, is examined at the level of the individual.

2.7.2. Ecological (Holistic) Model or Framework

Ecological (Holistic) Model or Framework focuses on the interconnections as well as the parts, giving individual and context, process and outcome equal importance. Personal health is seen as the product of connections between mind, body, spirit, emotions, and society; population health, as an emergent property arising from the interactions of individual, environmental, material and social relations; and global health as the outcome of all these interactions worldwide. The level of health experienced or attainable by an individual, community or population is a direct result of the interaction and quality of the relationship between the various determinants of health.

2.8 Health Literacy (HL)

HL is a term introduced in the 1970s (Simonds, 1974) and of increasing importance in public health and healthcare. HL is a relatively new concept in health promotion describing a range of outcomes to health education and communication activities (Nutbeam, 2000: 259). HL has gained importance on the European health agenda. The concept of 'HL' was originally used in the United States and Canada; however, it is now being used internationally, not only in health care but also within the public health

context (Kickbusch and Maag, 2008; Pleasant and Kuruvilla, 2008; European Commission, 2007; World Health Organization; 2012a; Kickbusch *et al.*, 2013).

There are several definitions of HL (IOM, 2004; WHO, 2009; Pleasant and McKinney, 2011). This is because HL involves the context (or setting) in which HL demands are made (e.g., health care, media, internet or fitness facility) and the skills that people bring to that situation (Rudd, *et al.*., 1999). Health literacy, as defined by the Institute of Medicine (IOM, 2004), is “the degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health decisions.” This capacity includes the ability to interpret documents, read and write prose (print literacy), use quantitative information (numeracy), and speak and listen effectively (oral literacy) in a health care setting. HL is the ability to obtain, read, understand and use healthcare information to make appropriate health decisions and follow instructions for treatment. HL is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (IOM, 2012; Sun *et al.*; 2013). HL is commonly defined as an individual's "ability to gain access to, understand and use health information" for promoting and maintaining health (Nutbeam, 2000: 263). It can be examined by "the degree to which individuals and communities have the capacity to obtain, process, and understand basic health information and services" needed to make appropriate health decisions (IOM, 2004). It describes the achievement of a level of knowledge, personal skills, and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions. Skills in social organization and advocacy are also an integral component of HL (Nutbeam, 2000). According to Sørensen *et al.*, (2012) being health literate means placing one's health and that of one's family and community into context, understanding which factors are influencing it, and knowing how to address them. An individual with an adequate level of HL can take responsibility for one's health as well as one's family health and community health.

2.8.1 A Three-Level Hierarchy in Health Literacy

Nutbeam (2000:263) has proposed a three-level hierarchy in HL: basic/functional literacy, through communication/interactive literacy to critical literacy.

Functional HL - basic reading and writing skills to be able to function effectively in a health context.

Interactive HL - more advanced cognitive and literacy skills, to participate in health care.

Critical HL - the ability to analyse critically and to use the information to participate in action to overcome structural barriers to health.

In the context of this study, all three levels were considered hence HL was assessed by reflecting aspects related to all the levels (see sub-section 4.2).

2.8.2 Determinants of Health Literacy

HL is dependent on individual and systemic factors, including; communication skills of laypersons and professionals i.e. reading level, numeracy level, language barriers, cultural appropriateness, format and style, sentence structure, use of illustrations, interactiveness of the intervention, and numerous other factors that affect how easily health information is understood and followed. Some investigators have elucidated the relationship between limited HL and socioeconomic indicators, health behaviours, and health outcomes (Sayah and Williams, 2012; Edwards *et al*, 2012). According to the Department of Health and Human Services (US), Office of Disease Prevention and Health Promotion (*n.d*)¹ the ideas about health and behaviours are shaped by the communication, information, and technology that people interact with every day. Health communication and health information technology (HIT) is central to health care, public health, and the way our society views health. These processes make up the context and the ways professionals and the public search for, understand and use health information, thereby significantly impacting their health decisions and actions.

¹Department of Health and Human Services (US), Office of Disease Prevention and Health Promotion. Health literacy online: A guide to writing and designing easy-to-use health web sites [Internet]. Rockville, MD: Office of Disease Prevention and Health Promotion. Available from: <http://www.health.gov/healthliteracyonline/why.htm>

In the conceptual model developed by Paasche-Orlow and Wolf (2007) (Fig.2), HL, which is affected by socio-demographic and economic characteristics (including the level of education reached, ethnicity, age, occupation, and income) as well as cognitive and physical abilities, is regarded to be among the determinants of health outcomes. As a determinant, HL affects a person's ability to access and use health care, to interact with providers, and to care for himself or herself.

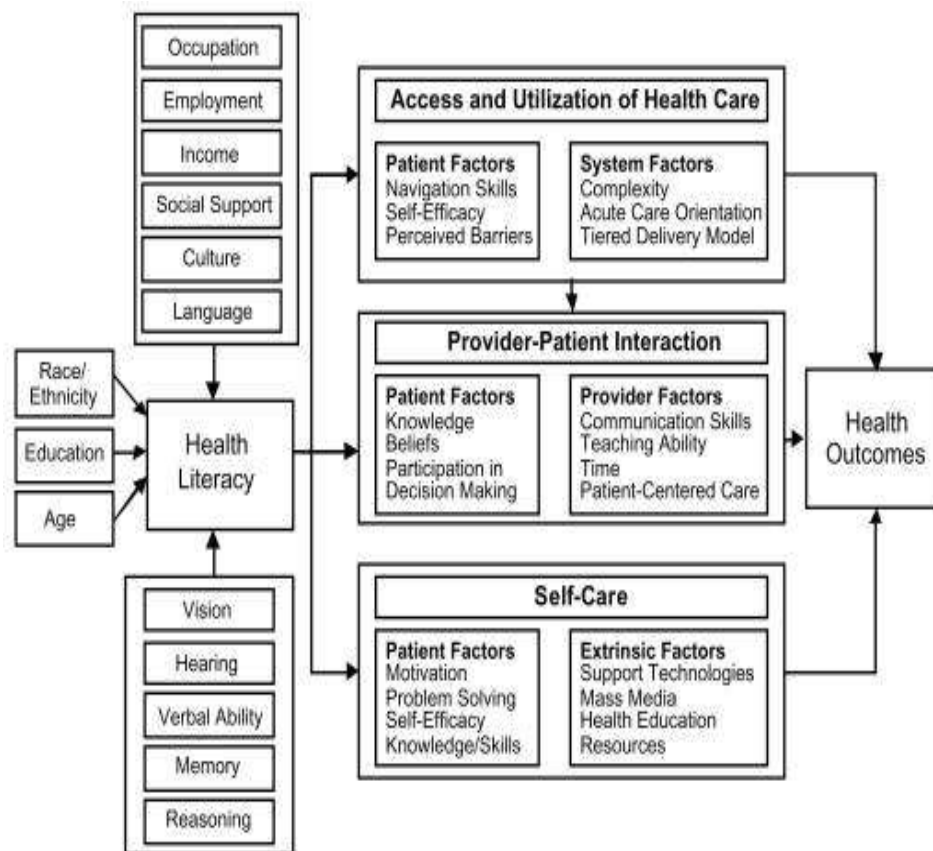


Figure 2: Causal pathways between limited health literacy and health outcomes

Source: Paasche-Orlow and Wolf, (2007)

The determinants of HL presented under this sub-section were considered (see sub-sections 2.22) in the construction of the conceptual framework. Similar factors have been observed in the findings of this study (sub-section 4.19). Additionally, the study has identified other factors apart from those identified through the literature review.

These included an individual concern on one health-related aspects, perceived influence of politics on health, and perceived involvement of LGAs in health.

2.8.3 Dimensions of HL

The European HL Project has defined four dimensions of HL: accessing, understanding, appraising, and applying the information to make everyday health decisions over the life span (Doyle *et al.*, 2012). Kaphingst *et al.*, (2012:6) further elaborate on dimensions of HL of health information materials, by pointing to accessing (i.e., audience appropriateness, material development details), understanding (i.e., plain language, clearly stated purpose, use of graphics), appraising (i.e., evaluation findings), and applying (i.e., skill-based learning, user involvement, provision of instructions) health information. These dimensions were applied in the study conducted in Morogoro, Tanzania to assess HL under the OHA.

2.8.4 Major Stakeholders in HL

Various stakeholders are involved in the whole chain of obtaining, communicating, processing, and understanding health information and services needed to make appropriate health decisions. Fig 3 presents the major stakeholders involved in HL initiatives.



Fig.3: Major Stakeholders in HL

Source: Mitic and Rootman, (2012)

In this study, schools were additionally found among institutions facilitating initiatives in developing HL in human health in the study area (see sub-section 4.24.5).

2.8.5 Impacts of HL on Health, Health Outcomes, and Health Care Utilisation

HL is an important predictor of health outcomes and health care utilization (U.S. Department of Health and Human Services, 2010; Berkman *et al*, 2010). Lack of HL can cause some adverse effects for individuals and society (Sun *et al*, 2013). Low literacy is associated with a variety of adverse health outcomes, including increased mortality, hospitalization, and in some cases poorer control of chronic health conditions (Dewalt *et al.*, 2004; Nielsen-Bohlman *et al.*, 2004; Pignone *et al.*, 2005; Wolf *et al.*, 2010; Kripalani *et al.*, 2010). Furthermore, limited HL impacts on the prevention and screening of diseases, health behaviour, the taking of patients' history and the

interpretation of diagnoses (Davis *et al.*, 2002; Schwartzberg and Wang, 2005; Miller *et al.*, 2007, Pappas *et al.*, 2007; Nutbeam, 2008). Knowing little about preventive care, people with low HL tend to use more medicines and more expensive healthcare services, including hospitalization and emergency services (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2009). Low HL in people with chronic health conditions leads to more ignorance about their disease conditions compared to those with higher HL, more misconceptions about the disease and its management, among others (Baker *et al.*, 2002; Lindau *et al.*, 2002). Some investigators have elucidated the relationship between limited HL and socioeconomic indicators, health behaviours, and health outcomes (Sayah and Williams, 2012; Edwards *et al.*, 2012). In the study, HL was found to influence an individual's preference for health care source (health care utilization).

2.9 Determinants of Health

Poor health cannot be explained simply by germs and genes. It involves the circumstances in which people live; their access to health care, schools and leisure opportunities; and their homes, communities, towns, and cities (Currie *et al.*, 2012). Several attributes are reported to influence the health of an individual, the society and at the global level including individual and cultural characteristics such as social status, gender, age and ethnicity, values and discrimination. In short, individual and population health is heavily influenced by social determinants. Socioeconomic Status (SES) is another determinant of health. Evidence gathered over the last two decades shows that disadvantaged social circumstances are associated with increased health risks (Acheson, 1998; Mackenbach and Bakker, 2002; WHO, 2006, Currie, *et al.*, 2008).

2.10 Health Behaviour (HB)

In its widest sense, HB includes all those behaviours associated with establishing and retaining a healthy state, plus aspects of dealing with departure from that state (WHO, 1995: 4). It includes any actions undertaken by an individual which have the potential to influence health. Some common health behaviours are exercising regularly, eating a

balanced diet, and obtaining necessary inoculations, smoking, physical activity, and consulting with health care professionals.

HBs are actions taken by a person to maintain, attain, or regain good health and to prevent illness. Health behaviour reflects a person's health beliefs ². Conner (2002:1) defines health behaviours as any activity undertaken to prevent or detect disease or for improving health and well-being. According to Conner (2002:1), health behaviours can be classified into health-enhancing and health impairing. Conner (2002) explains that health impairing behaviours have harmful effects on health or otherwise predispose individuals to diseases. Such behaviours include smoking, excessive alcohol consumption, and high dietary fat consumption. In contrast, engagement in health-enhancing behaviours conveys health benefits or otherwise protects individuals from the diseases. Such behaviours include exercise, fruit and vegetable consumption, and condom use in response to the threat of sexually transmitted diseases (STDs).

This study adopted the classification of HB by Conner (2002). Through literature review, health practices/behaviours and practices in the interface of humans, animals and the environment that could impact health were identified (see sub-sections 2.16.1-2.16.5) and classified accordingly. Data collected, measurement, analysis, and findings on HB under OHA are presented in sub-sections 3.4.3.3, 3.5.2, 3.6.1.3 and 4.3.1 respectively.

2.11 Health Seeking Behaviour

Health seeking behaviour is part of a wider concept of health behaviour (WHO, 1995). There have been two broad frameworks for looking at health-seeking behaviour (Krueger, 1983 as cited in WHO, 1995). The first is the pathway model, which describes the steps of the process from recognition of symptoms to the use of particular health facilities. This method attempts to identify a logical sequence of steps and looks at social and cultural factors that affect this sequence. This has been primarily an anthropological approach, with qualitative methods of investigation. The second is the

²Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier

determinants model, based on a more bio-medical and quantitative approach, where the focus is on outlining a set of determinants which are associated with the choice of different kinds of health service.

2.12 Determinants of Healthcare seeking

Some of the determinants are common in seeking health care services for humans and animals. These include local people's experiences with diseases, availability of traditional versus modern treatment, knowledge and beliefs about diseases, the decision process for seeking health services, and parochial versus cosmopolitan outlook of diseases. The behavioural aspects that are practised in turn determine the extent to which health services are accessed. Kuoeger, (1983) as cited in WHO (1995:5) uses various possible explanatory variables to highlight on the choice of a healer in the model. All the factors included are "explanatory variables" that can interact, leading to differences in individual behaviour for different conditions and on different occasions. These include the recognition of particular symptoms; the perception of those symptoms and the threat of disease; the extent to which symptoms disrupt family, work and other social activities; availability of treatment resources, physical proximity, psychological and monetary costs of taking action (including costs, time, money, effort, stigma, social distance, feeling of humiliation and the like); and beliefs in the efficiency of recommended health care (itself related to beliefs about the cause of the disease).

Other studies (see for example Amara and Gornemann, 1991; WHO, 1995; McCormack, 2012) have considered the importance of lay networks and cultural factors (beliefs about disease causation and to the potential efficacy of different forms of care, and have been said to affect the toleration or not of different symptoms) for determining health-seeking behaviour. Amaro and Gornemann provide a useful approach to the factor affecting utilization of STDs prevention and treatment services (Amaro and Gornemann, 1991) which incorporates elements of the health belief model, the Anderson and Newman Model of Social and Individual Determinants of Medical Care Utilisation, and the Theory of Reasoned Action. Their model is therefore based on a combination of patient characteristics and provider characteristics, looked at specifically in relation to STDs.

Patient characteristics include socio-demographic, knowledge and skills, beliefs, attitudes and values, psychological and psychosocial factors, socio-cultural and socio-environmental factors (cultural norms, nature of informal networks, situational factors like childcare responsibilities, transport and time), treatment and provider characteristics. Provider characteristics include socio-demographic factors, knowledge and skills, beliefs attitudes and values, psychological and psychosocial factors, socio-cultural and socio-environmental factors and treatment service structure characteristics.

The determinants of HCSB presented under this sub-section were considered in the construction of a conceptual framework (sub-section 2.22) and as variables in the binary logistic regression (sub-section 3.6.2.4.2). Similar factors have been observed from the findings of this study (sub-section 4.21).

2.13 One Health Approach

2.13.1 One Health: Concept and Practices

One Health Approach is a modern global movement to promote collaborative efforts between different health-related professionals, including medical doctors, veterinarians and many other scientific, health, environmental and other related disciplines. One Health approach attempts to recognise that numerous disciplines across many sectors are required to solve the complex problems facing public health. It takes a holistic approach to address human, animal and ecosystem health. It emphasizes multi-sector, transdisciplinary action across professions to ensure well-being within human, animal, and ecosystem interfaces (Papadopoulos *et al.*, 2011).

AVMA (2008) defines One Health as the collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals and our environment. One of the major issues in the control of infections transmissible to man and animals is the lack of or limited joint approach to improve the situation. Thus, the need for joint action with a combination of technologies and collaboration between both medical and veterinary professionals is paramount (Mbugi *et al.*, 2012). It is estimated that the direct cost of zoonotic diseases over the last decade has been estimated to be more than \$20 billion, with over \$200 billion in direct losses to affected

economies as a whole (World Bank, 2010). Given that 70percent of the world's rural poor depend on livestock and working animals for their livelihoods, animals cannot be left out of the solutions (FAO, 2002). Zoonoses control is unique in that effective interventions may lie outside the health sector because transmission often does not occur between humans, but only from animals to human-like in rabies or brucellosis (Zinsstag, 2005). The term One Health is used by World Bank (2010) to represent the inextricable link among human and animal health and the health of the ecosystems they inhabit.

OHA is the main focus of this study and therefore has been reflected throughout this study. HL, HB and HCSB assessed and analysed all reflected OHA throughout the study.

2.13.2 Benefits and Rationale of OHA on Human and Animal Health

According to AVMA (2008:3), a One Health approach has several benefits including (i) improving animal and human health globally through collaboration among all the health sciences, especially between the veterinary and human medical professions to address critical needs, (ii) meeting new global challenges head-on through collaboration among multiple professions—veterinary medicine, human medicine, environmental, wildlife and public health, (iii) developing centres of excellence for education and training in specific areas through enhanced collaboration among colleges and schools of veterinary medicine, human medicine, and public health, (iv) increasing professional opportunities for veterinarians, and (v) adding to our scientific knowledge to create innovative programs to improve health. One Health competencies support the development of skills for efficient and effective collaboration among disciplines for solving shared health challenges including food and nutrition security. Such skills include sharing of information, knowledge and data strengthening the relationships and interdependencies between human health and other health-related disciplines such as social sciences, animal health and ecosystem health.

2.13.3 One Health Approach in Tanzania: Where are we?

An important milestone towards addressing emerging health challenges at the animal-environment-human interface that underlines national commitment to strengthen mechanisms for prevention, detection and response to outbreaks has been reached by the Government of Tanzania after launching One Health Coordination Desk and the National One Health Strategic Plan on 13th February 2018. This is critical as the country embarks on building core capacities for preparedness and response to public health events under the International Health Regulations.

This step is cognizant of the fact that over sixty per cent of emerging, re-emerging, and endemic human diseases have their origins in animals. Humans are at increased risk of contracting diseases of animal origin because of a wide range of interconnected variables, including mass urbanisation, large-scale livestock production, and increased travel. Therefore, efforts to unite the sectors working to protect humans and animals and the ecosystem are paramount. The concept of One Health (OH) embodies this approach; it addresses public health events at the interface of human, animal and environmental health.

Various efforts have been put in place to identify zoonotic diseases of greatest national concern for Tanzania using a One Health approach, with input from representatives of human health, livestock, agriculture, wildlife, environment, research, and higher education sectors. A list of zoonotic diseases relevant for Tanzania has been identified, and the criteria for prioritization has been defined. Tanzania's priority zoonotic diseases were identified using the One Health Zoonotic Disease Prioritization tool, a semi-quantitative selection tool developed and coordinated by the U.S. Centers for Disease Control and Prevention (CDC) (Rist *et al.*, 2014; Centers for Disease Control and Prevention, 2018). Zoonotic disease prioritization was identified by national representatives as the first step toward addressing the public health challenges associated with zoonotic disease threats using a One Health approach (Centers for Disease Control and Prevention, 2018). To build in-country capacity to conduct future One Health prioritization workshops, nine local partners representing human, animal,

and environmental health sectors were trained by CDC as facilitators and three served as the facilitators during the workshop. The in-country facilitator training took place March 20–22, 2017. Tanzania’s One Health Zoonotic Disease Prioritization Workshop used a multisectoral, One Health approach to prioritize endemic and emerging zoonotic diseases of major public health and animal health concern that could be jointly addressed through an inter-ministerial collaboration including human health, livestock, agriculture, wildlife, environment, research, and higher education partners. The outcome was a list of six zoonotic diseases of highest priority to Tanzania that to be used to advocate for and build capacities in many areas including surveillance and laboratory detection systems, to improve prevention and control across the key One Health sectors in the country over the next five years and beyond (Centers for Disease Control and Prevention, 2018).

Despite all that has been discussed concerning efforts on One Health Approach in Tanzania in this subsection and in subsection 2.4.5, the results from this study indicate that there is low awareness on the concept and the practice plus a very low level of collaboration among professionals in the sectors related to health (sub-sections 4.22.1 and 4.22.2).

2.14 Humans, Animals and the Environment – the Interconnections

The convergence of people, animals, and our environment has created a new dynamic in which the health of each group is inextricably interconnected. The challenges associated with this dynamic are demanding, profound, and unprecedented. While the demand for animal-based protein is expected to increase by 50percent by 2020, animal populations are under heightened pressure to survive, and further loss of biodiversity is highly probable (Gibbs, 2005; AVMA, 2008). On top of that, Graham *et al.* (2008) report that of the 1,461 diseases now recognised in humans, approximately 60percent are due to multi-host pathogens characterized by their movement across species lines. And, over the last three decades, approximately 75percent of new emerging human infectious diseases have been zoonotic. Humans increasing interdependence with animals and their

products may well be the single most critical risk factor to human health and well-being concerning infectious diseases (AVMA, 2008).

There is a growing concern that the world's latest generation could be the first in history to experience a reduction in life expectancy and health in general. Yet, veterinary and human medicines are considered separate entities and the obvious links between them frequently ignored. It has been observed that the traditional approaches and past requisite skills and levels of knowledge may not be corresponding with the fast changes and new demands of food-animal industries and the shifting requirements needed for the corporate and public opportunities in the future (AVMA, 2008; Fasina, *et al.*, 2008).

At the same time, pollution and contamination of our environment have greatly reduced the health and sustainability of our environment. Environmental degradation promotes the expansion of infectious diseases and non-infectious threats. Such degradation of the environment will continue to create favourable settings for the expansion of existing infectious diseases, as well as an increasing number of acute and chronic non-infectious disease events detrimental to both human and animal health. Also, non-infectious threats include toxins and chemical contaminants, such as endocrine-disrupting chemicals in the environment (Colborn, *et al.*, 1996). Other examples include the melamine contamination of pet foods, fire-retardant carpet chemicals causing adverse effects in pet cats, and marine toxins in manatees (Gardner, 2007). Environmental conditions play an important role in the transmission of some diseases (i.e malaria), and therefore regulating these conditions can help to reduce disease burden. Environmental management practices for disease control (e.g. draining stagnant water and eliminating mosquito breeding habitats) can be implemented at the community level as a complement to other malaria control methods (Randell, 2008).

One strategy to better understand and address the contemporary health issues created by the convergence of human, animal, and environmental domains is the concept of One Health. Our increasing interdependence with animals and their products has spurred the medical and veterinarian professions to raise a need for a holistic, collaborative approach. This approach encourages the collaborative efforts of multiple disciplines

working locally, nationally, and globally, to attain optimal health for people, animals, and our environment (Zinsstag, 2005; AVMA, 2008).

2.15 Connections and Importance of OHA Practices to Population/ Demographic Studies

A-One Health approach is crucial to managing and protecting the health of humans, livestock, wildlife and the environment. Although still in its infancy in many areas of the world, the use of transdisciplinary teams to address wildlife-human-livestock boundary diseases will broaden the scope of options for solutions (Miller and Olea-Popelka, 2013). It is evident that attaining optimal health calls for collaborative efforts between humans, animals and the environmental professionals and understanding of humans, animals and the environment interactions and its consequences on health (Zinsstag, 2005; AVMA, 2008; Muhanga and Malungo, 2018a; 2018b). It is obvious that when optimal health is attained that quality of population will be enhanced. A quality of any population among others depends on the health of a respective society.

Health issues are useful to demographers much as demographic aspects are very vital to health and related disciplines (IOM, 2006; Nelson and Williams, 2007). It is obvious that the tools and techniques of population sciences are extremely relevant to the discipline of public health emergency preparedness. In fact, protecting and securing the population's health requires information about that population. This indicates how One Health practices are connected to population/ demographic studies even though the theoretical and practical connection between the methods of demography and the practice of public health emergency preparedness is weak. Collaborative efforts will lead to a reduction of mortality and morbidity hence improving the quality of the population.

Likewise, OHA is important to demographers in the sense that, through OHA, there are possibilities that those incidences claimed by Kambarage, *et al.*, (2003) which are undetected, unreported or underreported diseases could be attended to hence reduction of mortality and morbidity. It is known that among other aspects demographers have interest in the reduction of mortality and morbidity. Infectious diseases remain a

significant cause of mortality and morbidity globally; with approximately 75percent of emerging infectious diseases (EIDs) being zoonoses (Taylor *et al.*, 2001). The expansion of a given population and closer living proximity often means the disruption of environmental processes and more human-human and human-animal contact: population growth is a key factor in predicting the emergence of infectious diseases worldwide (Nelson and Williams, 2007).

Demographic techniques and data are endowed with a wealth of relevant information and expertise hence can assist in describing and evaluating the health characteristics of a given population. Various population characteristics such as biological risk factors and socio-economic conditions are often important determinants of health care outcomes and therefore must be considered in policy (IOM, 2006).

2.16 Health Behaviours and Practices in the Interface of Humans, Animals and the Environment

Literature (Ribbands, 1946;Vundule and Mharakurwa, 1996; Kazwala *et al.*, 1998; Oberländer and Elverdan, 2000; Fynn and O'Connor, 2000; Meslin *et al.*, 2000; Minja *et al.*, 2001; Nuwaha, 2002; Siamudaala *et al.*, 2003; Keiser *et al.*, 2005; Mukabana *et al.*, 2006; Muma *et al.*, 2006; Munang'andu *et al.*, 2006; Yasuoka *et al.*, 2006, Cleaveland *et al.*, 2007; Muma *et al.*, 2007; Opiyo *et al.*, 2007; Pfukenyi *et al.*, 2007; Munyeme *et al.*, 2008; Oloya *et al.*, 2008; Hang'ombe *et al.*, 2012; Mwacalimba , 2013) document several health behaviours and practices which reflect the interface of humans, animals and the environment. In this study, these behaviours were summarised and categorised as indicated in Appendix I and presented in various sections of the study.

The summarised and classified behaviours/practices in this subsection have been used in the study to analyse HBs of the individuals (3.6.1.3). These practices/behaviours are reflecting important health aspects beyond human health alone as they cut across health in the interface of humans, animals and the environment.

2.17 Information Seeking Behaviour and Its Determinants

Information seeking is a part-and-parcel of people's everyday work; as people carry out their daily activities, they are constantly seeking, providing, and managing information. Studies (Fox and Jones, 2009; Fox and Duggan, 2013) have shown that lay-people more and more choose to obtain information on their own when they encounter health problems. Health Information Seeking Behaviour (HISB) is broadly viewed as the ways by which individuals obtain information about health, illness, health promotion and risks to health (Lambert and Loiselle, 2007).

HISB varies depending on the type of information sought, reasons for, and experience of searching (Lorence *et al.*, 2006). Research shows that women are more likely than men to search for health information (Andreassen, *et al.*, 2007; Gallagher *et al.*, 2008; Fox and Jones, 2009). Online health consumers tend to be more educated, earn more and have high-speed internet access both at home and work (Kummervold *et al.*, 2008; Wangberg *et al.*, 2008). It has been further well documented that information seeking and use varies by discipline, profession, task, situation, and context (e.g., Marchionini, 1995; Bystrom, 1999; Hansen and Järvelin, 2005; Savolainen, 2006a, 2006b).

Though HISB is to a certain extent explained by psychological factors (e.g. self-efficacy, trait, perception and belief), increasingly studies report that HISB is socially patterned. Seeking health information requires both financial resources and cognitive skills developed through schooling which puts those from a lower socioeconomic status (SES) at a greater disadvantage (Ramanadhan and Viswanath, 2006; Galarce *et al.*, 2011).

Other identified factors that influence health information seeking, include socio-demographic factors (age, racial identity, occupation, household income, education, marital status, and geographic location variables), health conditions, personal situation, health consciousness, and perceived health risk. The first set concerned personal characteristics or context and included perceived uncertainty of personal health conditions and care recipient health conditions (later operationalized solely as the severity of personal health conditions) (Marton, 2011). Others are reported to be

perceived available source characteristics (physical access and cognitive access) and perceived source quality (relevance and reliability) (Johnson, 1997; Wilson, 1999; Choo *et al.*, 2000; Hong, 2006; Lemire *et al.*, 2008).

Case (2002) claims that information needs arise when people realise their existing knowledge is inadequate to satisfy their goal, while Wilson (1997) argues that information needs can also result out when people feel stressed and uncertain while facing threats (such as health problems) and as a result look for information to reduce the stress and uncertainty. Furthermore, finding information is an attempt to bridge a knowledge gap. A knowledge gap appears whenever people perceive there is not enough information in their minds and as a result, they will start searching for information to fill the blanks (Case, 2002). This process is also known as a *sense-making process* (Wilson, 1999). In the health information seeking context, a person may not know clearly about a particular health problem, that represents a knowledge gap of the disease, so there is a need to look up detailed information on this problem.

This variable is very important in studies related to HL. In this study, health information seeking (operationalized as access to health information) was found to be a determinant of HL (sub-section 4.18.1).

2.18 Sources of Health Information

It is reported (Marton, 2011; Marton and Choo, 2012) that the internet has become an increasingly important source of health information for the general public. Internet-based health information is accessed from a variety of sources, including websites run by organizations, homepages run by individuals, official government health websites, private health service websites, online community forums and online support groups where people actively exchange health information and blogs. Research shows that health professionals' use of the internet to obtain health and medical information has also increased. Other dominant sources of health information include discussions with others, public libraries, medical magazines, books and mass media such as TV,

newspapers and radio (Tang and Ng, 2006; Prendiville *et al.*, 2009; Younger, 2010). Studies (Andreassen *et al.*, 2007; Bessell *et al.*, 2002; Fox and Jones, 2009; Fox and Duggan, 2013; McMullan, 2006; Nicholas *et al.*, 2003; Zhang and Fu, 2011) have investigated the type of health information people search for.

In our study, the sources from which individuals obtained health information did not include the internet; which was found to be an important source for Marton and Choo (2012). In the study, individuals were found to use other sources of information.

2.19 The influence of Social Network on HL and HB Change

Social networks are generally defined as the structure or pattern of social ties that an individual has with other people (Cohen and Syme, 1985). These networks can be described both in terms of overall network characteristics (i.e. size, density, homogeneity) as well as the characteristics of individual linkages within that network (i.e. frequency, reciprocity, duration) (Heaney and Israel, 2008).

It is obvious that HL exists within a social context (Sentell *et al.*, 2017). Hence, the need to consider the roles of dyads, families, and communities in health information acquisition, comprehension and decision-making are very important (Nutbeam, 2000; Ratzan and Parker, 2000; Lee *et al.*, 2004; Roter, *et al.*, 2007; Bevan and Pecchioni, 2008; Ishikawa and Yano, 2008; Squiers, *et al.*, 2012; McCormack, *et al.*, 2013). Nutbeam (2000); Rotter *et al.*, (2007) and Latin, *et al.*, (2014) consider the ability to communicate effectively and/or to engage one's social network to influence in achieving health goals; HL takes into account such issues. Social networks provide a powerful approach for HB change. Social environments have been well documented to have major influences on the adoption of HBs, much as social processes may promote behaviour change (Kincaid, 2000; Saul, *et al.* 2007; Davey-Rothwell *et al.*, 2011; Tobin *et al.*, 2011; Hoffman, *et al.*, 2013; Latkin *et al.*, 2013; Terzian, *et al.*, 2013; Sorkin, *et al.* 2014; Wolfer and Scheithauer, 2014; Latkin and Knowlton, 2015).

Social relationships may influence health outcomes by influencing the practice of health-related behaviours, including preventive and lifestyle behaviours, treatment

adherence, and illness management behaviours (Gallant, 2013). There is a notable success on social network interventions in international health programs in promoting several health related aspects, modern family planning methods and bullying reduction among adolescents (Kincaid, 2000; Wolfer and Scheithauer, 2014); weight reduction, smoking cessation, exercise, and improving the well-being of people with schizophrenia (Saul *et al.*, 2007; Terzian *et al.*, 2013; Sorkin, *et al.*, 2014).

2.20 Health and Politics: Connections

Health, like all other aspects of human life, is political, in numerous ways (Bambra *et al.*, 2003). The health of the people is influenced far more by politics and power groups, the distribution of land and wealth than it is by the prevention and treatment of disease (Werner, 1981). Bambra *et al.*, (2003) point out to five aspects of the political nature of health as summarized here:

- a) Unequal distribution: health is political because, like all other life chances under a capitalist economic system, some social groups gain more of it than others.
- b) Health determinants: health is political because its social determinants, such as housing and income, are amenable to political interventions and are thereby dependent on political action (or more usually, inaction).
- c) Organisation: health is political because any purposeful activity to enhance health needs ‘the organised efforts of society’ or the engagement of ‘the social machinery’
- d) Citizenship: health is political because, the right to ‘a standard of living adequate for the health and well-being’ (UN, 1948) is, or should be, an aspect of citizenship and human rights.
- e) Globalization: health is political because we now face a complexity of worldwide crises – social, economic, ecological and ethical – that impact upon us all and contribute to ill health and avoidable deaths.

Ultimately, health is political because power is exercised over it. The health of a population is not entirely under the control of an individual citizen, nor of a doctor (especially not of a doctor, except in some instances of individual disease), but is substantially under the control of the social relations of the capitalist system. Changing this system and these relations is only achievable through politics and political struggle (Bambra *et al.*, 2003). Airhihenbuwa's PEN-3 model also frames health, among others, within the context of politics (Airhihenbuwa, 1995; 2007).

The connections between health and politics operationalized as the influence of politics on health (sub-section 3.5.10.4) in this study and were found to influence HL (4.19).

2.21 Local Government Authorities and Health Services Delivery in Tanzania

The public sector in Tanzania Mainland is divided into two government levels: the central government level and the local government level. This is the main government level responsible for the delivery of decentralized public services in the country, including the delivery of local health services (Boex *et al.*, 2015). The roles and responsibilities of local government authorities are clarified in the Local Government (District Authorities and Urban Authorities) Acts of 1982 (as amended). The law assigns local government authorities the responsibility to “promote the social welfare and economic wellbeing of all persons within its area of jurisdiction” and requires LGAs to take all measures “for the furtherance of and enhancement of the health, education, and the social, cultural and recreational life of the people” (Section 111). The First Schedule of the Act specifically assigns LGAs the authority to “build, equip and maintain, or grant sums of money toward the establishment, equipment and maintenance of hospitals, health centres, maternity clinics, [and] dispensaries.” Other literature (URT, 2003a; 2007a; 2007b) indicate the mandate of LGAs in health in Tanzania.

The study has also indicated that LGAs have been playing role in health care and educating people to become health literate in Tanzania, even though the majority of the respondents perceived the efforts put in place have not been effective (4.22). This partly

empirically explains the factors behind the problematic nature of HBs reported by other studies among Tanzanians.

2.22 Theoretical Framework

Evidently, knowledge is a driver to behavioural change. But given certain circumstances knowledge by itself has been observed to fail to drive such behavioural changes. This assumes that there are drivers together with or beyond knowledge. In such instances, countless explanations exist. Some (Freudenberg, 2000; Rosén, 2015) argue that culture is the context that informs behaviours. The PEN-3 model assumes that health beliefs and actions are best explained within the context of culture, history, and politics (Airhihenbuwa, 1989, 1995, 2007), while others (Airhihenbuwa, 2007; Thaker, 2008) assume that improved knowledge has to be accompanied by a change in attitude to generate expected outcomes in behaviour. Airhihenbuwa, (2007:177) argues that “improved knowledge and a change in attitude are the twin engines that generate expected outcomes in behaviour”. It is also postulated that in most cases correct knowledge has been given with an assumption that an individual is a rational being, is consequently likely to make a rational choice of positive behaviour change. There is also an argument that systemic issues of poverty and structural constraints might preclude an individual from making a “rational” choice or even receiving information (Airhihenbuwa, 2007) as cited in Freer (2015).

This study is theoretically guided by the PEN-3 model in providing empirical explanations on the existence of problematic nature of HBs and varying preferences for Tanzanians in seeking healthcare services despite the efforts of the government to improve health services and educating people to become more health literate. Some several theories and models explain HL, HISB, HB and HCSB. This study integrated other theories and approaches in the assessment of HL and its influence on health behaviour and healthcare-seeking behaviour under the framework of One Health Approach. This study adapted/adopted some variables from these theories (see Fig 4 and Table 2.1).

2.22.1 The PEN-3 Model

The PEN-3 conceptual model situates health beliefs and action within a context of culture, history, and politics and offers a lens to examine health perceptions that thwart the promotion of positive well-being (Airhihenbuwa, 1989, 1995, 2007; Freer; 2015; Rosén, 2015). It focuses on the role of culture as a connecting web by which individual perceptions and actions regarding health are shaped and defined (Airhihenbuwa 1995, 2007a, 2007b) while acknowledging that these perceptions and actions are building blocks in constructing health beliefs that are reproduced to express their cultural beliefs (Airhihenbuwa, 2007a).

The PEN-3 cultural model comprises of three primary domains: (1) Cultural Identity, (2) Relationships and Expectations, and (3) Cultural Empowerment. Each domain includes three factors that form the acronym PEN; *Person*, *Extended Family*, *Neighborhood* (Cultural Identity domain); *Perceptions*, *Enablers*, and *Nurturers* (relationship and expectation domain); *Positive*, *Existential* and *Negative* (Cultural Empowerment domain) (Iwelunmor, 2014:2). This model acknowledges cultural practices that are critical to positive health behaviours, unique practices that have a neutral impact on health, and the negative factors that are likely to have an adverse influence on health.

Under the Cultural identity domain, the role of health education in empowering People, Extended Family and Neighborhood (PEN) to make informed health decisions suitable to their roles in their families and communities is generally recognised. Another domain of this model is Relationships and Expectations which encompasses Perceptions, Enablers and Nurturers (PEN). Perceptions contain the knowledge, attitudes, values, and beliefs, within a cultural context, with potential to facilitate or obstruct personal, family, and community motivation towards change. Enablers are simply regarded as those cultural, societal, systemic, or structural influences can enhance barriers to change. They include the availability of resources, accessibility, referrals, employers, government officials, skills and type of services. Nurturers connote the degree to which health beliefs, attitudes, and actions are influenced and mediated, or nurtured, by extended family, kin, friends, peer and the community. The last domain is the Cultural

Empowerment which is made up of Positive Behaviour, Existential Behaviour and Negative Behaviours (PEN). These are behaviours that are based on health beliefs and actions that are known to be beneficial and must be encouraged are regarded as positive behaviours. Affirmation of these behaviours is critical to program success and sustainability. Existential Behaviour contains cultural beliefs, practices, and/or behaviours which are indigenous to a group and have no harmful health consequences, and thus need not be targeted for change and should not be blamed for program failure. Negative behaviours are those health beliefs and actions that are known to be harmful to health. Health providers must examine and understand them within their cultural, historical, and political context before attempting to change them (Airhihenbuwa, 1995:29-34; Airhihenbuwa and Obregon, 2000; Yick and Oomen- Early, 2009: 127-133).

2.22.2 Andersen's Behavioural Model of Health Care Use

This framework presupposes that the utilization of health care is influenced by the predisposition, the ability, and the need to use health services (Andersen and Newman, 1973). An individual's access to and use of health services is considered to be a function of three characteristics: population characteristics, health care systems and the external environment (Andersen, 1995).

Predisposing factors relate to the tendency to utilize health services and include individual characteristics that are not directly related to health care utilization but rather influence the likelihood of utilization. These characteristics can be categorised as demographic characteristics (including age and sex), socio-cultural characteristics of individuals that exist before their illnesses, social structure (the factors that determine the status of an individual in the society as well as the physical and social environment i.e education level, occupation, social networks, social interactions, culture and ethnicity) and health beliefs (attitudes, values and knowledge that an individual may have about health and health services) (Andersen, 1995).

Others are enabling characteristics/factors which describe the means that individuals have at their disposal with which make it possible to utilize health services. This is

based on the argument that even though an individual may be predisposed to utilize health services, certain factors must be in place to enable actual use. These are enabling factors or the logistical aspects of obtaining care that could be personal/family-related means and know-how to access health services. These include income, health insurance status and availability of health services, source of care, travel, extent and quality of social relationships. Usually, residence (urban/ rural) and distance are used as proxy measures for the availability of health services. Community-related aspects including available health personnel and facilities, and waiting time are enablers. Others are possible additions which are made up of genetic factors and psychological characteristics.

Need characteristics are the direct determinants of health care use which include self-reported and evaluated morbidity (Andersen and Newman, 1973). Need Factors are the most immediate cause of health service use, from functional and health problems that generate the need for health care services. "Perceived need will better help to understand care-seeking and adherence to a medical regimen, while evaluated need will be more closely related to the kind and amount of treatment that will be provided after a patient has presented to a medical care provider" (Andersen, 1995). Perception refers to how people view their general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help (Andersen, 1995).

2.22.3 Health Belief Model (HBM)

This model asserts that if individuals do not perceive a certain illness as serious, they will not seek treatment or preventive measures for themselves, for their household members or their livestock. The model predicts that individuals will take action to protect health if they perceive themselves to be susceptible to a problem and if they believe it will have serious consequences. Also, individuals need to believe a course of action is available that will reduce their susceptibility, and that the benefits of taking action outweigh the costs or barriers (Rosenstock, Strecher and Becker, 1994; Sheeran

and Abraham, 1995, cited by Hausmann-Muela *et al.*, 2003). This established model explains health behaviour by promoting a better understanding of beliefs about health.

2.22.4 ‘Sick Role’ Theory

In his ‘Sick Role’ Theory, Parsons (2005) stated that ill-health prevents people from fulfilling their social roles. A certain level of good health in the population is a key social resource for the efficient functioning of the society, with medicine working to maintain this favourable level of health. Health experts should work in collaboration to maintain this favourable level of health in society to increase production for their livelihood. The onset of illness was of interest to Parsons because it prevented the fulfilment of social roles, such as paid employment and parental duties. The motivation to withdraw from social roles and to be cared for as a sick person is, in this model, countered by the medical practitioner (Bradby, 2012:23). Where a person’s ill health requires a relinquishing of normal social roles, he or she is expected to visit a doctor and this encounter involves a reciprocal set of obligations and privileges. The incapacitated person is offered a niche, termed ‘the sick role’; where usual expectations are lifted and he or she is permitted time off to recover. The sick role offers the privilege of bed rest and the suspension of domestic and employment duties, on condition that professional help is sought out and full cooperation is ceded to the physician. In return, the physician is reciprocally obliged to act in the patient’s best interests and to offer technically competent care objectively. According to this theory, when an individual is sick, they adopt the role of being ill. This sick role has four main components (Williams 2005; Bradby, 2012):-

- (a) the individual is not responsible for their state of illness and is not expected to be able to heal without assistance;
- (b) the individual is excused from performing normal roles and tasks;
- (c) there is general recognition that being sick is an undesirable state; and
- (d) to facilitate recovery, the individual is expected to seek medical assistance and to comply with medical treatment.

Parsons’ theory attempted to identify typically seen behaviour in individuals who are ill. However, while groundbreaking, the sick role failed to account for variability in illness

behaviour. As a result, scholars have proposed multifaceted models and theories which identify factors influencing health care seeking (Wolinsky, 1988). This study assessed perceptions of people on how diseases can prevent them from their social roles and how they react/behave towards that.

2.22.5 Social Norms Theory

According to Nutbeam *et al.*, (2010), the Social Norms Theory suggests that much of people's behaviour is influenced by their perception of how other members of their social group behave. Social Norms Theory seeks to modify social and cultural environments to influence individual and group health behaviour positively. It has been widely applied using social marketing techniques. From this theory, the study was interested in an aspect of how people's behaviour is influenced by their perception of how other members of their social group behave in the context of the OHA.

2.22.6 Making Every Contact Count Approach

This approach takes on board aspects of engagement, training and support of Health Champions to enable their friends, families, neighbours and work colleagues to lead more healthy lives (NICE, 2007). Health Champions can help other people to enjoy healthier lives by raising awareness of health and healthy choices, sharing health messages, removing barriers and creating supportive networks and environments.

“Every healthcare professional should use every contact with an individual to maintain or improve their mental and physical health and wellbeing where possible, in particular targeting the four main lifestyle risk factors: diet, physical activity, alcohol and tobacco – whatever their speciality or the purpose of the contact.” (NICE, 2007 as quoted by NWPH³, n.d).

This approach was adapted and applied in the study to analyse how individuals' contact with healthcare professionals play a role towards maintaining or improving their health

³North West Public Health (n.d). Evaluation of Approaches to Health Literacy in Ashton, Leigh and Wigan <http://www.nwph.net/nwpho/Publications/NHS%20ALW%20Health%20Literacy%20Final%20Oct%202012.pdf>

and wellbeing in the context of the interactions of humans, animals and the environment.

2.22.7 Theory of Reasoned Action

This model shows how behavioural intentions are influenced by attitudes towards behaviours and subjective norms. Attitudes, in this case, are determined by the belief that the desired outcome will occur if a particular behaviour is followed and that the behaviour will benefit health. Subjective norms relate to the influence other people have on an individual's behaviour - the views of significant others are important here. A third influencing factor is perceived behavioural control, which includes believing that resources and opportunities will be available to perform the behaviour (Glanz *et al.*, 2008; Nutbeam *et al.*, 2010).

The aspects of interest to the study were attitudes towards behaviours and subjective norms. The study assessed attitudes towards health-related behaviours/practices and how they perceive can benefit their health and what kind of behavioural control can yield positive results under OHA.

2.22.8 Social Cognitive Theory (Social Learning Theory)

Social Learning Theory addresses both the underlying determinants of health behaviour and methods of promoting change. It is an expectancy-value theory that focuses on the interaction between the individual and the environment, particularly how the 'reinforcers' in the environment can shape an individual's behaviour. Social Learning Theory emphasizes the influence of other people on an individual's behaviours, observational learning and the role of self-efficacy (Nutbeam *et al.*, 2010). The study analysed the influence of social networks on HL and HB in the context of OHA.

2.22.9 Behavioural Economics and Choice Architecture

Behavioural economics is a way of understanding how people make choices (National Social Marketing Centre, 2011). It moves beyond traditional or 'neoclassical' economics, which assumes that people logically make decisions. The approach recognises that people do not always behave rationally, with behaviours often being

governed by instinct, emotion, past events and the people around us. Many ‘problem’ behaviours – such as eating unhealthy food or drinking too much alcohol – are a testament to this irrational decision-making. Understanding this can help design behavioural interventions that affect positively how we make decisions. Relatively simple changes can be made to the external environment that can prompt behaviour change. This study recognises the fact that there are sometimes the causes and effects which are at work with behaviour beyond rationality. In that context, the study analysed other factors at play with behaviour which have been proposed by this approach. In this study, the interest was on what drove sometimes individuals into certain HBs over and above rationality. The findings in sub-section 5.3.1 indicate incidences that well reflected this approach concerning health-related decisions which are sometimes made beyond rationality.

2.22.10 Pathway Model

Suchman (1965) was the first to describe HSB in a logical sequence of steps beginning with perception and evaluation of symptoms and ending with the use of different care types. Fabrega (1974) developed a theoretical model of illness behaviour, which concentrated on the information an individual might be expected to process during an illness episode. However, the approach is based on economics and elementary decision theory, and so assumes people use the principle of cost-benefit in evaluating best courses of action. This leaves out other possible influencing factors that could play a part. Dingwall’s model of illness action focuses mostly on lay responses to disturbances in body functioning (Dingwall, 1976). The model, however, is based on individual choice, which assumes that individuals are autonomous in making decisions and hence may underplay the social context in which they act.

Igun (1979) developed a model of 11 stages of health care seeking behaviour, from the point of recognizing symptoms until care is sought. The model details the process of HSB, moving from one stage to another, but does not describe the factors that influence this movement. Young’s decision-making tree describes the pathways individuals undertake during the process of decision-making around seeking help and the factors

that may change or hinder initial choice of care (Young, 1981). Since health-seeking behaviour is a social process that involves an individual's interaction with the social network, it is crucial to look at the decision-making processes from this perspective (Fabrega, 1974).

Models such as the Pathway Model and Determinant Model of Illness Behaviour demonstrate that the decision to engage with particular medical channels is influenced by a variety of socio-economic variables such as sex, age, the social status, the type of illness, access to services and perceived quality of service (Tipping and Segal, 1995; Akinawo and Oguntimehin, 1997).

The assumptions made by the Pathway and Determinant Models of Illness Behaviour concerning the decision to engage with particular medical channels particularly those related to access to services and perceived quality of service were also observed from the findings of this study (see sub-section 5.4.3).

The theories and approaches reviewed under this section were integrated into this study to develop HL-HB-HCSB Nexus analytical framework and context-specific instrumentation for assessing HL and HB under OHA.

2.23 Empirical Literature Review

To further understand the status of research on HL, HB and HCSB, numerous empirical studies related to this were reviewed. The aim was to review the methodological aspects that were employed in these other studies. The study benefited from the review of empirical studies in innumerable ways including adapting/adopting some methodological aspects and the variables used in the study.

A study by Sun *et al.*, (2013) was conducted to develop and validate a HL model at an individual level that could best explain the determinants of HL and the associations between HL and health behaviours even health status regarding infectious respiratory diseases. Skill-based HL test and a self-administrated questionnaire survey were conducted among 3222 Chinese adult residents. Path analysis was applied to validate the model. The model explained 38.6percent of variance for HL, 11.7percent for health

behaviour and 2.3percent for health status: (GFI=0.9990; RMR=0.0521; $\chi^2=10.2151$, $P=0.1159$). Education has a positive and direct effect on prior knowledge ($\beta=0.324$) and HL ($\beta=0.346$). HL was also affected by prior knowledge ($\beta=0.245$) and age ($\beta=-0.361$). HL was a direct influencing factor of health behaviour ($\beta =0.101$). The most important factor of health status was age ($\beta=0.107$). Health behaviour and health status had a positive interaction effect.

The study by Sun *et al.*, (2013) informed this study in terms of the variables in the course of formulating the conceptual framework. Variables such as prior knowledge and level of education were also incorporated in the study in Morogoro, Tanzania. The connections /linkages between HL and HB which were also analysed in the study in Morogoro as among the determinants of HBs.

The European HL Survey (HLS-EU, 2012:4) was conducted during the summer of 2011 across eight European countries; namely: Austria, Bulgaria, Germany (North Rhine-Westphalia), Greece, Ireland, Netherlands, Poland, and Spain. In each country, a random sample of approximately 1,000 EU-citizens, 15 years and older were interviewed yielding a total sample of approximately 8,000 respondents. TNS Opinion on behalf of the HLS-EU consortium collected the data, applying Eurobarometer standards in methodology and sampling procedures. Data were collected face to face via a standardized questionnaire. To measure HL, HLS-EU-Q was derived from the conceptual model and definition developed by the HLS-EU consortium (Sorensen, 2012). The conceptual model integrated three health-relevant areas (health care, disease prevention, health promotion) and four information processing stages (access, understand, appraise, apply) related to health-relevant decision-making and tasks. These areas and stages combined created a matrix for measuring HL (HL) with 12 sub-dimensions, which were operationalized by 47 items. The 47 items were assessed using a 4-point self-report scale (very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected health-relevant tasks. Therefore, the HLS-EU-Q refers to the self-perceived measure of HL and reflects interactions between individual competencies and situational complexities or demands. HLS-EU Q47 approach has been

modified to suit the context of OHA in Tanzania, and to assess HL in the interface of humans, animals and the environment in the selected wards in Morogoro municipality and Mvomero in Morogoro region in Tanzania.

2.24 Gaps in Previous Studies

To empirically bridge information/ knowledge gap as to why there is still notable existence of health impairing practices/behaviours and varying preferences for Tanzanians in terms of seeking healthcare services (URT; 2003a; 2007a; 2007b); despite numerous efforts by the government of Tanzania in improving health services and educating people to become health literate; gaps in previous studies had to be addressed. Through addressing those gaps, the study has established the reality and empirically documented explanations after a thorough investigation and analysis.

A study by Kambarage *et al.*, (2003) reports the existence of human Brucellosis originating from both traditional and dairy animals. The study claims that more than 500 000 human cases are being reported worldwide each year, but with the number of undetected cases believed to be considerably higher. A study by Kambarage *et al.*, (2003) does not provide answers as to why there are several unreported and or undetected cases. Empirical explanations concerning this aspect are part of this report from a study conducted in Morogoro, Tanzania.

Scholars (Scholz *et al.*, 2008) attribute this disturbing situation to the non-specific clinical picture of human brucellosis, low awareness of the disease and shortcomings in laboratory diagnosis. Low awareness by itself indicates apart from other factors lack of information on the interaction between animals and humans and how such interaction impacts on health i.e contaminations and infections resulting from animals, symptoms and preventive measures. This points out to the fact that collaborative efforts described under OHA could contribute towards addressing this situation. The study further

analysed the efforts in place by the government towards creating HL and its impacts on HBs changes.

The need for public information awareness creation has been a concern of other studies. For example, a study by *et al.*, (2007) documents evidence of brucellosis in humans in communities in the northern part of Tanzania. The study by Karimuribo, *et al.*, (2007) among others recommended for an urgent need to develop public health education programmes and to build disease diagnostic capacities in most of hospitals and health centres to assist medical experts to promptly diagnose this disease which symptomatically does not differ very much from malaria the most prevalent disease in Tanzania. It is possible that brucellosis may be a serious health constraint in animal-keeping communities, for which consumption of raw milk is a common practice. Further, Karimuribo *et al.*, (2007) recommended also for a need to formulate a national strategy that builds and works based on collaboration between veterinary and medical disciplines.

It is obvious that in absence of public health education programmes and proper diagnosis of some zoonosis (i.e brucellosis) whose symptoms are not very different from malaria, there are possibilities of having such diseases affecting the population immensely. This study assessed HL under OHA to establish to what extent people have the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions to promote and maintain good health in the interface of humans, animals, and the environment. Incognizant of the commitments of the government of Tanzania in strengthening mechanisms for prevention, detection, and response to outbreaks through the One Health Approach after initiation of the One Health Strategic Plan (2015–2020). This study identified and assessed collaborative efforts and strategies among various professionals in attaining optimal health for humans, animals, and the environment in the view of how the strategic plan (One Health Strategic Plan 2015–2020) has been translated at the local level.

Several studies on HL, including HLS-EU, (2012); Kutner *et al.*, (2006) did not take into account linking HL and HB in the interface of humans, animals and the environment. A study by Sun *et al.*, (2013) concentrated at the individual level and both studies were conducted in a different socio-economic and political reality of Tanzania and did not examine the role of cognitive variables (such as health beliefs, attitudes, self- efficacy) as described in psychological models in understanding the distribution/prevalence of HL and HB. This study focused on the individual's capabilities, actual skills and interaction an individual may have with health information or the health care system in the context of One Health.

The National Assessment of Adult Literacy (NAAL) was extremely important as the first national measure of literacy, providing systematic feedback to the education system and to the health care system about how literate American adults are. That feedback demonstrated that the level of information conveyed by these systems is not a good match with the abilities of most adults. The NAAL further identified substantial disparities associated with race and ethnicity, age, and insurance status (IOM, 2009). Through the NAAL an overall assessment of the level of literacy of American adults was obtained. Out of that, numerous research measures have been used to analyse the relationships existing among limited HL, health care, and health outcomes plus the impact of interventions on individuals with limited HL. These measures include the Test of Functional HL in Adults (TOFHLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). Researchers have used these measures to conduct studies that have shaped the field of HL. For example, as mentioned earlier, researchers found that those with lower HL have poorer health care and health outcomes. Baker *et al.* , (2007) used the TOFHLA to determine that inadequate HL independently predicts all-cause mortality and cardiovascular death among elderly persons and that HL is a more powerful variable than education. Among the findings of that report was that adults with limited HL “have less knowledge of disease management and health-promoting behaviours, report poorer health status, and are less likely to use preventive services.” Another finding was that HL measures are indicators of reading skills and that no

current measures include oral communication or writing skills and “none measure the HL demands on individuals within different health contexts” (IOM, 2004).

These studies (IOM, 2004; Baker *et al.*, 2007; IOM, 2009) have been significantly used to inform the designing of the study that was conducted in Morogoro, Tanzania. The feedback from the National Assessment of Adult Literacy (NAAL) demonstrated that the level of information conveyed by these systems is not a good match with the abilities of most adults hence contributed to problematic, inadequate or low HL (IOM, 2009). This feedback created a very important entry to the designing of the study conducted in Morogoro. It was observed that while the government of Tanzania had made efforts in improving health services and educating people to become health literate; health impairing practices/behaviours persisted and varying preferences for Tanzanians in terms of seeking healthcare services instead of going to the hospital (URT; 2003a; 2007a; 2007b). There is, therefore, a need to investigate whether the level of information conveyed through these efforts was a good match with the information requirements among Tanzanians towards HBs change. The study by Baker *et al.*, (2007) indicated that HL is a more powerful variable than education when it comes to HBs change. It was argued that there was a connection between limited HL and having less knowledge of disease management and health-impairing behaviours. In that context, it was then necessary to investigate whether people disregarded information provided through various government’s efforts hence, did not change their behaviour or what else marked the differences in health behaviours in the study area.

The studies reviewed under sub-section 2.23 were conducted in settings which are different from the political and socio-economic realities of Tanzania. This study adapted some aspects from these tools/measurements in the context of Tanzania and hence developed a context-specific approach to measure HL and HL-HB-HCSB nexus analytical framework under OHA.

2.25 Conceptual Framework, Research Questions and Hypothesis Development

Fig. 4 presents the conceptual framework for the study which was used to formulate research questions and develop hypotheses. A conceptual model has been provided as a visual example of the common attributes of HL, HB and HCSB along with possible factors that might influence these attributes. In this conceptual framework, HL is the dependent variable which is affected by several independent variables (predictors). This conceptual framework adopted/adapted some approaches and theories related to HL and HB from the literature review. The selection of the factors included in the study reflected coverage of previous studies and various theories, models and approaches from the literature review.

The study is informed by the problematic nature of HBs observed through the existence of HIBs sometimes resulting into a higher prevalence of infectious diseases (including zoonotic ones) and varying preferences for Tanzanians in terms of seeking healthcare services (instead of going to hospital) despite the efforts of the government of Tanzania to improve health services and educating people to become more health literate (URT, 2003a; URT, 2007a, URT, 2007b). Obviously what was observed was that the government was putting some efforts to educate people to become HL. The efforts were mostly based on the distribution of fact-based pamphlets, the placement of posters, health promotion campaigns and mass radio broadcasts (Mboera, 2007; URT, 2007a; 2007b; URT, 2017). This demonstrates that information was being disseminated to generate HL. Knowledge has always been connected to positive outcomes in behaviour change (Airhihenbuwa, 2007). Why people have not been changing their health behaviours despite these efforts made by the government in educating them (URT; 2003a; 2007a; 2007b) has been the central thrust of this study. Did people receive sufficient health knowledge to make them HL enough hence health behavioural change? Could health information and subsequently health knowledge stand as a strong driver towards health behavioural change? Which barriers exist in accessing, using, and understanding health information towards health behavioural change? Airhihenbuwa (2007:177) argues that knowing without a change in attitudes can not lead to

behavioural change. Freer, (2015: 16) has argued that most of the efforts related to campaigns on health promotion have always had in mind that an individual is “a rational being that, when given the correct knowledge, will make the rational choice of positive behaviour change”, this could sometimes not be the case as there are innumerable aspects which can preclude an individual from making a “rational” choice or even receiving the information. Other studies (Freudenberg, 2000; Freer 2015) have identified the systemic issues of poverty, structural constraints and culture among such precluding factors. Airhihenbuwa’s PEN-3 model explains health beliefs and actions within the context of culture, history, and politics (Airhihenbuwa, 1995, 2007). The model postulates that health behaviour within an African context can be best understood within the cultural identity of Africans. The model further insists that even for other education interventions to be effective there is a need to attach them to African ways of knowing. This conceptual framework contextualised these aspects in the course of providing empirical explanations as to why the Tanzania government’s efforts to educate people to become HL have not realized their intended targets, due to the existence of health impairing practices as reported in URT (2003a; 2007a; 2007b).

This study is theoretically guided by the PEN-3 model (Airhihenbuwa, 1995:29-34) which generally recognises the role of health education in empowering People, Extended Family and Neighborhood (PEN) to make informed health decisions appropriate to their roles in their families and communities under the Cultural identity domain. Relationships and Expectations is another domain of the model which comprised Perceptions, Enablers and Nurturers (PEN). Perceptions comprise knowledge, attitudes, values, and beliefs, within a cultural context, that may facilitate or hinder personal, family, and community motivation to change. The model assumes that there are enablers which are cultural, societal, systemic, or structural influences that may enhance barriers to change, such as availability of resources, accessibility, referrals, employers, government officials, skills and type of services. Nurturers refer to the degree to which health beliefs, attitudes, and actions are influenced and mediated, or nurtured, by extended family, kin, friends, peer and the community. PEN-3 model also

acknowledges Cultural Empowerment reflected in Positive Behaviour, Existential Behaviour and Negative Behaviours (PEN): Positive Behaviours are behaviours that are based on health beliefs and actions that are known to be beneficial and must be encouraged. Affirmation of these behaviours is critical to program success and sustainability. Existential Behaviour refers to cultural beliefs, practices, and/or behaviours that are indigenous to a group and have no harmful health consequences, and thus need not be targeted for change and should not be blamed for program failure. Negative behaviours are based on health beliefs and actions that are known to be harmful to health. Health providers must examine and understand them within their cultural, historical, and political context before attempting to change them. This theory goes beyond just valuing the influence of health information. It focuses on the effect of health knowledge on health behavioural changes through health education by looking at cultural, historical, and political context. Although it is a widely used model (Freer, 2015), no empirical information exists to have it applied in studies that are OHA based. It is a model reflecting the African context (Airhihenbuwa, 1995, 2007; Freer, 2015), to better understand HL and is premised on the need for context specificity (Nutbeam, 2000; Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009).

HL is thought to have significant implications on health outcomes and hence on the quality of the population. The focus of this study is on OHA since for optimal health to be attained there is a need to understand humans, animals and environment interactions and its consequences on health. This study assessed HL and HB under OHA. Specifically, the study assessed the level of HL and how it is associated with HB and HCSB of the household members in the study area. It also analysed the attitudes /perceptions of people on HB.

To establish how HL associates with HB, it was important to establish how health literate members of households were, what kind of health influencing practices they involve themselves with, and from which sources they prefer to seek health care in the study area. The question here is: are these people literate enough on issues related to health in the interface of humans, animals and the environment? It is apparent that

despite having several studies having assessed HL, none of them reflected the interface of humans, animals and the environment. On top of the efforts by the government to educate people to become more health literate, there is no evidence on having HL documented in national health datasets to be able to establish HL gaps which could form the basis of such efforts to educate the people (see for example; TDHS, Census). In light of that, it was worthwhile to establish HL levels in the study area since that has never been done before and a need to develop a context-specific approach /assessment tool to effect that.

It is not sufficient just to establish HL, but it is worthwhile to assess specific factors which determine HL, HB and HCSB. Understanding specific factors which determine HL, HB and HCSB remain important when it comes to the formulation of interventions related to HL, HB and HCSB. Fig. 4 indicates determinants of HL, HB and HCSB including subjects' characteristics, political aspects, service characteristics and disorder characteristics. The cause-effect relationships of these variables are further elaborated hereunder after reviewing of literature. However, these determinants obtained from LR were from studies which did not concentrate on OHA.

A conceptual model by Paasche-Orlow and Wolf (2007) indicates HL to be influenced by socio-demographic and economic characteristics. These characteristics as shown in Fig. 4 are referred to as subjects' characteristics (including the level of education attained, gender, age, and occupation). Several other studies (Rauschenbach and Hertel, 2011; Marinaccio *et al.*, 2013; Muhanga, 2017a; Kaale and Muhanga, 2017; Muhanga and Malungo, 2017b) have reported on socio-demographic and economic related characteristics to have predictive effects on other variables. Subjects' characteristics were traced to analyze their effects on HL, HB and HCSB. This study assessed the influence of household demographics, socio-cultural and economic characteristics related factors. Other models, Pathway Model and Determinant Model of Illness Behaviour also demonstrate that the decision to engage with particular medical channels is influenced by a variety of socio-economic variables (Tipping and Segal, 1995; Akinlawo and Oguntimehin, 1997).

The health of a population is not completely under the control of an individual citizen, nor of a doctor (except in some instances of individual disease), but is substantially under the control of the social relations of the society. Health is political much as power is exercised over it. There are ways public policy has been determining health in society. Public policy as a determinant of health is acknowledged by Bambra *et al.*, (2003) and Williamson and Carr (2009). At every local community, there are by-laws, directives or even policies which form part of local politics. To analyze the influence of local politics on HL, HB and HCSB, a variable in Fig. 4 on political aspects was included. The intention here was to give answers to questions on how local leadership involves itself in promoting health-related aspects for the local community. Together with this, local governance involvement on health-related aspects was also analysed. This is in line with the fact that local government authorities (LGAs) have been mandated by the Tanzania National Health Policy responsibilities concerning health administration in their areas of jurisdiction (URT, 2007a; 2007b). The question here is: are there any by-laws, directives or even policies which the LGAs have formulated on health care, diseases prevention and health promotion; in what or in which ways these by-laws, directives or even policies have managed to influence people's health. This study reflects also on Airhihenbuwa's PEN-3 model, which frames health within the context of history, culture, and politics (Airhihenbuwa, 1995:29-34).

Knowledge is an important intervening variable in most of the social and health-related studies, this idea is accommodated in the PEN-3 model (Airhihenbuwa, 1995, 2007). Theoretically, prior knowledge on environmental management practices; health and diseases form an important aspect of HL, HB and HCSB. Knowledge and awareness have a lot to influence on HL, HB and HCSB. In the study, it was important to find out if respondents had prior knowledge on issues related to health in the context of humans, animals and the environment interface and its consequences on health to humans, animals and the environment. The aspect of knowledge is important in this study since there were reported government efforts on improving health services and educating people to become more health literate (to cultivate the knowledge and skills needed to

access, understand and use health information), thus enabling and encouraging them to make healthier lifestyle choices which did not yield positive outcomes. The constructed conceptual framework (Fig.4) indicates prior knowledge having a direct link with Health Literacy based on the fact that the lack of knowledge in health-related aspects has several outcomes. These outcomes include poor understanding of the complex nature of their health; medical care and conditions; poorer comprehension of medical information; low understanding and use of preventive services plus the impact of certain individual behaviours on their health (see Davis *et al.*, 1996; Baker *et al.*, 1997; Baker, *et al.*, 1998; Bennett *et al.*, 1998; Doak *et al.*, 1998). In the study, prior knowledge was assessed and its influence on HL, HB and HCSB was analysed.

HL is partly about people's access to health information and their capacity to use it effectively to make appropriate health decisions to promote and maintain good health (Ratzan and Parker, 2000; TARSC, 2009; Berkman *et al.*, 2010). The communication, information, and technology that people intermingle with each day is the one that moulds ideas about health and behaviours of the people. These processes make up the context and the ways professionals and the public search for, understand, and use health information, significantly impacting their health decisions and actions. Issues of access to information describe individuals' information-seeking behaviour. In this context, it was important to address aspects of people's access to information in general and health information in particular, as at the core of health literacy, is an aspect of access to health information. The question answered here was: if the respondents had access to information about what type of information was being accessed? This study sought answers as to how, when and why people have been seeking health information. The interest was to test if access to information influenced HL, HB and HCSB through establishing if there existed any differences between those who had a higher level of access to information and those with a lower level. There is also an indication from the previous study (Kambarage *et al.*, 2003) that there are significant disease incidences which are undetected, unreported or underreported, while studies (*et al.*, 2007; Scholz *et al.*, 2008) have attributed occurrences of these incidences of failing to detect and report

to low awareness among other factors. Unquestionably, low awareness is partly connected to lack of information. Ultimately the intention of assessing access to information and types of information accessed was to answer whether information accessed was adequate, understood and used in ways which promoted and maintained good health by observing the kind of HB and HCSB exhibited. Therefore the influence of HISB on HL, HB and HCSB was analyzed. Variables on access to information, types of information accessed and Information seeking behaviour were added to the conceptual framework in Fig. 4.

Health care provider-patient interaction can play a role in raising awareness on health and healthy choices, sharing health messages, removing barriers and creating supportive networks and environments. This can then influence HL, HB and HCSB. This supposition is supported by Making Every Contact Count Approach (NICE, 2007 as quoted by NWPH⁴, *n.d*; Beck *et al.*, 2002).

Service characteristics which include aspects related to health care setting (i.e access to services in terms of physical proximity), perceived quality of service, the quality of medical care in terms of technical efficiency (as proxied by the availability of drugs, the type of provider) have been cited as key determinants of demand for health care (Mwabu *et al.*, 1993; Ellis *et al.*, 1994; Sahn *et al.*, 2003; Baker 2006). Other determinants are psychological and monetary costs of taking action (including costs, time, money, effort, stigma, social distance, feeling of humiliation and the like); beliefs in the efficiency of recommended health care (itself related to beliefs about the cause of the disease). In this study service characteristics taking into account efficiency in terms of accessing a particular modern human and animal health care service (availability, perceived costs involved and proximity –located within walking distance or not).

Disorder characteristics is another influencing factor on HL, HB and HCSB. Patient's ability to acquire and use information is dependent upon the specific health problem

⁴North West Public Health (n.d). Evaluation of Approaches to Health Literacy in Ashton, Leigh and Wigan <http://www.nwph.net/nwpho/Publications/NHS%20ALW%20Health%20Literacy%20Final%20Oct%202012.pdf>

faced, the type of illness also influences the choice of a medical channel, (Pathway Model and Determinant Model of Illness Behaviour) (Akinawo and Oguntimehin, 1997; Tipping and Segal, 1995). Perceptions on diseases and other social aspects is another important aspect in understanding the determinants of HB and HCSB (Baker, 2006) as it leads to the recognition of particular symptoms; the perception of those symptoms and the threat of disease; and the extent to which symptoms disrupt family, work and other social activities as explained in a model by Kuoeger, (1983) as cited in WHO (1995:5).

Attitudes and perceptions towards health behaviours were considered to be other variables having a direct link on HB. These aspects are well articulated in the PEN-3 model. This is based on the fact that an individual is likely to maintain a particular health behaviour if either particular individual(s) or the community around is having a positive attitude or perception over it. In this study, it was considered worthwhile to assess attitudes and perceptions on HB, diseases and other social aspects. Attitudes and perceptions are very important as public perception tend to influence and shape people's behaviour. The Theory of Reasoned Action shows how behavioural intentions are influenced by attitudes towards behaviours and subjective norms. Attitudes, in this case, are determined by the belief that the desired outcome will occur if a particular behaviour is followed and that the behaviour will benefit health. Subjective norms relate to the influence other people have on an individual's behaviour - the views of significant others are important here (Glanz *et al.*, 2008; Nutbeam *et al.*, 2010). According to Nutbeam *et al.*, (2010), Social norms theory suggests that much of people's behaviour is influenced by their perception of how other members of their social group behave. From this theory, the study was interested with an aspect of how people's behaviour is influenced by their perception of how other members of their social group behave in the context of the interface of humans, animals and the environment. The traditions and customs have been considered to have a lot of influence on behavioural aspects. There are instances where certain practices have been maintained on a consideration that they have customary values regardless of their consequences. In the context of an observation that the efforts of the government on improving health services and educating people to

become more health literate did not yield positive outcomes, it was important to investigate on perceptions and attitudes of the people towards HIBs.

A better understanding of beliefs about health explains HB very well. The Health Belief Model (HBM) predicts that individuals will take action to protect health if they perceive themselves to be susceptible to a problem and if they believe it will have serious consequences. Besides, individuals also need to believe a course of action is available that will reduce their susceptibility, and that the benefits of taking action outweigh the costs or barriers (Rosenstock, Strecher and Becker, 1994; Sheeran and Abraham, 1995 as cited by Hausmann-Muela *et al.*, 2003). According to a model by Kuoeger, (1983) as cited in WHO (1995:5), the choice of healthcare is also influenced by beliefs in the efficiency of recommended health care (itself related to beliefs about the cause of the disease).

To further capture aspects of HB and HCSB, this study had to analyse local people's experiences with diseases, availability of traditional versus modern treatment, knowledge and beliefs about diseases, the decision process for seeking health services, and parochial versus cosmopolitan outlook of diseases. These aspects have been covered partly under service characteristics, disorder characteristics and prior knowledge in Fig.4.

Andersen's behavioural model of health care use presupposes that the utilization of health care is influenced by the predisposition, the ability and the need to use health services (Andersen and Newman, 1973). Andersen grouped factors influencing utilization into three main categories which are population characteristics, health care systems and the external environment (Andersen, 1995): This is presented in Fig. 4 partly under perceptions on diseases and other social aspects also under services characteristics.

How do people perceive diseases in terms of how they can prevent them from their social roles. Such perceptions are expected to make one react/behave in a certain way. This is recognised to be an important aspect of health care seeking. The 'Sick Role'

Theory claims that there is general recognition that being sick is an undesirable state; and to facilitate recovery, an individual is expected to seek medical assistance and to comply with medical treatment (Williams, 2005; Parsons, 2005). This aspect is analyzed under disorder characteristics in Fig. 4.

The importance of lay networks and cultural factors (beliefs about disease causation and the potential efficacy of different forms of care have been said to affect the toleration or not of different symptoms) for determining health-seeking behaviour (see for example WHO, 1995; Amaro and Gornemann, 1991; McCormack, 2012). The study focused on social networking to analyze the influence of lay networks and some other cultural factors on the choice of a healer and maintenance of some HL, HB and HCSB. The Social Cognitive Theory (Social Learning Theory) emphasizes the influence of other people on an individual's behaviours, observational learning and the role of self-efficacy (Nutbeam *et al.*, 2010). The Behavioural economics and choice architecture approach recognises that people do not always behave rationally, with behaviours often being governed by instinct, emotion, past events and the people around us (National Social Marketing Centre, 2011). The framework presented in Fig. 4 accommodates a set of independent variables that influence people's behaviour in choosing healthcare sources.

This study focused on the perceived or self-reported HL, HBs and their perceptions on the effectiveness of stakeholders' initiatives (collaborative efforts and strategies) on in building public health capacity, developing HL and empowering people to manage their health in the interface of humans, animals and the environment. It established the realities concerning levels of HL, HBs exhibited and health care sources preferences plus the effectiveness of stakeholders' efforts in health-related aspects. The study analysed how HL, HBs and HCSB connect under OHA. The conceptual framework for this study is presented in Fig. 4.

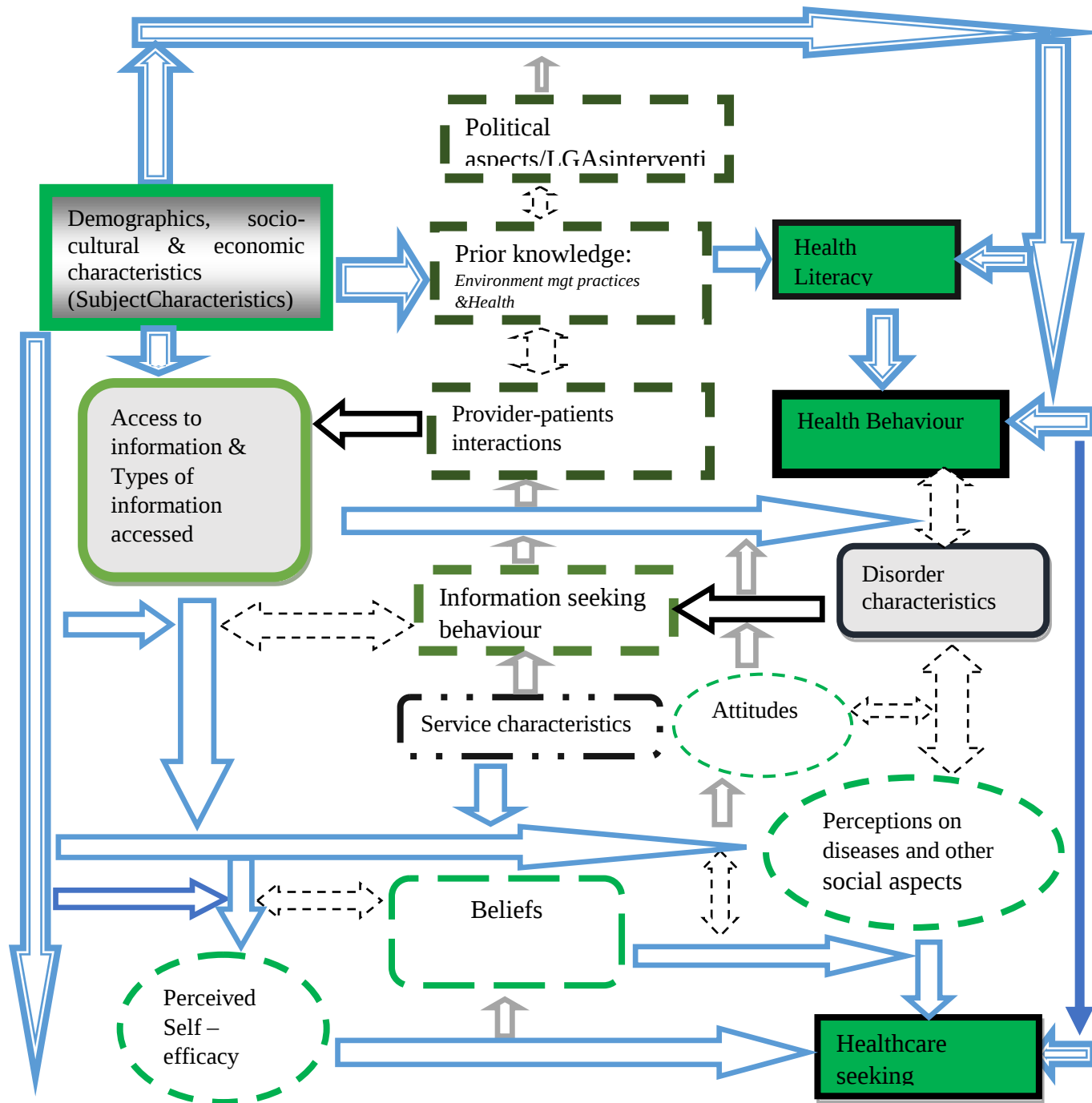


Fig.4: Conceptual Framework

Source: Researcher's own construct based on a systematic review of literature

2.26 Chapter Summary

Chapter 2 examines various aspects of HL and HB reflected in the interface of humans, animals and the environment connected to this study. This includes the geographical and economic description of the study area and human demographical parameters. It uncovers population and health policies and programmes in Tanzania and how these policies and programme shape policy landmarks that encourage comprehensive HL initiatives in the context of OHA. Additionally, the review exposes numerous theoretical and methodological aspects informing this study; including approaches towards measuring HL. This brings forth health literacy, health behaviour, health and quality of population into a connection in terms of how they influence each other. It moves into general determinants of HL, HB and HCSB. It identifies how scanty information is on the body of literature concerning HL globally and in Tanzania in particular, but little of what is found in the literature none is connecting HL to OHA. The literature makes it clear that HL is context-specific and that low, problematic or inadequate HL is a common phenomenon across the world regardless of the level of the economy of a country studied. Finally, the chapter explored various studies on the HL which exhibited some important methodological aspects for this study to adapt and adopt.

Source	Methodological Aspect	Aspects/Variables Adopted/Adapted
Sorensen <i>et al.</i> , (2012)	HLS-EU Conceptual Model	Matrix of Sub-dimensions of HL, HL Indices
Paasche-Orlow and Wolf (2007).	Provider-Patient Interaction	How the interaction creates an avenue for information exchange
Nutbeam <i>et al.</i> , (2010)	Social Norms theory	An aspect of how people's behaviour is influenced by their perception of how other members of their social group behave.
Gallant (2013)	Social Networks and Health	The influence of social networks on HB
National Social Marketing Centre, (2011)	Behavioural economics and choice	Governors of behaviours
NICE (2007)	Making Every Contact Count <i>The NHS's role in the public's HL</i>	Impact of Health Staff contact as an opportunity to maintain and, where possible, improve the mental and physical health and wellbeing of the presenting patient.
Parsons (2005)	'Sick Role' Theory	Perceptions of people on how diseases can prevent them from their social roles and how they react/behaviour towards that
Kuoeger (1983)	The choice of a healer in relation to various possible explanatory variables	The types of healers and other explanatory variables
Hausmann-Muela; Ribera and Nyamongo, (2003)	Knowledge, Attitudes and Practices (KAP) Survey	Approaches and facets of the survey
Gazmararian (2003)	HL Categories	Classification/categorization of HL
Conner (2002)	Classification of HB	Classification of HB
Airhihenbuwa, 1995; 2007	PEN-3 model	Health behaviours in the cultural context

CHAPTER THREE

METHODOLOGY OF THE STUDY

Introduction

This study employed both qualitative and quantitative research techniques. Qualitative techniques dealt with multiple realities in the study, with a focus on verbal narratives and observations (understanding and meaning) rather than numbers. Qualitative research generally takes place in naturally occurring conditions, as compared to quantitative research, whereby behaviours and settings are controlled and manipulated (McMillan, 2000, cited by Zafirovski, 2005). The quantitative techniques were descriptive and inferential in design with data collected using a questionnaire-based survey. According to Kothari (2009), descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose is a description of the state of affairs, as it exists at a particular time.

3.1 Geographical Location of the Study Area and Justification for its Choice

This study was conducted in Morogoro municipality and Mvomero districts both found in Morogoro region, Tanzania. Morogoro region is one among the regions in Tanzania Mainland that is found on the eastern side of the country. The region lies between latitudes 5°58' and 10°00' South of the Equator and longitudes 35°25' and 38°30' East of Greenwich. According to the 2012 Census, Morogoro region had a population of 2.22 million people distributed in six (6) districts with 506,289 households, and average household size being 4.4 people (URT-NBS *et al.*, 2013). It is bordered to the north by Tanga and Manyara while to the eastern side are the Coast and Lindi regions. On the western side, there are Dodoma and Iringa regions while Ruvuma is located to the southern side of the region (URT, MAFSC, 2014).

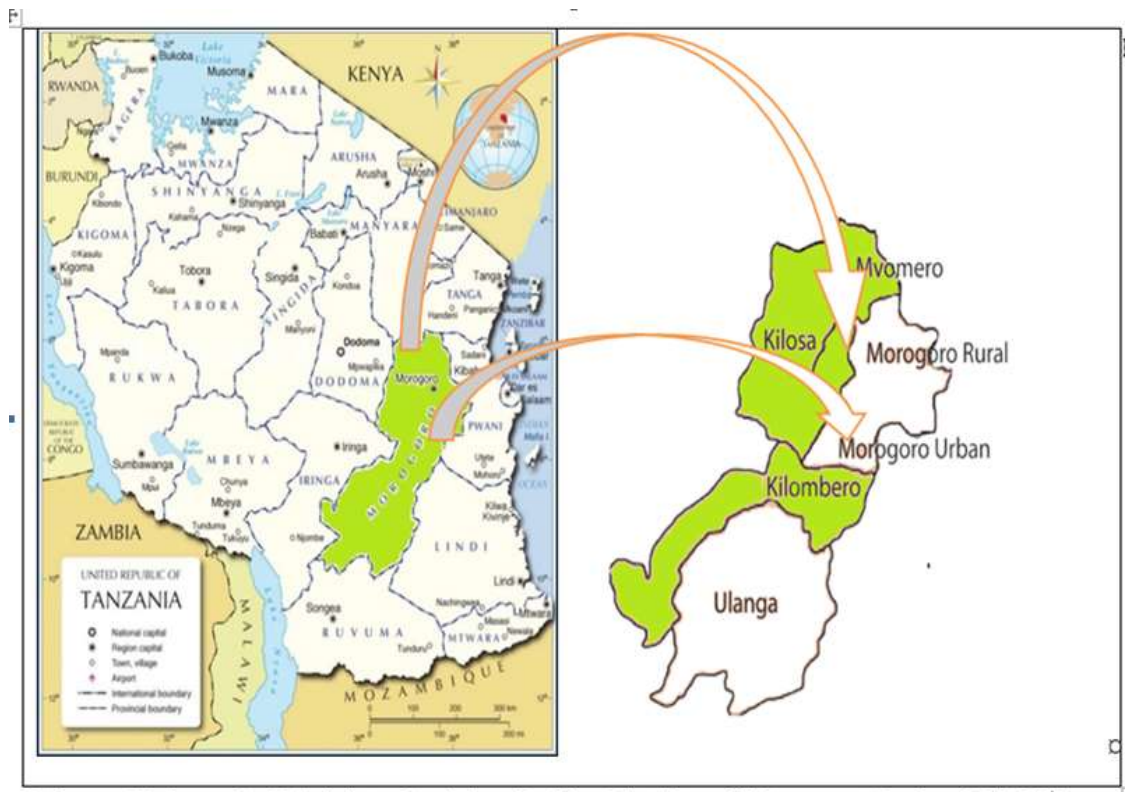


Fig. 5: Tanzania Administrative Map (Left) – Districts of Morogoro Region (Right)

The National One Health Strategic Plan 2015 – 2020 locates Morogoro under potential routes of risks exposure due to the identification of some incidences of zoonotic diseases in the area (URT-PMO, 2015:16). The choice of Morogoro urban and Mvomero districts in Morogoro region in Tanzania for this study is justified because there have been numerous incidences of interactions of humans and animals which have been reported in the area. This area is home to a pastoral community of Maasai origin. It is bordered by the Mikumi National Park, hence has a higher level of interaction between human and animals which is likely to lead to a higher risk of diseases due to possibility of prevalence of certain health behaviours. Studies (Karimuribo, *et al.*, 2005; Mgone *et al.*, 2014) have also identified health risks present in the area. This area is also occupied by inhabitants of very diverse socio-cultural and economic backgrounds, hence providing a very good opportunity to conduct a study of this nature where a phenomenon under

study requires comparison. Presence of medical and veterinary staff in these two districts also presents an opportunity of interaction to resolve issues under OHA.

3.1.1 Mvomero district

Mvomero district covers 6,633 km² distributed in 17 wards with a population of 312,109 (comprising of 154,843 males and 157,266 females), with a population density of 47.055/km² according to the 2012 census. It is home to among others, a pastoral community of Maasai origin; animal keeping community. It is bordered by Mikumi National Park, source of livestock products for Morogoro urban. Animal keepers are at higher risk of diseases due to uptake of raw livestock products (NBS *et al.*, 2016).

Table 3.1: Population in Selected wards in Mvomero District Council

S/No.	Ward	Population (Number)	Average HH Size
1	Doma	9,495	3.8
2	Melela	2,429	4.2

3.1.2 Morogoro municipality

Morogoro municipality has a population of 315,866 distributed in 19 administrative units namely as Wards (Tanzania NBS, 2013). Morogoro municipality covers an area of 288 km² – with a population density of 1,095.4/km². The area is inhabited by people with diverse socio-cultural and economic backgrounds, it is also the main market to livestock products from the Mvomero pastoral community (NBS *et al.*, 2016).

Table 3.2: Population in Selected wards in Morogoro Municipal Council

	Ward	Population (Number)	Average HH Size
1	Mazimbu	19,527	4.2
2	Kihonda	21,307	4.4

3.2 Research Philosophy and Paradigm

Dill and Romiszowski (1997) state the functions of paradigms as follows:

- Define how the world works, how knowledge is extracted from this world, and how one is to think, write, and talk about this knowledge
- Define the types of questions to be asked and the methodologies to be used in answering
- Decide what is published and what is not published
- Structure the world of the academic worker
- Provide its meaning and its significance

In the development of knowledge and the nature of knowledge for this study. The following consideration was taken :

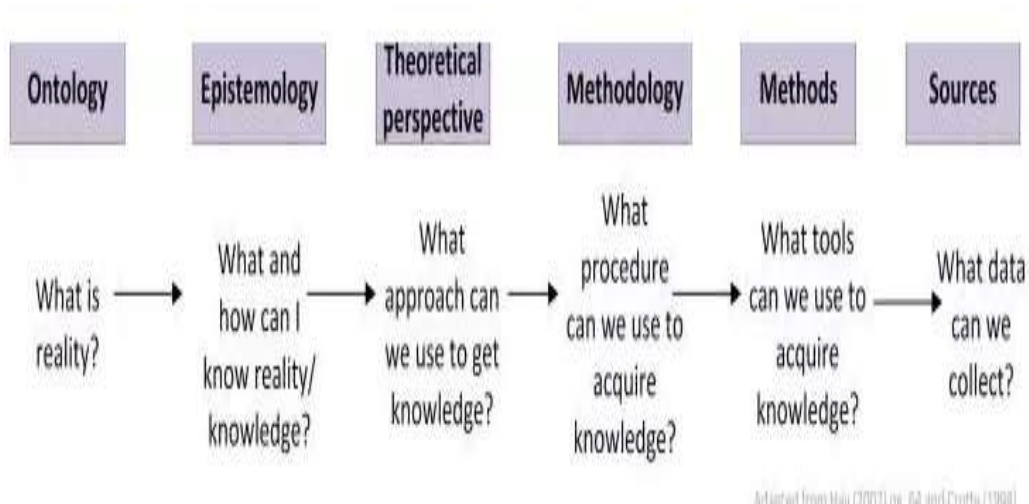


Fig. 6: Research philosophy and paradigm (general)

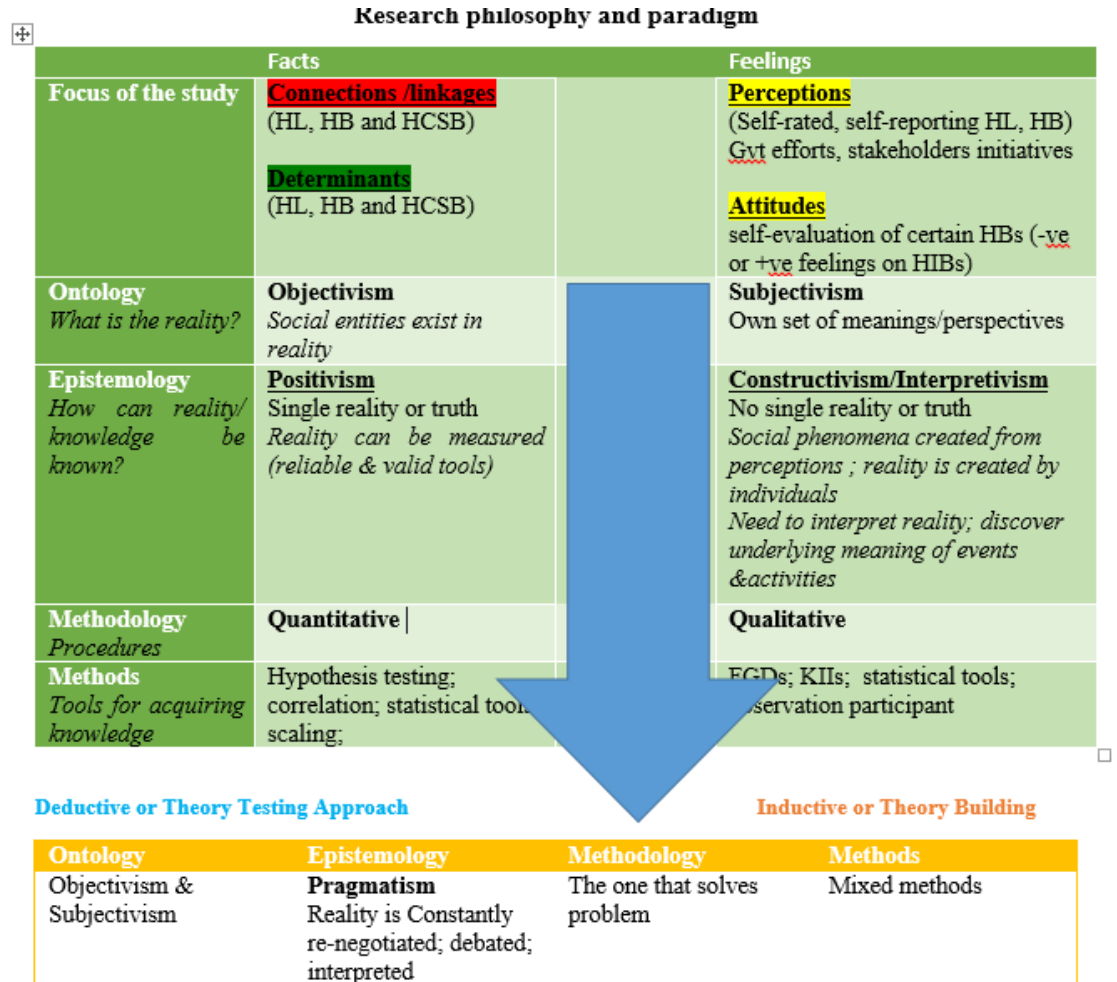


Fig. 7:Research philosophy and paradigm for this study

3.2.1 Research Design

A research design is an arrangement of conditions for collection and analysis of data in a manner that aims to combine the research purpose with economy in the procedure (Kothari, 2009). A structured questionnaire with open and close-ended questions was used to collect quantitative data. The main instruments used for data collection were household questionnaires, focus group discussions (FGDs), and key informants interviews (KIIs). For the qualitative part of the study, data was collected through FGDs and KIIs. A total of eight (8) FGDs were conducted in the study one (1) in each street/ village (see sub-section 3.4.1). Coenen *et al.*, (2012) assert that five FGDs are enough to reach saturation for inductive thematic analysis.

In this study, a total of sixteen KIIs were conducted. Key informant interviews are qualitative in-depth interviews with people who know what is going on in the community. The purpose of key informant interviews is to collect information from a wide range of people—including community leaders, professionals, or residents—who have first-hand knowledge about the community. These community experts, with their particular knowledge and understanding, can provide insight into the nature of problems and give recommendations for solutions (UCLA Center for Health Policy Research, *n.d*). Namey (2017) asserts that for interviews to reach saturation a total 6-12 interviews can afford that.

A cross-sectional research design was applied in this survey research. Cross-sectional research design allows data to be collected at a single point in time and used in descriptive analysis and for determination of relationships among variables (Ritchie and Lewis, 2003; Given, 2008). The cross-sectional research design was considered favourable due to the nature of the study's objectives, which needed data to be collected at a single point in time by using a structured questionnaire.

3.3 Populations, Sampling Units, Sampling Techniques and Sample Size

3.3.1 Population for the study

The population for the research was all households with livestock species at Mvomero district. In Morogoro municipality, the population included all the households.

3.3.2 Sampling Units

The sampling consisted of - (i) households, (ii) focus group participants, and; (iii) key informants.

3.3.3 Sampling Techniques, Sample Size Calculation, and Sample Size

Multi-stage sampling procedures were used in selecting study units, involving four (4) stages (in choosing districts, wards, villages/streets, and HHs). Identification of the districts, wards and villages/streets for the study was made through purposive sampling,

whereas respondents from the study areas were selected using simple random sampling. The multi-stage sampling procedure is useful in studying large and diverse populations where the costs are reduced because of sequential clustering (Singleton *et al.*, 1993; Kothari, 2004). The inclusion criteria for the wards in Mvomero district were those wards that pastoralists were mostly residing, and for the households, those having animals being kept and selling of livestock products to Morogoro urban, while those wards which were included in the study from Morogoro were those from areas products from Mvomero districts were sold, these are the wards where meat (particularly *offals*; *utumbo* in *Kiswahili*) and milk vending by Maasai from Mvomero district has been taking place⁵. Four wards were purposely selected to participate in the study, two from each district after meeting the criteria. The selected wards were Doma and Melela wards in Mvomero districts also Mazimbu and Kihonda Maghorofani in Morogoro municipality. Thereafter two villages/streets were purposively selected from the four wards making a total of eight villages/streets. The reconnaissance visits identified these vendors mostly in Reli and Mazimbu Darajani streets in Mazimbu ward also at Msamvu B and Maghorofani in Kihonda Maghorofani wards. Patton (2002: 230) argues that “The logic and power of purposeful sampling lies in selecting information-rich cases for study in-depth”, which have the potential to yield insights and an in-depth understanding rather than empirical generalizations. This form of participant selection focuses on selecting information-rich cases whose study will clarify the questions under study.

For sample size estimation, a 95 percent confidence interval (CI), a margin of error of 5percent, and a design effect of 1.5 were assumed. Design effect was used since the multistage sampling method was employed. A minimum adequate sample size was calculated based on the statistical estimation method by Kelsey et al. (1996). A sample size of 1440 respondents was determined by using the formulae:-

$$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P(1 - P).$$

Where:-

s = required sample size.

⁵These traders are popular in the area as *Wang'ombe* and *Baba Yeyo*

χ^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

The sample size for this study was calculated from the total population of each of the two (2) purposive selected streets/ villages from a ward. After obtaining the total sample for each ward, the proportions of each street/village from the total sample was calculated. The sample size was then distributed in the identified study streets/ villages. The sample size allocated for each village/ street was considered adequate since Bailey (1994) and Field (2009) claim that a sub-sample of 30 respondents being the bare minimum for studies in which statistical data analysis is to be done regardless of the population size.

Using across-sectional design both qualitative and quantitative data were collected. The choice of this design is based on being economical in terms of time, financial resources and nature of the study objectives (Kothari, 2004). A structured questionnaire guide using a Computer Assisted Personal Interviewing (CAPI) electronic platform was used for data collection. The local leaders were involved in preparing the sampling frame. IBM-SPSS v20 and Gretl software were used for computing frequencies, percentages, mean and maximum scores, chi-square, and coefficients correlation. All statistical tests were considered significant at $p\text{-value} = <0.05$.

Table 3.3: Distribution of study Population in the Selected Study Villages/Streets

District	Wards	Villages/streets	Population	Sampled population	Sample Distribution based on Total population
Morogoro	Mazimbu	Reli	2623 (2009)		186
		Mazimbu Darajani	2507 (1799)		177
		Total	5130 (3808)	363	363
	Kihonda/M	Maghorofani	3887		213
		Msamvu B	2777		153
		Total	6664	366	366
Mvomero	Doma	Maharaka	4595		181
		Doma	4900		193
		Total	9495	374	374
	Melela	Melela (Kidayi)	928		129
		Kibaoni	1501		208
		Total	2429	337	1440

3.4 Data Collection

Both quantitative and qualitative data were collected. The use of mixed data allows the researcher to have an in-depth understanding of indigenous patterns, traditions and practices, while at the same time enjoying the advantages of generalisation of research findings over a large population (De Lisle, 2011). This was used for triangulation to enrich the study findings.

Data collection was done in three (3) phases commencing on September 2016 and completed in May 2018. Before data collection, three enumerators were recruited and trained on the basic techniques of data collection. To ensure the validity and reliability of data, the three research instruments were pre-tested before they were used for actual data collection. Data collection was preceded by pre-testing of the research tools. Pre-testing of the questionnaire was carried out before the main investigation at Kingo ward in Morogoro municipality and Mzumbe ward in Mvomero district. Pre-testing of the research instrument covered some few individuals in these areas. The objectives for the

pre-testing of the research instruments were: (i) to pre-test both the checklist and the questionnaire, (ii) to determine the approximate time that will be needed to complete the data collection work, (iii) to ascertain the availability of data for the objectives of the research, and; (iv) to determine the most efficient way of carrying out the main research. Necessary changes were made based on the pre-testing results.

The Principal Investigator (PI) administered all the questionnaires and interview schedules with the assistance of 3 trained Enumerators. Data collection was administered through Computer Assisted Personal Interviewing (CAPI) electronic platform for questionnaires using tablet devices. The use of CAPI reduced the time lag between data collection and data analysis, reduced costs for questionnaire printing, and created convenience during the survey. For the case of FGDs, the FGDs guide was handled by the PI and the note taker assisted the PI in recording the conversation. Some of these instruments were translated into Kiswahili the local language of the subjects of this research; English language instruments were only administered to professionals.

3.4.1 Primary data collection

Primary data collection was accomplished through a structured questionnaire to obtain quantitative data. For qualitative data interview schedule and semi-structured interviews were used to interview respondents, key informants, and focus group participants. Moreover, personal observation, especially visits in public health centres, hospitals, households and abattoirs was employed to see the real situation concerning HL, HB and HCSB on the ground.



Photo 1



Photo 2

(Photo 1)PI explaining a point during FGDs at Doma, (Photo 2) Backyard slaughtering and meat inspection at Kihonda Maghorofani

Eight (8) FGDs were held involving 8 to 10 participants in each case. Composition of the FGDs was determined by the baseline survey. The FGDs, guided by a checklist of items, were conducted in venues where there was privacy so that other people could not listen to the discussions. During the FGDs, the discussants were free to express their feelings, attitudes and problems relating to HL, HB and HCSB. In each of these FGDs, thematic data saturation was reached. Thematic data saturation refers to data adequacy and it is reached when there are no new emerging ideas in the data (Kerr, *et al.*, 2010; O'Reilly and Parker, 2012; Houghton, *et al.*, 2013). This study also used Knowledge, Attitudes and Practices (KAP) surveys. KAP surveys are reported to be possibly the most frequently used studies in health-seeking behaviour research (Hausmann-Muela *et al.*, 2003: 3)

Table 3.4: FDGs: Location, Participants and Composition

Location	Number of participants	Composition	Total time
Reli street	10	Males and females	75 minutes
Mazimbu Darajani	8	Males only	69 minutes
Maghorofani	10	Females only	73 minutes
Msamvu B	10	Males and females	78 minutes
Maharaka	10	Females only	75 minutes
Doma	10	Males and females	75 minutes
Melela (Kidayi)	10	Males only	75 minutes
Kibaoni	10	Males and females	75 minutes

3.4.2 Secondary data collection

Secondary data were collected from various publications and reports of the central and local governments, statistics from hospitals and health centres, wards; and district, regional and national offices. Moreover, literature from the University of Zambia and Sokoine University of Agriculture libraries and internet was reviewed to supplement information acquired from primary data.

3.4.3 Instruments for Data Collection

3.4.3.1 Data on HL assessment

The first objective of the study aimed at assessing the extent to which individuals and professionals are health literate (based on the definition) in the context of the interface of humans, animals and the environment. This sub-study adapted some methodological aspects from the European HL Survey (HLS-EU, 2012: 4). The HLS-EU conceptual model integrates three health-relevant areas (health care, disease prevention, health promotion) and four information processing stages (access, understand, appraise, apply) related to health-relevant decision-making and tasks. These areas and stages combined create a matrix measuring HL with 12 sub-dimensions, which were operationalized by 47 items assessed using a 4-point self-report scale (very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected health-relevant tasks.

In this sub-study (objective) a questionnaire was developed reflecting health and related issues under the interface of humans, animals and the environment based on the approach presented in the matrix in Table 3.5. After reviewing current knowledge on HL assessment tools and approaches (including HL-EU Indices), a context-specific HL

assessment tool and approach to assessing HL in Tanzania under OHA was developed see Appendix II. The developed tool concentrated on health-related aspects in the interface of humans, animals and the environment. This tool involved activities reflecting several aspects which influence realizing optimal health for humans, animals and the environment. The matrix measured HL under OHA on a 4- point self-report scale (very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected One Health relevant tasks in the selected research sites in Morogoro, Tanzania. The data obtained unveiled the realities concerning HL of the people under OHA through respondents' self-reporting (perceived) HL.

Table 3.5: Matrix of Sub-dimensions of HL Based on the HLS-EU Conceptual Model

HL	Access/obtain information relevant to health	Understand information relevant to health	Appraise/judge /evaluate information relevant to health	Apply/use information relevant to health
Health Care	1) Ability to access information on medical or clinical issues	2) Ability to understand medical information and derive meaning	3) Ability to interpret and evaluate medical information	4) Ability to make informed decisions on medical issues
Disease Prevention	5) Ability to access information on risk factors	6) Ability to understand information on risk factors and derive meaning	7) Ability to interpret and evaluate information on risk factors	8) Ability to judge the relevance of the information on risk factors
Health Promotion	9) Ability to update oneself on health issues	10) Ability to understand health-related information and derive meaning	11) Ability to interpret and evaluate information on health-related issues	12) Ability to form a reflected opinion on health issues

Source: Sorensen *et al.*, 2012)

3.4.3.1.1 Reliability of the HL scale

This study adapted a scale that was used in the EU-Health Literacy survey. The scale comprised of 141 items. To suit the purposes of this study some modifications were made to fit the context of this study. It was worthwhile to test the reliability of the scale.

Internal consistency of a scale according to Pallant (2007), among others, is a very important reliability aspect to the scale. This refers to the degree to which the items that make up the scale hang together and measure the same underlying construct. Cronbach's alpha coefficient is the most commonly used indicator of internal consistency. According to DeVellis (2003), Cronbach's alpha coefficient of a scale should be above 0.7. The scale used in this study was tested for its internal consistency. The results are presented in Table 3.6.

Table 3.6: Reliability Statistics for HL scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.975	.989	141

Table 3.6 shows the Cronbach's alpha value. In this study, the Cronbach's alpha coefficient was 0.975. The value indicates a very good internal consistency reliability for the scale with the sample for the study.

3.4.3.2 Data on HB and HCSB under OHA

Objective two of this study analysed HB and HCSB under OHA. It specifically analysed all those actions/activities that have harmful effects on health or otherwise predispose individuals and animals to diseases (health impairing behaviours) plus those which conveyed health benefits or otherwise protect individuals and animals from diseases (health-enhancing behaviours). This sub-study gave answers to question on what people do that could impact on their health and which health care services they resort to in the case of ill health in the context of the OHA.

Literature was reviewed to identify various practices/ habits that could either impair or enhance health in the context of the interface of human, animals and the environment. Probing was made on the kind of Knowledge, Attitudes and Practices in place to reflect the HB and consequently HCSB. Identified habits/practices were categorised into health-enhancing behaviours and health impairing practices/behaviours (see subsections 2.16.1-2.16.5 in Appendix I), respondents were then asked if they had ever involved themselves in such practices/ habits in the past three months. Attitudes towards those

behaviours were analysed. For the case of HCSB, respondents were asked on their preferences in terms of health care source utilization ranging from traditional healers, self-treatment, no treatment, pharmacy or going to the hospital. The frequency at which an individual engages in any of the acts described his/her HB while HCSB only dealt with the preference of health care service sources. The data obtained under this revealed the realities concerning HB and HCSB of the people under OHA through own or self-reporting (perceptions) and attitudes towards HB.

3.4.3.3 Data on Determinants of HL, HB, and HCSB

Objective three (3) of this study investigated on what influences/determines HL, HB and HCSB in the context of OHA. This took into consideration the fact that there are some environmental, political and socio-economic factors at play towards influencing these variables under study. It further examined the role of socio-demographic variables (age, marital status, family size, gender etc) and cognitive variables (such as health beliefs, attitudes, and perceptions and about diseases, symptoms, self- efficacy etc). These variables have been documented in some other studies to influence HL, HB, and HCSB but these studies were purely based on human health hence did not take into consideration the interactions of humans, animals and the environment and its consequences towards attaining optimal health for humans, animals and the environment. Semi-structured interviews (for individuals, veterinarians, medical personnel in private and public health clinics, pharmacists, traditional healers, political leaders etc) examined the role of various variables as described in various models to assess how they influence/determine HL, HB and HCSB under OHA. These were also aligned towards KAPs orientation plus FGDs.

3.4.3.4 Data on Collaborative Efforts and Strategies on One Health Approach

Objective four (4) of this study identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary), social, economic, agricultural, environmental, wildlife and other interested parties — to attain optimal health for people, animals and the environment. Household members and key informants (the medical and veterinarians) responded to questions which aimed at

soliciting information on the situation about the collaborative efforts and strategies bringing together those professionals.

3.4.3.5 Data on the Linkages between HL, HB and HCSB under OHA

This sub-study under objective five determined the linkages between HL, HB and HCSB under OHA. It specifically established empirically how HL can influence these variables, the influence of HL on certain HB hence, the choice of certain health care seeking services in the interface of humans, animals and the environment. The linkage between HL, HB and HCSB under OHA was established by analysing the association between the HL score versus HB score; HL levels versus HCSB; HL levels versus HCSB and HB versus HCSB. This item has been explained under objective one and objective three (subsections 3.4.3.1 and 3.4.3.3) of this report. The data obtained here explained the associations /linkages (connections) among these variables.

3.4.3.6 Data on Government Initiatives on Public Health and HL

This sub-study under objective six assessed government initiatives in building public health capacity, developing HL and empowering people to manage their health. It specifically analysed how human and livestock health policies and institutions facilitate OHE practices at the study area, the role of other institutions in facilitating health in the society, and perceived effectiveness of their initiatives in the study area. The realities and perceptions were also established from the data collected under this sub-study.

Under this sub-study, the following were also done:-

- Policies, directives and secondary information from other sources to supplement primary data were reviewed
- There were one to one in-depth interviews with the selected key informants in each study area.

3.5 Measurement of Variables

This sub-section clarifies how various variables were measured in this study for statistical analysis.

3.5.1 Health Literacy

To measure HL, this study adapted methodological aspects from a model used in European HL Survey (HLS-EU, 2012: 4). This European HL Survey was based on human health aspects alone (see Table 3.5). For this study, the model was modified by adding variables related to humans, animals and the environmental health to fit in the context of OHA. Therefore, HL was measured by asking respondents “*On a scale from very easy to very difficult, how easy would you say it is to: i.e (find information about symptoms of illnesses that concern you?)*”. The items which were asked in these questions mainly reflected three(3) health-relevant areas (health care, disease prevention, health promotion) and four (4) information processing stages (accessing, understanding, appraising, application) related to health-relevant decision-making and tasks on health and other associated aspects under the interface of humans, animals and the environment. This led to the development of a context-specific HL assessment tool to assess HL under OHA, a matrix measuring HL under OHA on a four (4)- point self-report scale (very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected one health-relevant tasks (Appendix II). An index of the score was constructed to measure HL by assigning four (4) points to “very easy” response, three (3) points to “easy” response, two (2) points to “difficult” response, and one (1) point to “very difficult” response. Using IBM-SPSS (v20) under percentiles values, HL scores were cut into 3 equal groups to represent HL categories into Inadequate Health Literacy (IHL) (below the scores of 211.0000), Marginal Health Literacy (MHL) (between 211.0000 and 261.0000 scores) and Adequate Health Literacy (AHL) (the scores above 261.0000). Percentiles values were used to categorise HL.

3.5.2 Health Behaviour

In any study on HB, it is important to define the behaviour of interest as clearly as possible (Ajzen and Fishbein, 1980; Fishbein *et al.*, 2001). According to Ajzen and Fishbein (1980), behaviours can be defined in terms of four components: action, target, time and context. The action component is an obligatory element of the definition of any behaviour. The target component is usually necessary, depending on circumstances.

Time and context are optional; only for specificity on a particular definition of behaviour. In this study, individuals were asked: *“In the past three (3) months have you ever i.e consumed raw meat”*? Here, ‘consume’ is the action, ‘raw meat’ is the target and ‘in the past three months’ is the time component. No context was specified in this study.

Studies were reviewed to identify HB and practices under the interface of humans, animals and the environment (Refer Appendix I) . For this study, these behaviours were summarized and categorised into health-enhancing and health impairing behaviours. Identified behaviours were measured as dichotomies: with a “Yes/No response.” This implies that a person had a choice between two mutually exclusive and exhaustive alternatives: performing the behaviour or not performing it. A similar approach has been used by Weinstein (1993). An index score was constructed to measure behaviours, where all “No and Yes” responses were coded 0 and 1 respectively. A total of 38 health impairing practices/habits were presented and respondents were supposed to indicate if they had involved themselves or not in such practices by saying “Yes or No”. Given the fact that the presented practices/ behaviours were health impairing, hence the higher the score the lower engagement in health-enhancing behaviours and vice versa. The scores were computed from all “Yes” responses with a value of one (1) and all “No” responses from the value of zero (0). Mean score was computed and all the scores below the mean value signified the low level of involvement in HIPs/ health impairing practices hence exhibiting HEBs, while all those scores above the mean signified a high level of involvement in HIPs hence exhibiting HIBs. Using IBM-SPSS (v20) under percentiles values; HB scores were categorised into HIBS (HIBs) (the scores above 23.45) and Health Enhancing Behaviours (HEBs) (below the scores of 23.45).

3.5.3 Assessment of Health Care Seeking Behaviour

To determine HCSB, the respondents were asked about their preferences in terms of health care service sources. Five (5) health care service sources were presented to the respondents for them to rank based on their preferences. Sources of health care service presented to the respondents included no treatment, self-treatment, traditional healer,

pharmacy/veterinary and medical/veterinary personnel. To simplify analysis and discussion, these sources of health care service were collapsed into a dummy variable containing formal health care services/facilities (FHCS/F) and informal health care services/facilities (IHCS/F). The choices of health care sources under FHCS/F included pharmacy/veterinary and medical /veterinary personnel sources while no treatment, self-treatment and traditional healer were under IHCS/F.

3.5.4 Measurement of Attitudes towards HIB

Attitudes of individuals towards HIB were gauged using the same thirty eighty (38) Health impairing practices/habits identified through literature review (refer to Appendix I). The same health impairing practices/habits were subjected to attitudinal tests as Principle of Aggregation insists on the identification of a set of behaviours broadly representative of the same set of related behaviours known as a behavioural domain (Ajzen and Fishbein, 2005).

A Likert scale was used to measure attitudes of respondents towards HIBs in which thirty eighty (38) statements were administered, whereby half of the statements had negative connotation while the other half had a positive connotation. For each statement, the respondents were asked to indicate whether they strongly disagree, disagree, undecided, agree, or strongly agree with a statement. For all positive statements, the response “Strongly Agree” was given a weight of 5, while “Agree” was given a weight of 4, “Undecided” was given a weight of 3 and “Disagree” was given a weight of 2 and “Strongly Disagree” was given a weight of 1. For all the negative statements, the response “Strongly Agree” was given a weight of 1, while “Agree” was given a weight of 2, “Undecided” was given a weight of 3 and “Disagree” was given a weight of 4 and “Strongly Disagree” was given a weight of 5. Based on the statements provided, an index score for each respondent was constructed as a measure of their attitude towards HIBs. Using IBM-SPSS (v20) the scores were cut into 3 equal groups to represent a group of attitudes towards HBs, into unfavourable (negative), neutral (undecided) and favourable (positive) attitudes. The scores which were below 112 represented respondents who had unfavourable (negative) attitude towards health behaviours,

whereas scores ranging 112 to 117 represented neutral (undecided) attitudes and the score above 117 represented respondents who had positive attitudes towards health behaviours.

3.5.5 Measuring /Assessing Engagement on One Health Related Activities

The respondents were asked whether they had been involved in One health-related activities identified through the literature review to measure/assess their Engagement in One Health related activities (EOHRA) during the previous 3 months. A total of thirty (30) generic questions were asked. The responses were recorded as: '0' if one had not been involved in a certain activity in the past 3 months; '1' if had been involved in a certain activity in the past 3 months. These responses were then transformed into 1 and 2 respectively. Total scores as accumulated from EOHRA generic questions were computed for each HH. The total EOHRA scores were obtained by adding values for all the thirty (30) questions.

$$\text{Total EOHRA score (29-55)} = Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 + Q8 + Q9 \dots + Q30$$

Using IBM-SPSS (v20) under percentiles values; EOHRA scores were cut into 3 equal groups to represent levels of EOHRA categories into Inactive Engagement(IEOHRA) (below the scores of 33.3), Marginal Engagement (MEOHRA) (between 33.3 and 36.0 scores) and Active Engagement (AEOHRA) (the scores above 36.0).

3.5.6 Measuring/Assessment of Access to Health Information

To establish the extent to which individuals seek health information respondents were asked if in the past three months they had ever searched for health information. The respondents were required to indicate whether they had accessed and or searched for health information. A total of two (2) questions were asked to analyze respondents' health information seeking aspects. All the 'No' responses were coded 0 and the 'Yes' responses 1. These responses were then transformed into 1 and 2 respectively. Total scores as accumulated from these questions were computed for each household.

$$\text{Total HIS score (7-14)} = Q1 + Q2$$

To categorise health information seeking in the HHs the scores were cut into 3 equal groups to represent categories of health information seeking (HIS) by using IBM-SPSS under percentiles values. The categories are passive health information seeking (PHIS) (all scores below 9), moderate health information seeking (MHIS) (between 9 and 11 scores) and active health information seeking (AHIS) (the scores above 11).

3.5.7 Influence of Social Networking on HL and HB

To determine the influence of social networking on HL and HB the respondents were asked whether there was anyone outside their households that they went to ask for advice on health matters in the past three (3) months. The individuals are more likely to acquire new health practices while living in networks with dense clusters of connections -- that is when in close contact with people they already know well. The respondents were required to say “No” if they had no one and “Yes” if they had someone outside their households that they went to ask for advice on health matters.

3.5.8 Engagement in Health-Related Discussions

To measure/assess engagement in health-related discussions (EiHRD) respondents were asked whether they had involved themselves in health-related discussions for the previous 3 months on identified items through literature review. A total of 26 questions were asked on whether they had ever involved themselves in a discussion related to a particular item. The responses were recorded as: '0' if had not involved in a certain discussion in the past 3 months; '1' if had involved in a certain discussion in the past 3 months. These responses were then transformed into 1 and 2 respectively. Total scores as accumulated from EiHRD questions were computed for each household. The total EiHRD scores were obtained by adding values for all the 26 questions for each household.

$$\text{Total EiHRD scores (31-56)} = Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 + Q8 + Q9 + \dots + Q26$$

Health-Related Discussions Engagement was then categorised into levels; namely: - High level of Health Discussion Engagement, (scores above 45.0), Medium level of Health Discussion Engagement (scores between 36.0 and 45.0) and Low level of Health

Discussion Engagement (scores below 36.0) after cutting into three (3) groups using IBM-SPSS.

3.5.9 Levels of Community Members' Interaction with Professionals (CMIWP)

To measure the interaction of respondents with professionals (medical, veterinary and environmentalists) on health and related matters, respondents were asked if they had communicated with these professionals in the past three (3) months and if they had visited or been visited by any of these professionals. A total of 6 questions were asked, three (3) each, for communication and visiting aspects respectively. Respondents were required to respond “No” if they had not communicated with professionals and if they had not visited or been visited and ‘Yes’ responses if they had communicated with professionals and if they had visited or been visited. All “No” responses were coded as 0 and “Yes” responses were coded as 1. The responses were transformed to 1 and 2 for No and Yes responses respectively to compute the scores to indicate the level of community members' interaction with professionals. A total score was computed from the six (6) asked questions.

$$\text{CMIWP (3.00-6.00)} = Q1 + Q2 + Q3 + Q4 + Q5 + Q6$$

CMIWP was then categorised into levels; namely: - High level of CMIWP, (scores above 5.0), Medium level of CMIWP (scores between 4.0 and 5.0) and Low level of CMIWP (scores below 4.0).

3.5.10 Assessment of Knowledge, Attitudes, Perceptions and Beliefs on Diseases and Other Social Aspects

3.5.10.1 Knowledge, Attitudes and Perceptions on HL, HB and HCSB

To capture beliefs, knowledge, attitudes and perceptions on HL, HB, HCSB respondents were subjected to attitudinal statements. A Likert scale was used to measure knowledge, attitudes perceptions (KAPs) of respondents towards HL, HB, and HCSB in which thirty eighty (36) statements were administered, whereby half of the statements had negative connotation while the other half had a positive connotation. For each statement, the respondents were asked to indicate whether they strongly disagree, disagree, undecided,

agree, or strongly agree with a statement. For all positive statements, the response “Strongly Agree” was given a weight of 5, while “Agree” was given a weight of 4, “Undecided” was given a weight of 3 and “Disagree” was given a weight of 2 and “Strongly Disagree” was given a weight of 1. For all the negative statements, the response “Strongly Agree” was given a weight of 1, while “Agree” was given a weight of 2, “Undecided” was given a weight of 3 and “Disagree” was given a weight of 4 and “Strongly Disagree” was given a weight of 5. Based on the statements provided an index score for each respondent was constructed as a measure of their knowledge, attitudes perceptions (KAPs) towards HL, HB and HCSB under OHA.

$$\text{Total KAPs scores (101-129)} = Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 + Q8 + Q9 + \dots + Q36$$

3.5.10.2 Prior Knowledge, Beliefs, Perceptions and Attitudes towards Diseases

To test prior knowledge of the respondents on the diseases that are associated with the interface of humans, animals and the environment a total of 25 diseases were presented in the questionnaire for the respondents to identify their main symptoms, causes and treatments. Every correct answer had two (2) points that made a total of one hundred and fifty (three items for each disease: main symptom, cause and treatment). An index score was computed to gauge respondents’ prior knowledge on the diseases in the interface of humans, animals and the environment.

$$\text{Total Prior Knowledge Score ()} = Qi1 + Qi2 + Qi3 + Qi4 + Qi5 + Qi6 + \dots + Qi60$$

3.5.10.3 Belief in the Effectiveness of the Humans and Animals Health Services

To assess belief on the effectiveness of the human health services provided in the nearest health facility respondents were required to indicate whether they had:- (1) no belief at all, (2) no belief (3) had no idea, (4) moderate belief, or ; (5) high belief on the nearest modern human and animal health facility. For easy comparison, the scores for ‘no belief at all’ and ‘no belief’ were grouped into ‘no belief’; the scores for ‘had no idea’ were left intact, and the scores for ‘moderate belief’ and ‘high belief’ were

grouped into 'belief'. All the 'no belief' (no belief at all and no belief) responses were then given one (1) point and all the 'belief' ('moderate belief ' and 'high belief') responses were given two (2) points. An index of score to measure people's belief in the effectiveness of the human and animals health services was computed.

3.5.10.4 Knowledge, Attitudes and Perceptions on the Influence of Politics on Health

To assess knowledge, attitudes and perceptions on the influence of politics on health, the respondents were subjected to attitudinal statements out of which they were supposed to indicate their disagreements or agreements to the statements. A total of twenty-two (22) statements were administered, whereby half of the statements had negative connotation while the other half had a positive connotation. For each statement, the respondents were asked to indicate whether they strongly disagree, disagree, undecided, agree, or strongly agree with a statement. For all positive statements, the response "Strongly Agree" was given a weight of 5, while "Agree" was given a weight of 4, "Undecided" was given a weight of 3 and "Disagree" was given a weight of 2 and "Strongly Disagree" was given a weight of 1. For all the negative statements, the response "Strongly Agree" was given a weight of 1, while "Agree" was given a weight of 2, "Undecided" was given a weight of 3 and "Disagree" was given a weight of 4 and "Strongly Disagree" was given a weight of 5. Based on the statements provided an index score for each respondent was constructed as a measure of their knowledge, attitudes and perceptions on the influence of politics on health. A mean score was computed then used to categorise the response into negative influence and positive influence. All scores below the mean (negative influence) and all scores above the mean (negative influence).

3.5.11 Assessment of Service Characteristics (Perceived Efficiency on Accessing Modern Health Services)

To assess service characteristics, this study assessed the perceptions of respondents on the efficiency of accessing modern human and animal health services on the assumption that choice of other health care sources has always remained alternatives to modern health services. To that effect, respondents were asked on the availability, costs and

accessibility with respect to modern human and animal health services/facilities in the study area. A respondent was to say yes (available) or no (unavailable) for a respective human and animal service /facility, for the costs this study investigated on how respondents perceived the costs involved in human and animal services/facility whether affordable or not affordable. Another aspect involved in assessing services characteristics was on proximity /accessibility. Under this aspect, respondents were required to indicate whether a particular human and animal service was within walking distance or not within walking distance. To construct an index score, the responses were coded as 0 and 1 for unavailable and available respectively, 0 and 1 to indicate whether a certain service is unaffordable or affordable, not within walking distance (0) and walking distance (1).

3.5.12 Perceived Disorder characteristics

To be able to establish disorder characteristics the respondents were asked how serious did they perceive the disease lastly suffered in terms of how that particular disease interfered with the family, work and other social activities. The responses to this question included: - not at all serious (1), not serious (2); serious (3), very serious (4). To simplify the assessment, the responses ‘not at all serious’ and ‘not serious’ were collapsed into ‘not serious’; and the responses for ‘serious’ and ‘very serious’ were grouped into ‘serious’. This created a dummy variable.

3.5.13 Awareness on One Health Approach and Practices

To investigate respondents’ awareness of the One Health Approach, respondents were asked to indicate whether they had ever come across with the concept and practices related to OHA. This required the respondents to simply say yes or no to indicate their awareness of the concept and the practices. The responses were recorded as 0 and 1 for No and Yes respectively. This created a dummy variable.

3.5.14 Attendance to Seminars/Workshop/Campaigns/ Training on Health Related Aspects

Seminars, workshop, campaigns and training on health-related aspects act as sources of information on health-related aspects hence, are expected to influence both HL and HB.

Incognisant of that, this study investigated on the aspect of attendance to seminars, workshop, campaigns and training for the past 12 months. To that effect, respondents were asked if they had attended any seminars, workshop, campaigns, and training on health-related matters. A yes or no response was recorded for this question. This created a dummy variable.

3.5.15 LGAs Initiatives in Promoting Health

To establish LGAs initiatives in health promotion, health care and diseases prevention the respondents were asked a total of seven (7) questions. These questions were specifically meant to solicit information on the known initiatives by the LGAS in the study area concerning bylaws, directives and or policies on health promotion, health care and diseases prevention. The initiatives investigated included if there were any seminars/workshop, public announcements, village/wards/street meetings, visits by health officials from the wards, any parents meetings at school, leaflets distribution, any information dissemination on research on health promotion, health care and diseases prevention. The respondents were required to identify such initiatives by saying ‘yes’ if such initiative ever existed in their place and ‘no’ if there have never been such initiatives in the past 12 months. All the responses were then recorded into 0=no, 1=yes. An index of the score was constructed based on those responses.

3.5.16 Membership to CHF/NHIF

Membership to CHF/NHIF is considered to have considerable influence on health-related aspects, it is obvious that membership by itself provides access to modern human health care services. In this study, respondents were asked to indicate if they had a membership to any of the health funds i.e CHF or NHIF. A no or yes response was recorded for this question, coded 0 and 1 respectively. This created a dummy variable.

3.5.17 Perceptions on Effectiveness of the Stakeholders’ Initiatives in Building Public Health Capacity, Developing HL and Empowering People to Manage their Health

The respondents were asked how effective do they perceive the government initiatives on health in the study area in terms of conducting seminars/workshop, parents meetings

at school village/wards/street meetings, public announcements, visits by health officials from the wards and leaflets distribution related to diseases prevention, health promotion and health care. The respondents were to indicate whether such initiatives were (1) very effective, (2) effective (3) I don't know (4) ineffective and (5) very ineffective. An index of the score was constructed to measure respondents' perceptions of the government's effectiveness of the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health. Responses were given the value of five (5) for very effective, four (4) for effective, three (3) for undecided, two (2) for ineffective and one (1) for very ineffective. IBM-SPSS cut below the mean was categorised as ineffective and above the mean as effective.

Total score (14-18) = $Q_1 + Q_2 + Q_3 + Q_4 + Q_5 + Q_6$

3.5.18 Determining HL Differences between HB groups

To test the hypotheses of this study which stated that;

Health literacy does not differ significantly among individuals exhibiting health-enhancing behaviours and those with health impairing behaviours under OHA (Null), and, it's alternative which stated: Health literacy differs significantly among individuals exhibiting health-enhancing behaviours and those with health impairing behaviours under OHA, mean scores for HB were compared between three levels of HL (IHL, MHL and AHL) using One-way Analysis of Variance (ANOVA). Variables for HB and HL were used as determined and analyzed in subsections 3.5.1, 3.5.2, 3.6.1.2 and 3.6.1.3.

3.6 Data Processing, Analysis, Interpretation and Reporting

Data processing and analysis were done at the University of Zambia, Lusaka, Zambia and Sokoine University of Agriculture in Morogoro, Tanzania. Before analysis, data were sorted, coded and summarized. The Statistical Package for Social Sciences (IBM SPSS Statistics) Version 20 and Gretl computer software were used to analyse the collected data in conformity with the objectives of the study. The study combined both qualitative and quantitative data analyses. The data from the interviews with key

informants and the FGDs participants were transcribed and translated into English. The key points were marked with a series of codes and grouped into themes to facilitate qualitative analysis to back up the main findings. Various non-parametric and parametric tests were employed to establish relationships among variables.

3.6.1 Descriptive Analysis and Non-Parametric Tests

Data analysis undertaken in this study involved several descriptive statistics and non-parametric tests. Descriptive statistics used included mean, minimum and maximum scores, frequencies, percentages, histograms and pie charts. The principal non-parametric tests employed in the study were chi-square statistics and coefficients correlations.

3.6.1.1 Analysis of Socio-Demographic Characteristics of the Respondents

Descriptive statistics were employed in the analysis of the socio-demographic characteristics including age, marital status, sex, highest education, occupations and family size of the respondents. Descriptive statistics used included mean, minimum and maximum scores, frequencies, percentages, histograms and pie charts (on individual variables related to socio-demographic characteristics).

3.6.1.2 Analysis of Health literacy under OHA

Descriptive statistics were employed in the analysis of the HL. A total of one hundred and forty-one (141) items reflecting health and related issues under the interface of humans, animals and the environment were used to analyze HL. The items reflected humans' health (47), animals' health (47) and environmental health (47). An individual's HL was rated by how that particular individual finds it 'very difficult', 'difficult', 'easy' or 'very easy' if s/he was to engage herself in a task related to a particular health-relevant area(s) (health care, disease prevention, health promotion) and information processing stages (access, understand, appraise, apply) related to health-relevant decision-making. The scores were computed from the responses with values of one point (1) for every 'very difficult' response, two points (2) for every 'difficult' response, three points (3) for every 'easy' response and four points (4) for every 'very easy' response. Mean, minimum and maximum scores were computed out of those

scores. This means an individual responding ‘very difficult’ for all items would have scored 141 points and ‘very easy’ scoring 564. Scores were categorised into Inadequate Health Literacy (IHL), Marginal Health Literacy (MHL) and Adequate Health Literacy (AHL). A similar categorization has also been employed by Gazmararian, *et al.*, (2003) in their study on HL. In this study, IBM- SPSS (v20) functions were used to cut scores into three (3) equal groups to represent HL categories into IHL (below the scores of 211.0), MHL (between 211.0 and 261.0 scores) and AHL (the scores above 261.0). Frequencies and percentages have been used to present HL categorisation.

3.6.1.3 Analysis of Health Behaviour under OHA

An individual’s HB was indicated by how that particular individual engages in certain health-related practices. To analyse data on HB, an index of the score was also computed from 38 health-related practices identified from the literature review (see subsection 3.5.2). Frequencies and percentages were also computed to present scores into categories for HB. An index of the score was constructed to measure behaviours, where all “No and Yes” responses were given values of 1 and 2 from the value of 0 to 1 respectively. A total of 38 health impairing practices/habits were presented and respondents were supposed to indicate if they had involved themselves or not in such practices by saying “Yes or No”. Given the fact that the presented practices/ behaviours were health impairing, the higher the score the lower the engagement in health-enhancing behaviours and vice versa. The mean score was computed and all the scores below the mean value signified the low level of involvement in HIPs/ health impairing practices hence exhibiting HEBs, while all those scores above the mean signified a high level of involvement in HIPs hence exhibiting HIBs. The minimum and maximum scores were 12 and 30 respectively with the mean score being 23.45 (95% CI: 22.89% to 24.08%). Using IBM-SPSS (v20) HB scores were categorised into HEBs (the scores above 23.45) and HIBs (below the scores of 23.45). Frequencies and percentages were used to present categories of HB.

3.6.1.4 Analysis of HCSB under OHA

Individuals' preferences in terms of healthcare service sources were analyzed using frequencies and percentages. The respondents were simply required to indicate their preferences from five (5) health care service sources. The sources from which they were to choose included no treatment, self-treatment, traditional healer, pharmacy, and medical personnel (hospital). These health care service sources were then collapsed into a dummy variable which comprised of formal health care services/facilities (FHCSF) and informal health care services/facilities (IHCSF) (see subsection 3.5.3).

3.6.1.5 Analysis of Collaborative Efforts and Strategies of Various Health Professionals on OHA

Descriptive statistics were employed in the analysis of the data under this objective. Frequencies and percentages were used to report responses on the collaborative efforts and strategies involving various professionals in the course of giving solutions to health-related challenges in the interface of humans, animals and the environment.

3.6.1.6 Analysis of Stakeholders' Initiatives in Building Public Health Capacity, Developing HL and Empowering People to Manage their Health

To analyze stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health, this study employed descriptive statistics. Data that were collected in line with this study objective were reported using frequencies and percentages.

3.6.1.7 Linkages between HL, HB and HCSB under OHA

To analyze data for this study objective which required to establish associations (linkages) between HL, HB and HCSB several nonparametric tests were employed. The choice of non-parametric tests employed to test the association between variables was based on the type of variables that were involved. The variables whose associations were tested included: - HL which involved computation of scores (interval/ratio variable) and also categorised (into AHL, MHL and IHL), HBs which was also obtained after the construction of an index of scores (interval/ratio) and categorised (into HEBs and HIBs)

and HCSB which involved health care sources preferences (categorical/nominal). According to Bryman, (2008: 326) there are varieties of statistical techniques for examining relationships (association). Deciding which technique(s) to use depends on the nature of two variables to be analyzed. The methods of bivariate analysis in Appendix III are commonly used to explore the association between pairs of variables.

3.6.1.7.1 Association (relationship) between HL scores and HB scores

To examine association (relationship) between HL scores and HB scores which are both metric variables (interval/ratio, continuous variables), Pearson's correlation coefficient (Product Moment Correlation Coefficient) was employed. It gives information about the magnitude of the association, or correlation, as well as the direction of the relationship. (Sedgwick, 2012). The coefficient is measured on a scale with no units and can take a value from -1 through 0 to +1. It is used to describe the strength and direction of the relationship between two variables (usually continuous). It can also be used when one of the variables is dichotomous – that is, it has only two values (Pallant, 2007). To check for violation of the assumptions of linearity and homoscedasticity and to get a better idea of the nature of the relationship between variables before testing correlation, a scatterplot was generated.

3.6.1.7.2 Association between HL and HB

A chi-square test was further employed to examine the association between HL and HB. The HL levels and HB categories were used. The Chi-square test for independence was used to determine whether two categorical variables (HL and HB) were related. It specifically established the proportion of AHL, MHL and IHL for the HEBs and HIBs.

The variables met the requirements for the Chi-square test for independence: - One categorical independent variable, for the case of this study HB, is a categorical variable with two possible outcomes (HIBs/HEBs). HL is a categorical dependent variable with AHL, MHL, and IHL being its outcomes. The interest here is the number of people in each category (not scores on a scale).

3.6.1.7.3 Association (relationship) between HL levels and HCSB

Contingency table and Chi-square (χ^2) were used to examine association (relationship) between HL levels which is an ordinal variable and HCSB which is a nominal variable. Contingency table allows two variables to be simultaneously analysed so the relationships between the two variables can be examined (Bryman, 2008).

3.6.1.7.4 Association (relationship) between HB categories and HCSB

The association (relationship) between HB which is a dichotomous variable (HIBs and HEBs as outcomes) and HCSB which is nominal variable (resulting into IHCSF and FHCSF) was examined by using Chi-square (χ^2).

3.6.2 Inferential Analysis and Parametric Tests

Inferential analysis was employed to examine determinants of HL, HB and HCSB. The parametric tests used in this study included regression analysis and the One Way Analysis of Variance (ANOVA). Parametric tests usually have more statistical power than nonparametric tests. Thus, it is more likely to detect a significant effect when one truly exists. Ordinal logistic regression was used to analyse determinants of HL given socio-demographic and other factors. Binary logistic regression was used to examine the determinants of health behaviour and behaviour of choosing healthcare sources in the view of predictor variables. ANOVA was a parametric test employed to test the hypotheses of this study.

3.6.2.1 Data Reduction Techniques

Variables inspection and elimination of factors were used to find factors among observed variables. The study data contained many variables for that matter there was a need to reduce the number of variables. Elimination of factors enabled the least significant among the observed variables to be removed. This enabled more significant factors to be produced from a large number of variables. The reduced factors were also used for further analysis in the study.

3.6.2.2 Tests of Normality

Normality check was done for the variables involved in parametric tests. Normality was checked on variables by inspecting the histograms of scores on variables subjected to parametric test, scatterplots were used to see if there was an indication of a linear relationship between the two variables. A linear relationship in a scatterplot is indicated roughly by a straight line not a curve. Homoscedasticity was also checked for variability of scores of variables X if they are similar for all values of variable x. Evenly fairly cigar shape along its length was observed in the scatterplot. The distribution of scores on continuous variable was checked through skewness and kurtosis, a requirement for parametric statistical techniques such as ANOVA. A Skewness and Kurtosis value of 0 indicates a perfectly normal distribution which is uncommon occurrence in social sciences. Since this study involved a large sample (a sample of 1440) then normality issues are not expected to affect the results. According to Tabachnick and Fidell (2007:80) whenever reasonably large samples (200+ cases) are involved in a study skewness cannot make a substantive difference in analysis. No outliers were identified when the tails of distribution were looked at in the histogram.

3.6.2.3 One way Analysis of Variance (ANOVA)

ANOVA compares the means of two independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different (Pallant, 2007). ANOVA is a parametric test that was used in comparing HB scores from three different (independent) groups of people (those with IHL, MHL and AHL). The variables used in this test included (HB scores) which was a dependent variable or test variable and (HL levels) that was an independent variable or grouping variable. These variables met requirements for running One Way ANOVA. This analysis was done to test the hypotheses of this study which state:

Null: Health literacy does not differ significantly among individuals exhibiting health enhancing behaviours and those with health impairing behaviours under OHA.

Alternative: Health literacy differs significantly among individuals exhibiting health-enhancing behaviours and those with health impairing behaviours under OHA.

3.6.2.4 Regression Analysis

The study employed an Ordinal Logistic Regression (OLR) model for examining the determinants of HL, while determinants of HB and HCSB respectively were examined by a Binary Logistic Regression (BLR) model.

3.6.2.4.1 Measurement of Variables included in the Logistic Regression Model

To run OLR and BLR, it was necessary to collapse some of the continuous variables into categorical variables and reducing or collapsing the number of categories of some categorical variables to simplify analysis (applied in specific analysis) and discussion.

Marital status

Marital status was reduced into two (2) categories representing people ‘in a relationship’ and ‘not in a relationship’. The category ‘not in a relationship’ comprised of never married/single, separated, widows, widowers and too young to marry, while the ‘in a relationship’ category included those respondents who were either married or cohabiting. The transformed variable was recorded as ‘0’ for ‘not in a relationship’ and ‘1’ for ‘in a relationship’ respectively.

Highest education

Highest education was transformed into continuous variable (years of schooling), whereby zero (0) years were allocated to those who had ‘not gone to school at all’, six (6) years for those who dropped out (didn’t complete ‘primary school’-standard seven) and those who attended to ‘universal adult education’, seven (7) years for those with ‘primary school education’- completed standard seven (7), ten (10) years for those who ‘didn’t complete secondary school’ –form four (4), eleven (11) years for those with ‘secondary school education’, twelve (12) years with ‘post-secondary or vocational education’, thirteen (13) those who completed high school-form six (6) or holding a diploma, and, sixteen (16) years for those who graduated from universities on a 3 years

degree program. Years of schooling were recorded as zero (0), seven (7), eleven (11), twelve (12) thirteen (13) and sixteen (16) based on the responses from this survey.

Occupation of the respondents

This categorical variable was reduced or collapsed from nine (9) categories to two (2) categories. Hence, 1=formal employment (included government employees, NGO employees and licensed traders), and 0=informal employment (crop farmers, livestock keepers, non-licensed traders, housewives and unemployed).

HB score

A continuous variable was collapsed into a dichotomous variable (HEBs and HIBs) using the mean score. The scores below the mean value signified the low level of involvement in HIPs/ health impairing practices hence, exhibiting HEBs, while all those scores above the mean signified a high level of involvement in HIPs hence exhibiting HIBs. Using IBM-SPSS (v20) HB scores were categorised into HIBs (HIBs) (the scores above 23.45) and Health Enhancing Behaviours (HEBs) (below the scores of 23.45). This variable was then recoded into a dummy variable by transforming this variable into a new variable from the ordered variable, whereby all the 1 responses (those exhibiting HEBs were maintained as 1 or Yes responses) for 2 responses (signifying those exhibiting HIBs were transformed into 0 or No responses). This qualified this variable for binary logistic regression.

HL score

A continuous variable was collapsed into categorical variable after establishing cut points for three (3) equal groups using IBM-SPSS (v20) into adequate health literacy(AHL)with the scores above 261.0), marginal health literacy (MHL)with between 211.0 and 261.0 scores and inadequate health literacy (IHL)with the scores below 211.0). This resulted in presenting HL into three (3) levels.

HCSB

Health care service sources were collapsed into a dummy variable containing 0=informal health care services/facilities (IHCSF) and 1=formal health care

services/facilities (FHCSF). The choices of health care sources under FHCSF included pharmacy/veterinary and medical /veterinary personnel sources while no treatment, self-treatment and traditional healer were under IHCSF.

3.6.2.4.2 Predictor Variables for HL, HB and HCSB

Table 3.7 provides information for all predictor variables included in the OLR and BLR models along with their expected outcome. Socio-demographic related characteristics have been reported to have a predictive effect on other dependent variables in other studies. Education attainment contributes to the transmission of the specific information, development of generic skills or proficiencies and is associated with individual beliefs, attitudes, and habits towards various social aspects. The sex of household head is considered to have a predictive effect on other dependent variables too. Concerning household size, it is argued that a household with a greater number of people is likely to have a greater burden in terms of up keeping costs than those with fewer household members hence affecting household access to various services, health care services inclusive. Access to information about health is likely to promote knowledge on health hence increased use of certain healthcare sources, enhancing HL and exhibiting health-related practices that are likely to lead to good health outcomes. Social networking has been among the factors that influence individuals' decisions on various social aspects and act also as a source of information. A household participating in any social relationship or networking, such as participation in local organisations or having people to whom they can seek advice, is likely to have better access to information about health practices, increasing household awareness, and access to social support. Individuals' contacts/interactions with healthcare professional play roles in maintaining or improving HL through health messages shared. Engagement in health-related discussions can contribute towards individuals understanding on health-related aspects hence influencing health outcomes. Availability of health options in a particular community is among determinants of access to health facilities (MIT, 2010; Rauschenbach and Hertel, 2011; Marinaccio *et al.*, 2013; Ringo, *et al.*, 2017; Muhanga and Malungo, 2017a; Muhanga and Malungo, 2018a).

Table 3.7: Predictor Variables for HL, HB and HCSB in the OLR and BLR Models

Predictor variable	Coding	Category	Expected Outcome
Marital status of the HH ^{1,2,3}	0=not in a relationship, 1=in a relationship	Dummy	+/-
Occupation of the HH ^{1,2,3}	0=informal, 1=formal employment	Dummy	+/-
Years of schooling ^{1,2,3}	Number of years spent studying	Continuous	+/-
Age of the HH ^{1,2,3}	Age in years	Continuous	+/-
Sex of the HH ^{1,2,3}	0=Female; 1=Male	Dummy	+/-
Membership in organisation	0=No; 1=Yes	Dummy	+/-
EiHRD ^{1,2,3}	Scores	Continuous	+/-
EiOHERA ^{1,2,3}	Scores	Continuous	+/-
Social networking ^{1,2,3}	0=No; 1=Yes	Dummy	+/-
Health behaviour categories ^{1,3}	0=HEB; 1=HIB	Dichotomous	+/-
Scores in HB	Scores	Continuous	+/
Access to HI ^{1,2,3}	Scores on AHI	Continuous	+/
HL score ^{2,3}	Total score on HL	Continuous	+/
HL levels	1=IHL, 2=MHL, 3= AHL	Categorical	+/
Attitudinal score	Scores	Continuous	+/
Attitudes towards HB ^{1,2,3}	0=Negative, Positive, Neutral	Categorical	+/
Health care source preference) ^{1,2}	0=informal 1=formal	Categorical	+/
CMIWHP scores ^{1,2,3}	Scores	Continuous	+/
PKBPAD Scores ^{1,2,3}	Score	Continuous	+/
BEOHAS ³	0=effective , 1=not effective	Dummy	+/
Influence of politics on health ^{1,2,3}	Scores	Continuous	+/
SC-PEPMHS ³	Scores	Continuous	+/
Perceived Disorder characteristics ^{2,3}	0 =not serious, 1=serious	Dummy	+/
LGAs initiatives on health promotion, health care and diseases prevention	Scores	Continuous	+/

Key: ¹- HL, ²- HB, ³- HCSB (indicates what a variable has been used to determine)

Abbreviations

PKBPAD -Prior Knowledge, Beliefs, perceptions and attitudes towards diseases score

BEOHAS -Belief in the effectiveness of humans and animals health services

SC-PEAMHS-Service characteristics (Perceived Efficiency in accessing modern health services)

CMIWP- Community members' interaction with professionals

EiHRD -Engagement in Health Related discussions

EiOHERA- Engagement in OHE related activities

3.6.2.4.3 Ordinal logistic regression (OLR)

Ordinal logistic regression or (ordinal regression) was used to analyse the predictors of HL. OLR is ideal to predict dependent variables that are in ordered level (ordinal) given one or more independent variables. The ordinal structure of the dependent variable (HL) in this study qualifies for the application of this model. Ordinal Logit Models are applied when the dependent variable has at least 3 categories with categories ordinally arranged (Hosmer and Lemeshow, 2000). The dependent variable (HL) was measured at an ordinal level; HL intervals into AHL, MHL and IHL). Ordinal regression enabled the determination of which independent variables have a statistically significant effect on the dependent variable (HL). The last category was taken as the reference category automatically in the IBM -SPSS (Pallant, 2007).

The model is chosen because it is ideal for the dependent (response) variable that is ordinal (measures having categories with natural ordering) with independent variables (predictors) that are a mixture of variables to be recorded at the categorical (nominal and ordinal) and continuous (interval and ratio) levels. The variables involved in this regression met other requirements including having no multi-collinearity (absence of two or more independent variables which are highly correlated with each other). Proportional odds assumption (assumption of parallel lines in IBM-SPSS) requirement was also met, as it was observed that each independent variable had an identical effect at each cumulative split of the ordinal dependent variable.

3.6.2.4.3.1 Determinants of HL

All predictor variables used in the analysis as listed in Table 3.7 were checked for multicollinearity and presence of Proportional Odds assumption before they were introduced into the OLR model. The dependent variable (Y) used in this analysis was 'health literacy', which was categorised into IHL, MHL and AHL.

The interpretation of the results was done with respect to B-values, Wald statistics, P-values and odds ratio.

3.6.2.4.4 Binary Logistic Regression (BLR)

The determinants of HB and HCSB were examined by a BLR model. The model is ideal for the dependent (response) variable that is measured on a dichotomous scale with one or more independent variables(predictors), which is either continuous(i.e., an interval or ratio variable) or categorical (i.e., an ordinal or nominal variable). The dependent variables (HB and HCSB) are dichotomous; distributed into (HEBs and HIBs) for HB and (IHCSF and FHCSF) for HCSB respectively. Other requirements that were met included variables having the independence of observations, the dependent variable having mutually exclusive and exhaustive categories plus the existence of a linear relationship between any continuous independent variables and the logit transformation of the dependent variable.

3.6.2.4.4.1 Determinants of HB

The dependent variable (Y) used in this analysis was HB which was categorised into HEBs and HIBs. BLR was used here to predict the odds for the occurrence of a particular HB. The model used is shown in the equation below:

$$\text{Log} [P_i / (1-P_i)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{16} X_{16} + \epsilon$$

Where;

$\text{Log} [P_i / (1-P_i)]$ = Natural logarithm of the odds for the occurrence of a particular HB.

The dummy for the dependent variable (performing a particular health behaviour under OHA) was coded as 1 = health-enhancing behaviour, 0 = health impairing behaviour.

P_i = the probability that health-enhancing behaviour would be performed

β_0 = Constant

ε = error term

β_1 to β_{15} = Logistic regression coefficients of the predictor variables.

Independent variables in the model are as follows:

x_1 = HL points (score)

x_2 = Age of respondent (in years)

x_3 = Sex (0=female, 1=male)

x_4 = Education of the respondent (years of schooling)

x_5 = Engagement in Health Related discussions (score)

x_6 = LGA initiatives on health promotion, health care and diseases prevention (score)

x_7 = Engagement in OHE related activities (score)

x_8 = Community Members Interaction with professionals (score)

x_9 = Perceived Service Characteristics (Score)

x_{10} = Prior Knowledge (score)

x_{11} = Influence of politics on health (score)

3.6.2.4.4.2 Determinants of HCSB

The dependent variable (Y) used in this analysis was ‘source of health care preference or healthcare-seeking behaviour’, which the study has categorised into no treatment, self-treatment, traditional healer, pharmacy, and medical personnel. These sources were categorised into 0= (IHCSF) and 1= (FHCSF).

The model used is shown in the equation below:

$$\text{Log} [P_i / (1-P_i)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{16} X_{16} + \varepsilon$$

Where:

$\text{Log} [P_i / (1-P_i)]$ = Natural logarithm of the odds for occurrence of a particular HCSB.

The dummy for the dependent variable (performing a particular health behaviour under OHA) was coded as 1 = health-enhancing behaviour, 0 = health impairing behaviour.

P_i = the probability that health-enhancing behaviour would be performed

β_0 = Constant

ε = error term

β_1 to β_{15} = Logistic regression coefficients of the predictor variables.

Independent variables in the model are as follows:

x_1 = HL points (score)

x_2 = Education of the respondent (years of schooling)

x_3 = Marital status of the respondent (0=not in a relationship, 1= in a relationship)

x_4 = Engagement in Health Related discussions (score)

x₅= Health Behaviour (Score)
 x₆=Engagement in OHE related activities (score)
 x₇ = Community Members Interaction with professionals (score)
 x₈= Awareness on OHA (0=no, 1=yes)
 x₉= Perceived Service Characteristics (Score)
 x₁₀=Attendance Seminars and Workshops (0=no, 1=yes)
 x₁₁= Prior Knowledge (Scores)
 x₁₂= LGAs initiatives in health promotion, care and diseases promotion (score)
 x₁₄= Influence of politics on health (score)
 x₁₅= Beliefs on the effectiveness of humans and animals service

3.6.3 Qualitative data

Data from the KIIs and FGDs were summarised noting contentions, agreements and disagreements among members of various groups. The qualitative research results were used to supplement the quantitative results obtained using the structured questionnaire. Qualitative information was organised into various themes based on each specific objective. Then the interpretation was made and used in the discussion to back up quantitative results. The qualitative data was useful to give an in-depth explanation of some issues which could not be captured through a structured question.

Verbatim transcription was employed to retain the original meaning of the recorded interviews and focus group discussion. Verbatim transcription refers to the replication of the exact words that are captured in an audio or video record; it is a word-for-word reproduction of verbal data, where the written words are an exact replication of the audio recorded words (Poland, 1995; Halcomb and Davidson, 2005:38). The use of verbatim transcription enabled to provide the context in which the words were spoken. This is the reproduction of word to word audio data into written form. This is a reliable mode of transcription as it does not give room to the interpretation of the spoken word. It also gives details of non-verbal cues used during the interview (Poland 1995; Miller, 2014).

3.7 Triangulation

Triangulation is a powerful technique that facilitates validation of data through cross verification from two or more sources. Specifically, it refers to the application and combination of several research methods in the study of the same phenomenon (Bogdan

and Biklen, 2006). The purpose of triangulation in research is to increase the credibility and validity of the results (Cohen and Manion, 2000: 254; O'Donoghue and Punch, 2003:78; Altrichter *et al.*, 2008:147).

To guarantee the validity, this study relied on multiple data sources to inform cases in Morogoro municipality and Mvomero districts, Tanzania. The source from which data were obtained included research participants, key informants and stakeholders and village elders. Furthermore, this study used an informed systematic approach to multiple data collection methods including participant and indirect observation, semi-structured and informal interviews, focus groups, and document analysis. Additionally, time spent in the field along with the researcher's extensive knowledge and key informants guaranteed an accurate portrayal of information in this study.

3.8 Data interpretation and Reporting

Data were interpreted with reference to existing literature noting similarities and differences between the literature and the findings of the research, to contribute to more empirical knowledge to the existing literature. Reporting of the research findings based on scientific papers.

3.9 Ethical Issues

The protocol for the study was approved by the University of Zambia (UNZA). Local research clearance was granted by Morogoro municipality and Mvomero district administrative officials. To avoid any impediment to the research process, the researcher had to clarify the purpose of the study to the local government and village leaders. Introducing the purpose of the study to the local leadership facilitated the process of identifying the key informants for qualitative interviewing. The researcher obtained the written and oral (for those who could not read and write) informed consent from all those who participated in the study. They were informed of their right to withdraw from the study at any time. The participants were assured of their anonymity in that none of the information from them will be attributed to their names. Permission was sought from individuals to use various photographs in this report in which they appear.

3.10 Dissemination of the Findings

- (i) PhD Seminar presentations at The University of Zambia. One seminar presentation on preliminary results was conducted on 2nd May 2017 during postgraduate seminar week followed by a poster presentation on the same day.
- (ii) Conferences
- (iii) Policy briefs on key findings and policy implications will be written and shared with policymakers and health experts at various levels.
- (iv) Issuance of leaflets with key findings and recommendations to various stakeholders
- (v) Four (4) journal articles and one (1) conference paper have been published in peer-reviewed journals and a proceeding (Appendix IV).
- (vi) Meetings will be held at ward level where the study was conducted



Photo 3 Poster presentation at UNZA, DRGS grounds, 2nd May 2017

Chapter Summary

This chapter presents the methodological process and related techniques that were employed to assess HL levels, HB and HCSB under OHA in Morogoro, Tanzania. Furthermore, the same methodological process and related techniques were used to assess the influence of HL on HB and HCSB, plus attitudes of people on HIBs. The research design, sample selection, data collection, and data analysis of the research process are described in this chapter. A cross-sectional research design was used and structured questionnaire, FGDs, and KII were the primary method of data collection. Health Literacy assessment tool and a Likert scale assessed HL and attitudes towards

HB, while an index of score gauged HBs. One thousand four hundred and forty respondents (1440), seventy-eight (78) FGDs and 16 KII participants were purposefully sampled as research participants. IBM-SPSS v.20 was used to analyse quantitative data while qualitative data were organised into themes on specific objectives to back up findings. Data analysis included frequencies, percentages, mean, minimum and maximum scores, chi-square test, correlation coefficients, ANOVA, ordinal and binary logistic regressions.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the study's findings. It describes the socio-demographic characteristics of the respondents from a study conducted in Morogoro, Tanzania. The chapter further presents research findings on HL levels, HB and HCSB under OHA. Additionally, it presents results on the influence of HL on HB and HCSB, and attitudes of people on HIBs. It further presents the determinants of HL, HB and HCSB plus the linkage between HL, HB and HCSB under OHA. It reports on the identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary) and other interested parties - to attain optimal health for people, animals and the environment. Finally, it provides an in-depth view of respondents with respect to stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health.

4.1 Socio-Demographic Characteristics of the Respondents

As stated in Chapter Three (subsection 3.3), participants for this study were chosen purposively using multistage sampling procedure. Furthermore, participation was based on the following criteria: (1) heads of household (or their representatives, 18+ years) having livestock species and selling of livestock products to Morogoro urban (applied for Mvomero district) participants, (2) all heads of household (or their representatives, 18+ years) residing in those wards products from Mvomero districts were sold, meat (particularly *offals*; *utumbo* in *Kiswahili*) and milk vending by Maasai from Mvomero district has been taking place, (3) being a medical, health, environmental or veterinarian professional for the KII participants for both Morogoro municipality and Mvomero. The summary of the socio-demographic characteristics of the respondents is provided in Table 4.1.

Table 4.1: Socio-Demographic Characteristics of the Respondents (n=1440)

Variable	Categories	Percentage
Age in Years	21-39	42.1
	40-49	26.3
	50-59	17.1
	60-69	10.7
	> 70	3.8
Level of Education	Not gone to school at all	39.2
	Universal adult education	2.5
	Primary school	30.0
	Secondary school	8.8
	Post-secondary /vocational	10.4
	University	9.2
Sex	Male	47.9
	Female	52.1
Marital Status	Never married/Single	30.4
	Married	57.5
	Separated	1.7
	Widow	5.4
	Widower	2.5
	Cohabiting	0.8
	Too young to marry	1.7
Household Size	1-3	21.7
	4-7	65.9
	> 8	12.4

The results reveal that 29.2 percent (95% CI: 23.3 to 35.0) of the interviewed respondents were aged between 30 to 39 and 3.8% (95% CI: 1.7 to 6.2) were above 70 years. The average age was 43.7 years (95% CI: 43.1 to 44.4 years), and the lowest age and the highest age were 21 and 72 respectively. The majority of the respondents 52.1 percent (95% CI: 49.6 to 54.7) interviewed were women. Slightly more than one-third (39.2 percent; 95% CI: 36.6 to 41.7) of the respondents had not gone to school at all. Of the interviewed respondents, about 57.5 percent (95% CI: 50.9 to 63.8) of the respondents were married. In terms of household size (total number of household members) the average household size was 5 (95% CI: 5.08 to 5.28) members. The smallest household size (minimum) had 1 member and the largest household size (maximum) had 10 members. About 62.9 percent of the interviewed households had 1 to 5 members.

4.2 Health literacy under the Humans, Animals and the Environment Interface

Objective number one (1) assessed HL under OHA in the study area. HL under the humans, animals and the environment interface at the household level was measured by using a context-specific HL assessment tool. This tool has been elaborated under subsections 3.4.3.1 and 3.5.1. The results indicate that the mean score was 261.9 (95% CI: 257.6 to 266.4) while maximum and minimum scores were 141.0 and 501.0 respectively with a Standard deviation of 85.0 (95% CI: 81.4 to 88.3). Table 4.2 and Fig. 8 present HL results into categories, the results indicate that 36.3 percent (95% CI: 33.7 to 38.9) of the respondents had IHL, 30.8 percent (95% CI: 28.4 to 33.3) with MHL, and 32.9 percent (95% CI: 30.3 to 35.3) had AHL.

Table 4.2: Health Literacy categories (n=1440)

Health Literacy Categories	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Inadequate Health Literacy (IHL)	522	36.3	33.7	38.9
Marginal Health Literacy (MHL)	444	30.8	28.4	33.3
Adequate Health Literacy (AHL)	474	32.9	30.3	35.3
Total	1440	100.0		

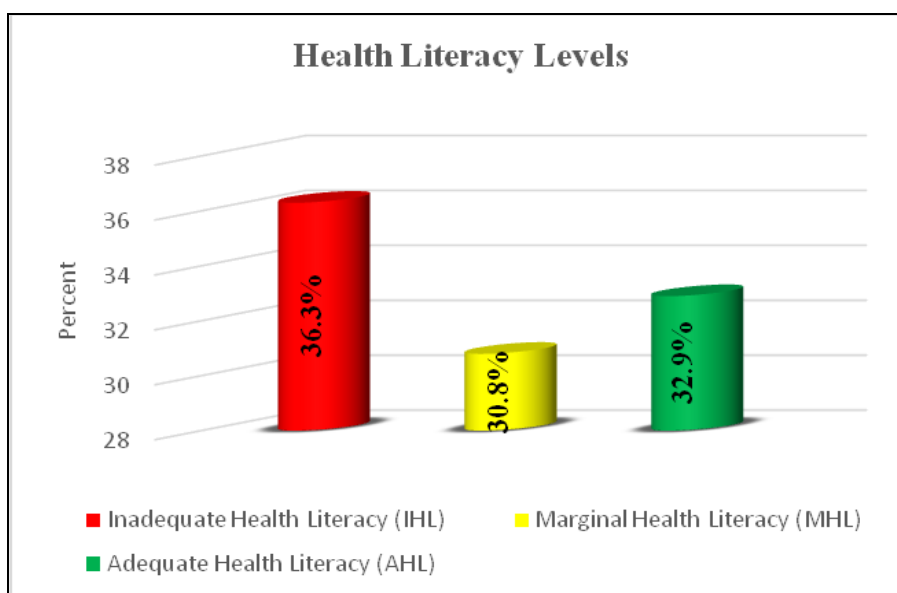


Fig.8 Health Literacy levels

4.3 Health Behaviours and HealthCare Seeking Behaviours under OHA

Objective number two (2) of this study assessed HBs, and HCSBs under OHA in the study area.

4.3.1 Health Behaviours

HBs at the household level were measured by using an index of the score which was developed using 38 health behaviour variables which reflected habits/practices that could impair health reflecting the interactions of humans, animals and the environment. The approach to measuring HBs using an index of the score has been elaborated under subsections 3.4.3.2 and 3.5.2. The results indicate that the mean score was 23.45 (95% CI: 23.2 to 23.7); the minimum score was 12 while the maximum score was 30 with the Standard Deviation of 4.63 (95% CI: 4.47 to 4.78). The results in Table 4.3 reveal that majority (60 percent) (95% CI: 57.5 to 62.5) of the respondents interviewed had exhibited HIBs while only 40% (95% CI: 37.5 to 42.5) had HEBs.

Table 4.3: Categories of Health Behaviours (n=1440)

	Frequency	Per cent	95% Confidence Interval	
			Lower Bound	Upper Bound
HEBs (Low Health Impairing practices)	576	40.0	37.5	42.5
HIBs (Low Health Enhancing practices)	864	60.0	57.5	62.5
Total	1440	100.0		

Summary of individuals scores reflecting habits/practices that could impair health reflecting the interactions of humans, animals and the environment is presented in Appendix VI and Fig. 9.

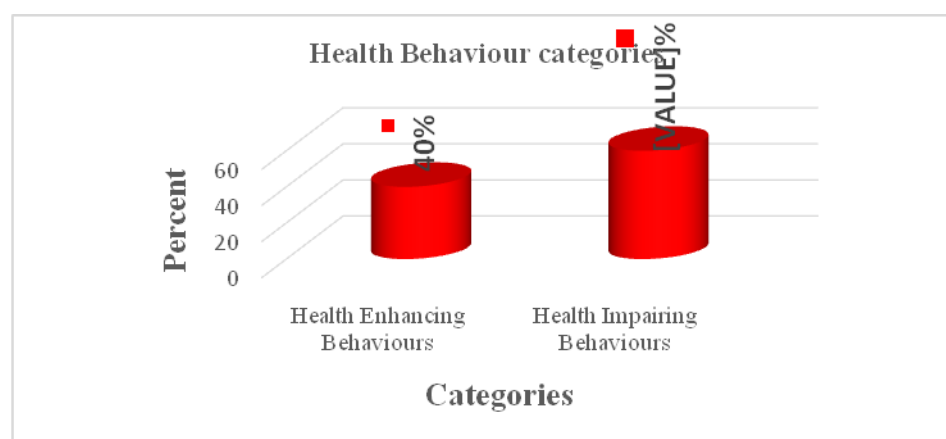


Fig.9: Health Behaviours categories

4.3.2 HealthCare Seeking Behaviours

The results for health care service sources preferences are presented in Table 4.4, the table shows that 41.2 percent (95% CI: 38.7 to 43.8) of the respondents preferred IHCSF while 58.8 percent (95% CI: 56.3 to 61.3) had preferred IHCSF when seeking health care service for themselves and their animals. Sub-sections (3.4.3.3 and 3.5.3) are expounding further on how this variable has been approached.

Table 4.4: Health care service source preferences (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Informal Health sources/facilities	594	41.2	38.7	43.8
Formal health care sources/facilities	846	58.8	56.3	61.3
Total	1440	100.0		

4.4 Attitudes towards Health Impairing Behaviours under OHA

Under objective three (3) of this study individuals' attitudes on HIBs under OHA were analysed. Statements on Knowledge, Attitudes and Practices on HIBs were subjected to attitudinal measurement using a Likert scale. The approach used to assess attitudes towards HIBs has been elaborated under subsections (2.16.1, 2.16.2, 2.16.3, 2.16.4, 2.16.5, 3.4.3.3, 3.5.4). The summary of results for total attitudinal scores are presented in Appendix VII, whereby the mean score was 114.52 (95% CI: 114.1 to 114.9), the minimum score was 103 while the maximum score was 131 with the Standard Deviation of 6.78 (95% CI: 6.5 to 7.0). The overall results for attitudinal scores after being categorised into three (3) categories are presented in

Table 4.5, whereas 30 percent (95% CI: 27.6 to 32.4) of respondents had a negative (unfavourable) attitude towards health behaviours, 35 percent (95% CI: 32.6 to 37.5) of the respondents had positive (favourable) attitude and 35 percent (95% CI: 32.5 to 37.4) were undecided hence neutral attitude towards health behaviours. Appendix VII summarizes total attitudinal scores towards HIBs into frequencies and percentages. Table 4.5 presents the attitudes towards HIBs into categories. Subsection (3.5.4) provides details on the categorization of attitudes towards HIBs.

Table 4.5: Categories on Attitudes towards HIBs (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Favourable (positive) attitude	504	35.0	32.6	37.5
Neutral (undecided) attitude	504	35.0	32.5	37.4
Unfavourable (negative) attitude	432	30.0	27.6	32.4
Total	1440	100.0		

Objective number three (3) of this study assessed attitudes towards HBs under OHA in the study area. Under this objective, individuals' self-evaluation of certain HBs including their beliefs about the outcome of such behaviours/practices on health were analysed. Table 4.5 presents the attitudes towards HB into categories, while in Table 4.6, an association between individuals' attitudes and their HBs is presented.

The results in Table 4.6 indicate that HIBs (Low Health Enhancing practices) were higher among those with favourable attitudes towards health impairing behaviours/practices constituting 45.8 percent within the HIBs category, while HEBs (Low Health Impairing practices) were higher among respondents with unfavourable attitudes towards health impairing behaviours/practices constituting 56.2 percent within the HEBs category.

Table 4.6 Attitude* Health Behaviours Categories Cross tabulation (n=1440)

Groups of attitude		Health Behaviours Categories		Total
		HEBs	HIBs	
Favourable (positive) attitude	Count	108	396	504
	% within Groups of attitude	21.4%	78.6%	100.0%
	% within HB Categories	18.8%	45.8%	35.0%
	% of Total	7.5%	27.5%	35.0%
Neutral (undecided) attitude	Count	144	360	504
	% within Groups of attitude	28.6%	71.4%	100.0%
	% within HB Categories	25.0%	41.7%	35.0%
	% of Total	10.0%	25.0%	35.0%
Unfavourable (negative) attitude	Count	324	108	432
	% within Groups of attitude	75.0%	25.0%	100.0%
	% within HB Categories	56.2%	12.5%	30.0%
	% of Total	22.5%	7.5%	30.0%
Total	Count	576	864	1440
	% within Groups of attitude	40.0%	60.0%	100.0%
	% within HB Categories	100.0%	100.0%	100.0%
	% of Total	40.0%	60.0%	100.0%

$\chi^2(2) = 320.357, p < .000, \phi = .472$

Table 4.6 also presents chi-square results on the association between attitudes and HB categories. A chi-square test of independence indicates a significant association between attitudes towards HIBs and HB categories $\chi^2(2, n=1440) = 320.357, p = .000, \phi = .472$. The phi coefficient in this study is .472 based on Cohen's 1988 criteria of .10 for a small effect, .30 for medium effect and .50 for large effect. This indicates that the strength of association between the variables (attitudes and HBs) is strong.

4.5 Engagement in the One Health Related Activities (EOHRA)

The findings reveal that minimum and maximum scores were 29 and 55 respectively with the average score being 35.65 (95% CI: 35.4 to 35.9) and a Standard Deviation of 4.22 (95% CI: 3.9 to 4.5), the scores are presented in Appendix VIII. The results indicate that 33.3 percent (95% CI: 30.3 to 36.4) had low EOHRA, 41.3 percent (95% CI: 38.0 to 44.5) with Medium EOHRA and only 25.4 percent (95% CI: 22.5 to

28.4) with High EOHRA. Table 4.7 presents the results on the categorization of EOHRA.

Table 4.7: Engagement in One Health related activities (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Low engagement	480	33.3	30.3	36.4
Medium engagement	594	41.3	38.0	44.5
High Engagement	366	25.4	22.5	28.4
Total	1440	100.0		

4.6 Access to Health Information

Appendix IX presents results concerning scores on access to health information. Findings reveal that the minimum and maximum scores were 7.00 and 14.00 respectively with the average score being 9.92 (95% CI: 9.8% to 10.0%) and Standard Deviation of 1.69 (95% CI: 1.6% to 1.7%).

The findings in Table 4.8 show that 45 percent (95% CI: 41.9 to 48.1) of the respondents are under PHIS category, 39.2 percent (95% CI: 35.9% to 42.4%) on MHIS category and 15.8 percent (95% CI: 13.5 to 18.1) under AHIS category.

Table 4.8: Health Information seeking categories (n=1440)

	Frequency	%	95% CI	
			Lower Bound	Upper Bound
Passive Information Seeking (PHIS)	648	45.0	41.9	48.1
Moderate Information Seeking (MHIS)	564	39.2	35.9	42.4
Active Information Seeking (AHIS)	228	15.8	13.5	18.1
Total	1440	100.0		

4.7 Social Networking on Health Related Matters

Social networking on health-related matters was investigated in this study. The results in Table 4.9 reveal that only 31.7 percent (95% CI: 28.6% to 34.7%) of the respondents acknowledged having had someone outside their households that they went to ask for advice on health matters in the past three (3) months.

Table 4.9: Social Networking on Health Matters (n=1440)

	Frequency	Per cent	95% CI	
			Lower Bound	Upper Bound
Social networking (No)	984	68.3	65.3	71.4
Social networking (Yes)	456	31.7	28.6	34.7
Total	1440	100.0		

4.8 Engagement in Health Related Discussions (EiHRD)

The results in Appendix X show that minimum and maximum scores on EiHRD were 31.00 and 56.00 respectively with the mean score being 40.64 (95% CI: 40.2 % to 41.0%) and a Standard Deviation of 6.48 (95% CI: 6.3% to 6.7%). Table 4.10 reveals that 23.8 percent (95% CI: 21.0% to 26.5%) of respondents were under high level of EiHRD, followed by 41.2 percent (95% CI: 38.2% to 44.4%) who were under medium level of EiHRD and 35.0 (95% CI: 32.0% to 38.0%) under low level of EiHRD. The levels of EiHRD are presented in Table 4.10.

Table 4.10: Levels of Engagement in Health Related discussions

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Low EiHRD	504	35.0	32.0	38.0
Medium EiHRD	594	41.2	38.2	44.4
High EiHRD	342	23.8	21.0	26.5
Total	1440	100.0		

4.9 Community Members' Interaction with Professionals (CMIWP)

Appendix XI shows that the minimum and maximum scores on CMIWP were 3.00 and 6.00 respectively with the mean score being 4.7 (95% CI: 4.65 to 4.76) with Standard Deviation of 0.84 (95% CI: 0.8 to 0.9).

The results further indicate that of those who were interviewed only 17.5 percent (95% CI: 15.0 to 19.9) were in High level of CMIWP, 42.5 percent (95% CI: 39.5 to 45.9) on Medium level CMIWP and 40.0 percent (95% CI: 37.2 to 43.1) on Low level of CMIWP. The categories of CMIWP are presented in Table 4.11.

Table 4.11: Levels of Interactions with Professionals on Health Matters (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Low CMIWP	576	40.0	37.2	43.1
Medium CMIWP	612	42.5	39.5	45.9
High CMIWP	252	17.5	15.0	19.9
Total	1440	100.0		

4.10 Prior Knowledge, Beliefs, Perceptions and Attitudes towards diseases

The results in Table 4.12 indicate that the minimum and maximum scores on Prior knowledge were 103.00 and 131.00 respectively with the mean score being 114.52 (95% CI: 114.2 to 114.9) with Standard Deviation of 6.8 (95% CI: 6.5 to 7.1).

Table 4.12: Prior Knowledge Total Score (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
103.00	72	5.0	4.0	6.3
105.00	72	5.0	3.9	6.1
106.00	72	5.0	4.0	6.1
107.00	36	2.5	1.7	3.3
108.00	36	2.5	1.7	3.3
110.00	108	7.5	6.2	8.9
111.00	36	2.5	1.7	3.3
112.00	144	10.0	8.5	11.5
113.00	36	2.5	1.7	3.4
114.00	216	15.0	13.3	16.9
115.00	72	5.0	3.9	6.1
116.00	36	2.5	1.7	3.3
117.00	72	5.0	4.0	6.1
118.00	108	7.5	6.2	8.8
119.00	36	2.5	1.8	3.3
121.00	72	5.0	4.0	6.2
122.00	36	2.5	1.7	3.3
123.00	36	2.5	1.7	3.3
125.00	72	5.0	3.8	6.2
131.00	72	5.0	3.9	6.3
Total	1440	100.0		

4.11 Beliefs in the Effectiveness of the Modern Human and Animals Health Services

Belief in the effectiveness of the human and animals health services provided at the nearest modern health facility was assessed in this study, and results are presented in Table 4.13. The majority of the respondents (84.2 percent) (95% CI: 82.4 to 86.0) were found to have beliefs on the effectiveness of such services.

Table 4.13: Belief in the effectiveness of human and animal health services (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
No belief on effectiveness	228	15.8	14.0	17.6
Belief on effectiveness	1212	84.2	82.4	86.0
Total	1440	100.0		

4.12 Knowledge, Attitudes and Perceptions on the Influence of Politics on Health

The results in Table 4.14 indicate that the minimum and maximum scores on the influence of politics on health were 56.00 and 80.00 respectively with the mean score being 66.10 (95% CI: 65.82 to 66.37) with Standard Deviation of 5.33 (95% CI: 5.12 to 5.53).

Table 4.14: Influence of Politics on Health Total Score (n=1440)

Scores	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
56.00	36	2.5	1.7	3.4
57.00	36	2.5	1.7	3.3
59.00	72	5.0	3.9	6.1
60.00	108	7.5	6.2	9.0
61.00	72	5.0	3.9	6.1
62.00	36	2.5	1.7	3.3
63.00	72	5.0	4.0	6.2
64.00	108	7.5	6.2	9.0
65.00	108	7.5	6.3	9.0
66.00	180	12.5	10.9	14.2
67.00	36	2.5	1.7	3.3
68.00	180	12.5	10.8	14.2
69.00	72	5.0	4.0	6.0
70.00	72	5.0	3.9	6.1

71.00	72	5.0	3.9	6.2
72.00	36	2.5	1.7	3.3
73.00	36	2.5	1.7	3.3
75.00	36	2.5	1.7	3.3
79.00	36	2.5	1.7	3.4
80.00	36	2.5	1.7	3.3
Total	1440	100.0		

4.13 Service Characteristics (Perceived Efficiency on Accessing Modern Human and Animal Health Services)

This study assessed service characteristics by analysing the perceptions of respondents on the efficiency in accessing modern human and animal health services in the area. The results in Appendix XII indicate that the minimum and maximum scores on the service characteristics (perceived efficiency on accessing modern human and animal health services) were 8.00 and 32.00 respectively with the mean score being 18.52 (95% CI: 18.17 to 18.85) and a Standard Deviation of 6.60 (95% CI: 6.42 to 6.76).

4.14 Perceived Disorder characteristics

The results in Table 4.15 on disorder characteristics show that 58.3 percent (95% CI: 55.8 to 61.0) of the respondents stated that they did not perceive serious the disease lastly suffered in terms of how such disease interfered with the family, work and other social activities. The remaining 41.7 percent (95% CI: 39.0 to 44.2) regarded the diseases lastly suffered as serious, and had interfered with various aspects of their social life.

Table 4.15: Perceived Disorder Characteristics (n=1440)

Response	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Not serious	840	58.3	55.8	61.0
Serious	600	41.7	39.0	44.2
Total	1440	100.0	100.0	100.0

4.15 Awareness on One Health Approach

Table 4.16 indicates low awareness on the concept and practices related to OHA (5 percent) (95% CI: 4.0 to 6.1) while the majority of the respondents (95 percent) (93.9 to 96.0) were not aware of the concept and practices related to OHA in the study area.

Table 4.16: Awareness on OHA (n=1440)

Responses	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Unaware on OHA	1368	95.0	93.9	96.0
Aware on OHA	72	5.0	4.0	6.1
Total	1440	100.0	100.0	100.0

4.16 Attendance to seminars/workshop/campaigns/ training on health-related aspects

The results in Table 4.17 indicate that majority of the respondents (92.5 percent) (95% CI:91.1 to 93.8) attended to seminars, workshops, campaigns and training on health-related matters for the past twelve (12) months as opposed to only 7.5 percent (95% CI:6.2 to 8.9) who attended.

Table 4.17: Attendance to Seminars, Workshops/ Campaigns and Training on Health Related Activities (SWCToHRA) (n=1440)

Response	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Not attended	1332	92.5	91.1	93.8
Attended	108	7.5	6.2	8.9
Total	1440	100.0	100.0	100.0

4.17 LGAs Initiatives in Health Promotion, Diseases Prevention and Health Care

The results in Table 4.18 indicate the minimum and maximum scores on LGAs initiatives in health promotion, diseases prevention and health care were 1.00 and 6.00 respectively with mean score of 3.00 (95% CI: 2.89 to 3.09) with Standard Deviation of 1.86 (95% CI: 1.83 to 1.88).

Table 4.18: LGAs Initiatives in Health Issues Total Score (n=1440)

Scores	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	612	42.5	39.8	45.2
2.00	36	2.5	1.7	3.3
3.00	72	5.0	3.9	6.1
4.00	252	17.5	15.3	19.5
5.00	396	27.5	25.2	29.9
6.00	72	5.0	3.8	6.1
Total	1440	100.0	100.0	100.0

4.18 Membership to Health Insurance Funds (CHF/NHIF)

The status of respondents concerning membership to health insurance funds i.e CHF or NHIF is presented in Table 4.19. The results show that majority of the respondents (68.3 percent) (95% CI: 66.0 to 70.8) were non-members to health insurance funds with only (31.7 percent) (95% CI: 29.2 to 34.0) having membership in health insurance funds.

Table 4.19: Membership to health funds (n=1440)

Responses	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Members to CHF/NHIF	984	68.3	66.0	70.8
Non-members to CHF/NHIF	456	31.7	29.2	34.0
Total	1440	100.0	100.0	100.0

4.19. Determinants of HL under OHA

Under objective four (4) of the study, the determinants of HL under OHA were analysed. Ordinal regression was performed to determine the predictors of HL under OHA in the study area. The traditional .05 criterion of statistical significance was employed for all tests. Addition of the predictors to a model that contained only the intercept significantly improved the fit between model and data, $\chi^2(13, n= 1440) = 1814.91$, Nagelkerke $R^2 = .806$, $p < .000$.

The capability of the model to improve the ability to predict the outcome was determined by comparing the final model against the baseline to see whether it has significantly improved the fit to the data. The significant chi-square statistic

($p < .0005$) indicates that the final model gives a significant improvement over the baseline intercept-only model, a chi-square of $p < .000$ was observed in this study. This is an indication that the model is in a position to offer better predictions. The test of consistency of observed data with the fitted model from the *Goodness-of-Fit output* indicates a larger p-value (p-value=1.000) from this study, indicating that the data and the model predictions are similar and that the model is good. The rule is if $p < .05$, then the model does not fit the data well. Another important statistic is the Pseudo R-square Statistics (the coefficient of determination) which summarizes the proportion of variance in the outcome that can be accounted for by the explanatory variables, with larger R^2 values indicating that more of the variation in the outcome can be explained up to a maximum of 1 (Pallant, 2007). The pseudo R^2 values (Nagelkerke) of 80.6% indicates that predictors explain a relatively large proportion of the variation between respondents in HL. The larger R^2 values (up to a maximum of 1) indicate more of the variation in the outcome.

Test of parallel lines was used to evaluate the appropriateness of the proportional odds (PO) assumption. This test compares the ordinal model which has one set of coefficients for all thresholds (labelled Null Hypothesis), to a model with a separate set of coefficients for each threshold (labelled General). If the general model gives a significantly better fit to the data than the ordinal (proportional odds) model (i.e. if $p < .05$) then we are led to reject the assumption of proportional odds. This is not the case in this study given the value ($p = .064$).

As revealed in Table 4.20, significant unique contributions were made by health information seeking (InfoSeekingScore), one health concern (Score OneHealthConcern), health behaviour (HealthBehaviourScore), individuals interactions with medical, veterinarians and environmental professionals (ScoresInteractMedicVetEnviron), prior knowledge on health-related aspects (PriorKnowlegTotalScore), perceived influence of politics on health (InfluencePoliticsOHealth_Score), perceived involvement of LGAs in health (ScoreonLGA), marital status (TransformedMarital) and occupation of the respondents (TransformedOccu).

The results indicate that the odds of those in a relationship having adequate HL was 2.437 (95% CI, 1.805 to 3.291) times that those who are not in a relationship, a

statistically significant effect at $p < 0.001$. The odds of those in formal occupation having adequate HL was 2.222 (95% CI, 1.439 to 3.430) times that of those in informal occupation, a statistically significant effect at $p < 0.001$. An increase in health information seeking (expressed in Information Seeking scores) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of 2.900 (95% CI, 2.446 to 3.439, $p < 0.001$).

The results further reveal that an increase in health behaviour (expressed in health behaviour score) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of .557 (95% CI, .518 to .598), $p < 0.001$. An increase in Interaction with Medical, Veterinarian and Environmental professionals (expressed in Interactions with a medical, veterinarian and environmental professionals scores) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of 2.429 (95% CI, 1.965 to 3.002), $p < 0.001$.

Other variables that had a significant influence on HL was prior knowledge, whereby it was revealed from the results that an increase in prior knowledge (expressed in Prior Knowledge Score) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of 1.053 (95% CI, 1.026 to 1.080), $p < 0.001$. An increase in the Perceived Influence of Politics On health in the study areas by the respondent (expressed in Influence of Politics On health score) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of 1.144 (95% CI: 1.105 to 1.186), $p < 0.001$.

Also, a unit increase in the perceived LGA involvement in health-related matters by a respondent (expressed in LGA involvement in health Score) was associated with an increase in the odds of having adequate health literacy, with an odds ratio of 1.369 (95% CI, 1.204 to 1.557), $p < 0.001$.

Table 4.20 Ordinal Regression Results for the Predictors of HL under OHA

		p- values	95% CI		
			Odds Ratio	Lower Bound	Upper Bound
Threshold	[Health Literacy Levels = 1.00]	.000	1.29	.137	.379
	[Health Literacy Levels = 2.00]	.000	1.22	.064	.338
	Information Seeking Score	.000	2.900	.894	1.235
	Score on One Health Concern	.000	.917	-.123	-.049
	Scores on Engagement on One Health Related Discussions	.088	1.015	-.002	.033
	Health Behaviour Score	.000	.557	-.657	-.514
	Scores on Interactions with Medical Veterinary and Environmental Professionals	.000	2.429	.676	1.099
	Prior Knowledge Total Score	.000	1.053	.026	.077
	Influence of Politics on OHA Score	.000	1.144	.100	.170
	Score on LGA	.000	1.369	.186	.443
Location	Attitudes Total Score	.	1.000	.	.
	Years of schooling	.899	.991	-.144	.126
	[Marital status=.00]	.000	2.437	.590	1.191
	[Marital status =1.00]	.	1.000	.	.
	[Healthcare Source=.00]	.084	.754	-.602	.038
	[Healthcare Source=1.00]	.	1.000	.	.
	[SEX=.00]	.415	.886	-.411	.169
	[SEX=1.00]	.	1.000	.	.
	[Occupation=.00]	.000	2.222	.364	1.233
	[Occupation=1.00]	.		1.000.	.

4.20 Determinants of HBs under OHA

Under objective five (5) of the study determinants of HB under OHA were assessed. A binary logistic regression was performed to assess the influence of several variables in determining HB (HEBs) of the respondents. This model was employed to estimate the likelihood of a binary response (HEBs=1, and HEBs=0) based on several independent variables. The model comprised of 15 independent variables as shown in Table 4.31. The full model containing all predictors was statistically significant, $\chi^2 (15, N=1440) = 1368.132$, $p = .000$ indicating that the model was able to distinguish between respondents who exhibits HEBs and those with HIBs (HEBs=0). That means predicting which of two categories a person is likely to belong to given certain other information. The Omnibus Test of the model coefficient provides an overall clue of how well a particular model performs which is referred to as goodness of fit test (Pallant, 2007). A highly significant value $p \leq 0.05$ is normally required, from the results of this analysis the value was $p = 0.000$, while

the chi-square value was 1368.132 with 15 degrees of freedom. Hosmer Lemeshow Goodness of the fit test indicates a poor fit by a significant value $p \leq 0.05$, hence to be able to support the model, there is a requirement for a p -value larger than 0.05 (Pallant, 2007). For the Hosmer Lemeshow test the chi-square value was 2.51 with a p -value of 0.96 were recorded in this study, it can be noted that the p -value obtained here is greater than 0.05, hence supports the model. Other important aspects are the Cox and Snell R square and Nagelkerke R Square values. The Nagelkerke R Square value indicates the amount of variation in the dependent variable explained by the model ranging from 0 to 1. In this study the values for Cox and Snell R square and Nagelkerke R Square are 0.527 and 0.702 respectively, this is an indication that the model as a whole is explained between 52.7 percent (Cox and Snell R square) and 70.2 percent (Nagelkerke R squared) of the variance in HB and correctly classified 85.8 percent of cases.

Table 4.21 indicates only five (5) of the independent variables to have made a unique statistically significant contribution to the model. One Health Concern (scores), HL of the respondents (HL scores), Prior Knowledge on health-related issues (scores), Influence of Politics on health (scores) and LGA involvement in health (scores) are indicated in Table 4.21 to have a significant influence on determining health behaviour in the interface of humans, animals and the environment.

The findings from the binary logistic regression in Table 4.21 reveal that One Health Concern (with an odds ratio of 1.231, $\beta=.207$, $p<0.000$), HL of the respondents (with an odds ratio of 1.018, $\beta=.018$, $p=0.000$) and LGA involvement in health (with an odds ratio of 1.968, $\beta=.677$, $p=0.000$) to be the strongest predictors of HB. Other variables, including; Prior Knowledge on health-related issues (with an odds ratio of .941, $\beta= -.061$, $p=.045$) and Influence of Politics On health (with an odds ratio of .849, $\beta= -.164$, $p=.003$) were also statistically significant.

The results further reveal that an increase in One Health Concern (expressed in scores) was associated with health-enhancing behaviour, with an odds ratio of 1.231 (95 % CI, 1.106 to 1.369), Wald χ^2 (1)= 14.259, $p=0.000$. An increase in HL (expressed in HL scores) was associated with health-enhancing behaviour, with an odds ratio of 1.018 (95 % CI, 1.009 to 1.027), Wald χ^2 (1) = 16.783, $p=0.000$. LGA

involvement in HRA (expressed in LGA score) increase was associated with an increase in the odds of performing health enhancing practices, with an odds ratio of 1.968 (95% CI, 1.419 to 2.728), $p < 0.001$. The results further indicate that an increase in the influence of politics on health (expressed as the influence of politics on health total score) was associated with a decrease in the odds of performing health impairing practices, with an odds ratio of .849 (95% CI, .762 to .945), $p = .003$. It was observed that Prior Knowledge on health-related issues was associated with health-enhancing behaviour whereas an increase in Prior Knowledge (expressed in prior knowledge total score) was linked to decrease in the odds of performing health impairing practices, with an odds ratio of .941 (95% CI, .887 to .999), $p = .045$.

Table 4.21 BLR on Determinants of Health Behaviour (HEBs) (n=1440)

Variables	p-value .	Odds Ratios	95% C.I. for Odds Ratios	
			Lower Bound	Upper Bound
Marital status	.770	.714	.075	6.829
Score on One health concern	.000	1.231	1.106	1.369
HL Scores	.000	1.018	1.009	1.027
Scores on Engagement on Health Related Discussion	.349	1.038	.960	1.124
Scores on Interaction with Health Professionals	.351	.761	.428	1.352
Prior Knowledge Total Score	.045	.941	.887	.999
Influence of Politics on Health Total Score	.003	.849	.762	.945
Score on LGA involvement on Health	.000	1.968	1.419	2.728
Healthcare Seeking Source	.576	1.333	.487	3.652
Years of schooling	.902	1.028	.661	1.598
Sex	.299	1.560	.674	3.613
Age	.193	1.023	.988	1.059
Service Characteristics Score	.519	1.060	.888	1.267

4.21 Determinants of HCSB under OHA

Objective six (6) of the study assessed the determinants of HCSB under OHA. To analyse the determinants of HCSB of the respondents in the interface of humans, animals and the environment, this study used binary logistic regression. This model was employed to estimate the likelihood of a binary response (IHCS/F=0, and FHCS/F=1) from several independent variables. The model contained a total of 13 independent variables (see Table 4.32). The full model containing all predictors was

statistically significant, $\chi^2 (15, n=1440)=760.053, p=.000$ this is an indication of the fact that the model was able to distinguish between respondents who prefer seeking healthcare from IHCS/F and those who seek health care from FHCS/F. In its simplest form, this means that this predicts which of two categories a person's preference in terms of healthcare-seeking is likely to belong to given certain other information. The Omnibus Test of the model coefficient provides an overall clue of how well a particular model performs which is referred to as goodness of fit test (Pallant, 2007; Field, 2009). A highly significant value $p \leq 0.05$ is normally required, from the results of this analysis the value was $p = 0.000$, while the chi-square value was 760.053 with 15 degrees of freedom. Hosmer Lemeshow Goodness of the fit test indicates a poor fit by a significant value $p \leq 0.05$, hence to be able to support the model, there is a requirement for a p -value larger than 0.05. For the Hosmer Lemeshow test the chi-square value was 3.03 with a p -value of 0.93 were recorded in this study, it can be noted that the p -value obtained here is greater than 0.05, hence the model is supported. Other important aspects are the Cox and Snell R square and Nagelkerke R Square values. The Nagelkerke R Square value indicates the amount of variation in the dependent variable explained by the model ranging from 0 to 1. In this study the values for Cox and Snell R square and Nagelkerke R Square are 0.411 and 0.554 respectively, this is an indication that the model as a whole is explained between 41.1 percent (Cox and Snell R square) and 55.4 percent (Nagelkerke R squared) of the variance in HCSB and correctly classified 78.8 percent of cases. Table 4.22 indicates only three (3) of the independent variables to have made a unique statistically significant contribution to the model (marital status, service characteristics score, beliefs on the effectiveness of modern human and animals' health services).

The findings in Table 4.22 indicate that marital status (being in a relationship), service characteristics score, beliefs on the effectiveness of modern humans and animals health services had a significant influence on determining the preference of a source to seek health care from in the interface of humans, animals and the environment.

The results from the logistic regression presented in Table 4.22, indicates that Marital status being predictor on an individual's preference of source to seek health

care from, recording an odds ratio of 0.001(95% CI, .000 to .010), $\beta=-6.946$, $p=0.000$. This indicates that those in a relationship are more likely to choose formal health facilities than those who were not, controlling for all other factors in the model. The results further show that service characteristics score had a significant influence on the choice of health facility with an odds ratio of 1.678, $\beta=0.518$, $p<0.001$. The findings imply that a unit increase in the score in the service characteristics signifies an increase in the likelihood of FHCS/F preference over IHCS/F by 1.678 (95% CI, 1.408 to 1.999) times. Belief in the effectiveness of human and animal services is indicated to significantly influence the preference of health facility with an odds ratio of 5.268, $\beta=1.662$, $p<0.001$. The odds of those who had a belief in the effectiveness of human and animal health services to prefer formal health care service source was 5.268 (95% CI, 1.954 to 14.205) times that of those had no belief in the effectiveness of human and animal health services, a statistically significant effect, $p<0.001$.

Table 4.22 BLR predicting Health care service preferences

Variables	p-value	Odds Ratio	95% C.I.for Odds Ratio	
			Lower Bound	Upper Bound
Years of schooling	.086	1.548	.940	2.551
Attendance on Seminars/Workshops	.850	.795	.074	8.495
Awareness on OHA(1)	.171	.215	.024	1.938
Score on LGA	.904	1.019	.747	1.392
Influence of Politics on Health Total Score	.548	.969	.875	1.073
Prior Knowledge Total Score	.607	1.018	.952	1.088
Scores on Interaction with Medical Veterinary Environ. Professionals	.682	.906	.566	1.450
Health Behaviour Score	.545	.947	.794	1.129
Scores on Engagement on Health Related Discussion	.769	1.013	.930	1.103
HL Scores	.782	.999	.992	1.006
ScoreOneHealthConcern	.720	1.020	.916	1.135
Marital(1)	.000	.001	.000	.010
Occupation (1)	.847	1.140	.299	4.350
Belief on the effectiveness of HUMAN and ANIMAL Services(1)	.001	5.268	1.954	14.205
Service Characteristics Score	.000	1.678	1.408	1.999
Constant	.109	.001		

4.22 Collaborative Efforts and Strategies to Attain Optimal Health for People, Animals and the Environment in the Study Area

Objective seven (7) of this study identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary), social, economic, agricultural, environmental, wildlife and other interested parties in attaining optimal health for people, animals and the environment.

4.22.1 Awareness on the Concept and Practices Related to OHA

The findings in Table 4.23 indicate that only 5 percent (CI 95%, 4.0 to 6.2) of the respondents who were interviewed were aware of the concept and the practice of OHE.

Table 4.23 Awareness on OHA Concept and practices

Response	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Not aware	1368	95.0	93.8	96.0
Aware	72	5.0	4.0	6.2
Total	1440	100.0		

To confirm individuals' awareness on OHA concept and practices, the respondents were asked what they know on OHA. The results in Table 4.24 indicate only 2.5 percent (CI 95%, 1.7 to 3.4) of the respondents managed to correctly describe OHA by saying it is a collaborative effort of multiple disciplines dealing with health issues.

Table 4.24: Knowledge on OHA (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Collaborative efforts of multiple disciplines dealing with health issues	36	2.5	1.7	3.4
N/A	1404	97.5	96.6	98.3
Total	1440	100.0		

4.22.2 Medical, Veterinary and Environmental Personnel Collaborations

The results in Table 4.25 reveal that only 3.8 percent (CI 95%, 2.8 to 4.8) were aware, with the majority of the respondents (91.2 percent: CI 95%, 89.7 to 92.7) were not aware on how these professionals collaborated in the study area, other 5.0

percent (CI 95%, 3.9 to 6.2) claimed that there were no any collaborations observed within the specified period.

Table 4.25: Medical, Veterinary and Environmental Personnel Collaborations (n=1440)

Response	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
No collaboration	72	5.0	3.9	6.2
Collaborated	54	3.8	2.8	4.8
Unaware of such collaboration	1314	91.3	89.7	92.7
Total	1440	100.0		

4.22.3 Potential Hindrances towards Effective Collaboration

The results in Table 4.26 indicate that 5 percent (CI: 95%, 3.9 to 6.2) of the respondents identified lack of good health policies, while 2.5 percent (CI 95%, 1.7 to 3.3) identified unavailability of veterinary services in their area, another 2.5 percent (CI 95%, 1.7 to 3.3) identified lack of government support and the remaining 90 percent (CI 95%, 88.4 to 91.6) were not aware on the factors that are hindering collaboration between medical and veterinary officers.

Table 4.26 Factors Hindering Effective Collaboration on Health Related Aspects (n=1440)

Responses	Frequency	%	95% CI	
			Lower Bound	Upper Bound
Lack of good health policies	72	5.0	3.9	6.2
Unavailability of veterinary services in rural areas	36	2.5	1.7	3.3
Lack of government support	36	2.5	1.7	3.3
Don't know	1296	90.0	88.4	91.6
Total	1440	100.0		

The results in Table 4.27 reveal that 39.2 percent (CI 95%, 36.7 to 41.8) of the interviewed respondents claimed that for optimal health for animals, humans and the environment to be attained there is a need for technical collaboration between medical professionals, veterinary and environmentalists while 60.8 percent (CI 95%, 58.2 to 63.3) didn't know whether there was such a need.

Table 4.27 Need for Technical Collaboration between Professionals (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
There is a need	564	39.2	36.7	41.8
Don't know whether there is a need	876	60.8	58.2	63.3
Total	1440	100.0		

4.22.4 Reasons for the Need for Technical Cooperation

The respondents who acknowledged the need for technical cooperation included, their reasons included; that technical collaboration between medical professionals, veterinary and environmentalists help to save lives of both humans and animals (7.5 percent: CI 95%, 6.1 to 8.8), while 2.5 percent (CI 95%, 1.7 to 3.3) of the respondents attributed the need for the collaboration to its potentiality to help to conserve the environment. Table 4.28 presents the results.

Table 4.28 Reasons for Technical Collaboration (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Help to save the lives of humans and animals	108	7.5	6.1	8.8
Help to conserve environment	36	2.5	1.7	3.3
Didn't understand whether there is a need	1296	90.0	88.5	91.6
Total	1440	100.0		

4.22.5 Awareness on Technical Collaboration on Diagnosis and Surveillance of Diseases

The results in Table 4.29 indicate that only 2.5 percent (CI 95%, 1.7 to 3.3%) of the respondents are aware of some collaboration on diagnosis and surveillance of zoonotic or non-zoonotic diseases.

Table 4.29 Awareness on Technical Collaboration on Diagnosis and Surveillance of Diseases (n=1440)

Responses	Frequency	Per cent	95% Confidence Interval	
			Lower Bound	Upper Bound
Not aware	936	65.0	62.6	67.4
Aware	36	2.5	1.7	3.3
Don't know	432	30.0	27.7	32.4
N/A	36	2.5	1.7	3.4
Total	1440	100.0		

4.22.6 Support for the Institutionalization of Technical Collaboration

The respondents were asked whether if they will support the technical collaboration between medical professionals, veterinarians and environmentalists when institutionalized. The results in Table 4.30 reveal that the majority of the respondents (94.2 percent) (95% CI, 93.1 to 95.3) were in favour of such collaboration if institutionalized.

Table 4.30 Support for the Institutionalization of Technical Collaboration between Professionals (n=1440)

Response	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Not supporting	84	5.8	4.7	6.9
Supporting	1356	94.2	93.1	95.3
Total	1440	100.0		

4.23 Linkage (association) between HL, HB and HCSB under OHA

Under Objective eight (8) of this study, the linkages (associations) between HL, HB and HCSB under OHA were determined.

4.23.1 HL and HB

Pearson's correlation coefficient (Product Moment Correlation Coefficient) was employed to determine the association (relationship) between HL scores and HB scores. The results for Pearson's correlation coefficient are presented in Table 4.31.

Table 4.31: Association between HL Scores and HB Scores (n=1440)

		HL Score		HB Score
Health Literacy Score	Pearson Correlation		1	-.631**
	Sig. (2-tailed)			.000
	N		1440	1440
	Bootstrap	Bias	0	.000
		Standard Error	0	.015
		95% CI	Lower	1
			Upper	1
	Pearson Correlation		-.631**	1
	Sig. (2-tailed)		.000	
	N		1440	1440
Health Behaviour Score	Bootstrap	Bias	.000	0
		Standard Error	.015	0
		95% CI	Lower	-.659
			Upper	1
				1

The relationship between HL (as measured by health literacy total score) and HB (presented into health impairing behaviours/practices scores) was investigated using Pearson Product Moment Correlation Coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a strong, negative correlation between the two variables, $r=-.63$, $N=1440$, $p<0.000$, with high scores on HL associated with lower scores on health impairing behaviours/practices. This means the higher the HL scores the lower the scores on HIB (hence HEBs).

A chi-square test of independence was further employed to examine the association between HL and HB involving HL levels and HB categories. A contingency table in Table 4.32 presents cross-tabulation results indicating the association between HL levels and HB categories.

Table 4.32 Health Literacy Levels * Health Behaviours Categories Cross tabulation (n=1440)

		Health Behaviours Categories		Total
		HEB (Low Health Impairing practices)	HIB (Low Health Enhancing practices)	
IHL Level	Count	36	486	522
	% within HL Levels	6.9%	93.1%	100.0%
	% within HB Categories	6.2%	56.2%	36.2%
	% of Total	2.5%	33.8%	36.2%
MHL Level	Count	144	300	444
	% within HL Levels	32.4%	67.6%	100.0%
	% within HB Categories	25.0%	34.7%	30.8%
	% of Total	10.0%	20.8%	30.8%
AHL Level	Count	396	78	474
	% within HL Levels	83.5%	16.5%	100.0%
	% within HB Categories	68.8%	9.0%	32.9%
	% of Total	27.5%	5.4%	32.9%
Total	Count	576	864	1440
	% within HL Levels	40.0%	60.0%	100.0%
	% within HB Categories	100.0%	100.0%	100.0%
	% of Total	40.0%	60.0%	100.0%

$$\chi(2) = 623.420, p < 0.001, \text{Phi} = 0.658$$

The results from Table 4.32 indicate that 93.1 percent of the respondents who were interviewed who had HIB (Low Health Enhancing practices) also had IHL, while

only 6.9 percent of those who had HEBs were found to have IHL. The table further indicates that the majority of those who were reported to have HEBs (83.5 percent) were found in the AHL category and only 16.5 percent under HIBs.

Table 4.32 also presents chi-square results on the association between HL levels and HB categories, the results reveal that $\chi(2) = 623.420, p < 0.001$. It is indicated that there is a statistically significant association between HB categories and HL levels. This means that the proportions of levels of HL is significantly different among those with HEBs and HIBs. This shows that there is an association between HL levels and HB. The results are presented in Table 4.32. The phi coefficient in this study is .658 based on Cohen's 1988 criteria of .10 for a small effect, .30 for medium effect and .50 for large effect. This indicates that the strength of association between the variables (HB categories and HL levels) is very strong.

4.23.2 HCSB and HL Levels

Contingency table and chi-square (χ^2) were used to examine association (relationship) between HL levels and HCSB (which is being operationalized in this study as a preference for health care service source).

Table 4.33: Health Care Source Preferences * HL Levels Cross tabulation (n=1440)

				Health Literacy Levels			Total
				IHL Level	MHL Level	AHL Level	
HCS preferences	Informal health care sources/facilities	Count		252	198	144	594
		% within HCS preferences		42.4%	33.3%	24.2%	100.0%
		% within HL levels		48.3%	44.6%	30.4%	41.2%
		% of Total		17.5%	13.8%	10.0%	41.2%
	Formal health care sources/facilities	Count		270	246	330	846
		% within HCS preferences		31.9%	29.1%	39.0%	100.0%
		% within HL levels		51.7%	55.4%	69.6%	58.8%
		% of Total		18.8%	17.1%	22.9%	58.8%
	Total	Count		522	444	474	1440
		% within HCS preferences		36.2%	30.8%	32.9%	
		% within HL levels		100.0%	100.0%	100.0%	
		% of Total		36.2%	30.8%	32.9%	

$\chi(2) = 35.793, p < 0.001, \phi = .158$.

The results in Table 4.33 indicate that 42.4 percent of the interviewed respondents who preferred IHCSFs (Informal Health sources/facilities) had IHL, 33.3 percent had MHL and 24.2 percent had AHL. The rest of the respondents (39.0%) who preferred FHCSFs were those who had AHL, followed by 31.9 percent with IHL and 29.1 percent with MHL.

The results for the Chi-square tests for the association of health care source preference and HL level are presented in Table 4.33. The results from the Chi-Square Tests of independence indicate that $\chi^2(2) = 35.793, p < 0.000$. This is an indication that there is a statistically significant association between HCSB categories and HL levels. The proportions of levels of HL is significantly different among those preferring IHCSF and FHCSF. The phi coefficient in this study is .158 based on Cohen's 1988 criteria of .10 for a small effect, .30 for medium effect and .50 for the large effect the strength of association between the variables is small.

4.23.3 Association between HB categories and HCSB

The association (relationship) between HB categories and individuals preferences for seeking health care (referred to HCSB) was examined by using Contingency table and Chi-square (χ^2) are detailed in Table 4.34.

Table 4.34 HB Categories * health care source preferences Cross tabulation (n=1440)

		health care source preferences		Total
		IHCSF	FHCSF	
HEB	Count	186	390	576
(Low	% within HB Categories	32.3%	67.7%	100.0%
Impairing	% within health care source preferences	31.3%	46.1%	40.0%
practices)	% of Total	12.9%	27.1%	40.0%
HIB	Count	408	456	864
(Low	% within HB Categories	47.2%	52.8%	100.0%
Health	% within health care source preferences	68.7%	53.9%	60.0%
Enhancing	% of Total	28.3%	31.7%	60.0%
practices)	Count	594	846	1440
Total	% within HB Categories	41.2%	58.8%	100.0%
	% within health care source preferences	100.0%	100.0%	100.0%
	% of Total	41.2%	58.8%	100.0%

$\chi^2(2) = 31.177, p < 0.001, \phi = -.149$.

The results in Table 4.34 indicate that 68.7 percent of those who preferred informal health care sources /facilities had HIBs, while only 31.3% of the respondents who had HEBs preferred seeking health care from informal health care sources /facilities. The majority of the respondents (67.7 percent) who had HEBs preferred seeking health care from formal health care sources/facilities. The results from the Chi-Square Tests of independence (with Yates Continuity Correction) indicate that $\chi^2(2) = 31.177, p < 0.001$. This indicates a statistically significant association between HB categories and HCSB. The preferences of HCS source are significantly different among those with HIBs and HEBs. A chi-square test for independence (with Yates Continuity Correction) in Table 4.34 indicates a moderate association between Health Behaviours Categories and health care source preferences, $\chi^2(2, n=1440) = 31.177, p < 0.001, \phi = -.149$.

4.24 Stakeholders' Initiatives in Building Public Health Capacity, Developing HL and Empowering People to Manage their Health

Under objective nine (9) and ten (10) of this study stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health were assessed. The results on these initiatives and related aspects are presented under subsections 4.24.1, 4.24.2, 4.24.3, 4.24.4, 4.24.5, 4.24.6 and 4.24.7.

4.24.1 Bylaws, Local Policies and Directives on Health Promotion, Healthcare and Diseases Prevention

The results in Table 4.45 indicate bylaws, local policies and directives on health promotion, healthcare and diseases prevention that were identified by the respondents. It is indicated that 10.0 percent (95% CI: 8.5 to 11.6) of the identified focused on restrictions on certain health behaviours, 12.5 percent focused on encouraging certain health behaviours, while 10.0 percent (95% CI: 8.5 to 11.5) were on meat inspection in their area, 27.5 percent (95% CI: 25.1 to 29.9) on environmental management practices near residential areas, 15.0 percent (95% CI: 13.1 to 16.9) on where and when pasture and selling outlets businesses can be located, 15.0 percent (95% CI: 13.2 to 16.9) on water sources use (which, for who, when) and 10.0 percent (95% CI: 8.5 to 11.7) on village control issues of livestock feed in the area nearby game reserve.

Table 4.35 Bylaws, Local Policies and Directives on Health Promotion, Healthcare and Diseases Prevention (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Village control on issues of livestock feed in the area nearby the game reserve	144	10.0	8.5	11.7
Water sources use which for who when	216	15.0	13.2	16.9
Where and when pasture selling outlets and businesses can be located	216	15.0	13.1	16.9
Environmental mgt practices near residential areas	396	27.5	25.1	29.9
restrictions on certain health behaviours	144	10.0	8.5	11.6
Encouraging certain health behaviours	180	12.5	10.8	14.2
Meat inspection	144	10.0	8.5	11.5
Total	1440	100.0		

4.24.2 Local Government and Public Health

The results in Table 4.36 indicate the ways through which local government has been dealing with public health and related aspects through its capacity. The findings reveal that 8.8 percent (95% CI: 5.4 to 13.3) of the respondents identified LGAs involvement in public health through the services it commissions and delivers, whereas 67.4 percent (95% CI: 61.3 to 73.3) of the respondents identified LGAs involvement in public health through its regulatory powers, the other 8.8 percent (95% CI: 5.4 to 12.9) of the respondents identified LGAs involvement in public health through community leadership and the remaining 15.0 percent (95% CI: 10.0 to 20.0) were not in a position to identify any ways through which LGAs involved itself in public health.

Table 4.36 LGAs Involvement in Public Health through Its Capacity (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Through the services, it commissions and delivers	126	8.8	5.4	13.3
through its regulatory powers	972	67.4	61.3	73.3
Through community leadership	126	8.8	5.4	12.9
Don't know LGAs involvement in Public health	216	15.0	10.0	20.0
Total	1440	100.0		

4.24.3 Focus of the Identified Government Initiatives on Health in the Study Area

Table 4.37 presents results on the focus of the identified government initiatives on health promotion, healthcare and diseases prevention in the study area.

Table 4.37 Focus of the Identified Government Initiatives on Health

Focus	Diseases prevention		Health promotion		Health care	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Seminars/Workshop	108	7.5	0	0	0	0
Public Announcements	792	55.0	36	2.5	0	0
Village/wards/street meetings	1368	95.0	36	2.5	0	0
Visits by Health Officials from the wards	720	50.0	0	0	0	0
Parents meetings at school	468	32.5	0	0	0	0
Leaflets distribution	792	55.0	0	0	0	0

The results indicate that 7.5 percent of the respondents identified seminars/workshops on diseases prevention, no seminars /workshops were identified for health promotion and health care. Of the identified public announcements, 55 percent focused on diseases prevention, whereas only 2.5 percent of public announcements on health promotion were identified by the respondents and none on health care. Village/wards/street meetings on diseases prevention accounted for 95 percent of the identified village/wards/street meetings, and village/wards/street meetings were on health promotion 2.5 percent and none were on health care. Visits by Health Officials from the wards on diseases prevention accounted for 50 percent of the identified visits by Health Officials from the wards, with none on health promotion and health care. For the case of parents meetings at school, 32.5 percent were on diseases prevention and none were on health promotion and health care. The findings further reveal that 55 percent of the leaflets distributed were on diseases prevention and none on health promotion and health care.

4.24.4 Perceptions on Effectiveness of the Stakeholders' Initiatives in Building Public Health Capacity, Developing HL and Empowering People to Manage their Health

The results in Tables 4. 38 reveal that the minimum and maximum scores were 14 and 18 respectively with a mean of 17.32 and a Standard deviation of 1.15.

Table 4.38 Scores on Perceived Effectiveness of the Stakeholders' Initiatives in Building Public Health Capacity (n=1440)

Scores	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
14.00	72	5.0	2.5	7.9
15.00	36	2.5	.4	4.6
16.00	252	17.5	12.5	22.1
17.00	72	5.0	2.5	7.9
18.00	1008	70.0	64.6	75.4
Total	1440	100.0		

The results in Table 4.39 further reveal that 30 percent of the respondents perceived the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health to be effective while 70 percent perceived it being ineffective.

Table 4.39 Perceptions on Effectiveness of the Stakeholders' Initiatives in Building Public Health Capacity (n=1440)

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Effective	432	30.0	22.9	35.8
Ineffective	1008	70.0	64.2	77.1
Total	1440	100.0		

4.24.5 Institutions' Involved in Initiatives in Building Public Health Capacity on Human and Animals Health at the Study

The results in Table 4.40 reveal that 70 percent (95% CI: 67.6 to 72.4) of the respondents identified hospitals, 27.5 percent (95% CI: 25.1 to 29.7) schools and 2.5 percent (95% CI: 1.7 to 3.4) NGOs as institutions which facilitate health initiatives in building public health capacity on human in the society.

Table 4.40 Institutions Facilitating Health Initiatives in Building Public Human Health Capacity

Institutions	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Schools	396	27.5	25.1	29.7
Hospitals	1008	70.0	67.6	72.4
NGOs	36	2.5	1.7	3.4
Total	1440	100.0		

4.24.6 Institutions Facilitating Initiatives in Developing Health Literacy in Human Health in the study area

The results further in Table 4.41 indicate that 80 percent (95% CI: 75.0 to 85.4) of the respondents identified hospitals and 20 percent (95% CI: 14.6 to 25.0) schools as institutions which facilitate health initiatives in developing HL in human health in the society.

Table 4.51 Institutions Facilitating Initiatives in Developing HL in Human Health

	Frequency	%	95% Confidence Interval	
			Lower Bound	Upper Bound
Hospitals	1152	80.0	75.0	85.4
Schools	288	20.0	14.6	25.0
Total	1440	100.0		

4.24.7 Institutions Facilitating Initiatives in Building Public Health Capacity on Livestock Health

The results Table 4.42 indicate that all the respondents interviewed (100 percent) identified schools as the only institution in the study area which has been involving itself facilitate health initiatives in building public health capacity on livestock health in the society.

Table 4.42 Institutions Facilitating Initiatives in Building Public Health Capacity on Livestock Health

	Frequency	Per cent	95% Confidence Interval	
			Lower Bound	Upper Bound
Schools	1440	100.0	100.0	100.0

4.25 Health Behaviour Mean Differences between HL Groups

A One-way Analysis of Variance (ANOVA) was run to explore the impact of HL on HB as measured by health impairing practices score. HL was categorised into IHL (below the scores of 211.0000), MHL (between 211.0000 and 261.0000 scores) and AHL (the scores above 261.0000). A statistically significant difference at the $p = .05$ level in HIP scores for the three HL levels (groups): $F(2, 1439) = 795.206, p = .000$ was observed. ANOVA results are detailed in Table 4.43.

Table 4.43 ANOVA Results for Health Behaviour Mean Differences between HL Groups

Health Behaviour Score					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16218.093	2	8109.047	795.206	.000
Within Groups	14653.682	1437	10.197		
Total	30871.775	1439			

Post hoc comparisons using the Tukey test (Table 4.43) show that the mean score for IHL level ($M=26.73, SD=2.57$) was statistically different from the MHL level ($M=24.50, SD=2.89$). The score for MHL level also was statistically significantly different from the AHL level ($M=18.83, SD=3.97$). The results in both Table 4.60 and Table 4.61 indicate significant mean differences in the groups.

Table 4.44 Multiple Comparisons

Dependent Variable: Health Behaviour Score

Tukey HSD

(I) HL Levels	(J) HL Levels	Mean Difference (I-J)	Standard Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
IHL Level	MHL Level	2.23563*	.20616	.000	1.7520	2.7193
	AHL Level	7.90019*	.20261	.000	7.4249	8.3755
MHL Level	IHL Level	-2.23563*	.20616	.000	-2.7193	-1.7520
	AHL Level	5.66456*	.21090	.000	5.1697	6.1594
AHL Level	IHL Level	-7.90019*	.20261	.000	-8.3755	-7.4249
	MHL Level	-5.66456*	.21090	.000	-6.1594	-5.1697

*. The mean difference is significant at the 0.05 level.

Table 4.45 presents the descriptives on the means for the groups as recorded for the ANOVA test.

Table 4.45 Descriptives on Means of Groups
Health Behaviour Score

	N	Mean	Standard Dev.	Standard Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
IHL Level	522	26.7356	2.57759	.11282	26.5140	26.9573	19.00	30.00
MHL Level	444	24.5000	2.89430	.13736	24.2300	24.7700	19.00	30.00
AHL Level	474	18.8354	3.97699	.18267	18.4765	19.1944	12.00	30.00
Total	1440	23.4458	4.63181	.12206	23.2064	23.6853	12.00	30.00

Summary of findings

This chapter presented an overview of the study participants' socio-demographic characteristics and results for each specific objectives plus research questions. The first question was: What is the level of HL of the people in the study area with a reflection on OHA? The results revealed the majority of the respondents having IHL (36.3 percent), MHL (30.8 percent) and only 32.9 percent had AHL. The other question was: What are the HBs and HCSB plus individuals attitudes under OHA in the study area? Findings indicated that majority of the respondents had HIBs (60 percent) and (40 percent) only exhibited HEBs, FHCSFs were preferred than IHCSF at 58.8 percent and 41.2 percent respectively, as for the attitudes towards HIPs, 30 percent had unfavourable, 35 percent had neutral and 35 percent favourable attitudes towards HIPs. The third question was: What are the determinants of health behaviour, health care seeking and HL under OHA? HL was found to be determined by health information seeking, one health concern, health behaviour, individuals interaction with medical, veterinarians and environmental professionals, prior knowledge on health-related aspects, the influence of politics on health, the involvement of LGAs in health, marital status and occupation of the respondents. HB determinants included one health concern, HL of the respondent, prior knowledge on health-related aspects, the influence of politics on health and involvement of LGAs in health. The results revealed marital status, service characteristics and beliefs on the effectiveness of modern humans and animals' health services to determine HCSB. Another question in this study was: What are the collaborative efforts and strategies of various stakeholders — to attain optimal health for people, animals and the environment and how effective are such efforts? Several efforts were found, including; diagnosis and surveillance of diseases. Majority of the

respondents (70 percent) perceived stakeholders' collaborative efforts and strategies to attain optimal health for people, animals and the environment being ineffective. This study also answered this question: What are the linkages between HL, HB and HCSB under OHA? HL was found to link/associate with HB, HB linked with HCSB, HL also associated with HCSB. The final question was: Are there any initiatives in developing HL and empowering people to manage their health and how effective are such initiatives? Several initiatives were found. The alternative hypothesis that *Health literacy does not differ significantly among individuals exhibiting HEBs and those with HIBs under OHA* was confirmed ($F= 795.206$, $p< 0.001$) and null hypothesis rejected.

CHAPTER FIVE

DISCUSSION

Introduction

This section discusses the findings from a study conducted in Morogoro municipality and Mvomero districts both found in Tanzania. It discusses HL and its influence on HB, attitudes of people on HIBs and the influence of attitudes on HL and HB in the interface of humans, animals and the environment. This chapter further discusses the determinants of HL, HB and HCSB plus the linkage between HL, HB and HCSB under OHA. It also discusses the identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary) and other interested parties — to attain optimal health for people, animals and the environment. Finally, it provides an in-depth view of respondents with respect to stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health.

5.1 HL levels at the Study Area

The results indicate that over one third making the majority of the respondents had IHL, and below one third had AHL. The findings from this study are similar to findings from other studies conducted in various parts of the world. The trend indicates that IHL is reported to be a common occurrence throughout the world. Both low and limited HL levels have been observed to be common even in economically advanced countries with strong education systems (Gazmararian, *et al.*, 1999b; Sørensen *et al.*, 2015), though the situation is reported to be worse in the developing part of the world (Muhanga and Malungo, 2018a). Undeniably, to quote CDC⁶ there are a significant proportion of people among even within “those who read well and are comfortable using numbers, who are still facing HL issues much as they aren't familiar with medical terms or how their bodies work.” Such individuals have

⁶Understanding Health Literacy: <https://www.cdc.gov/healthliteracy/learn/Understanding.html>

problems with interpreting statistics and evaluating risks and benefits that affect their health and safety.

A popular study known as “The European Health Literacy Survey (HLS-EU)” conducted in eight European countries revealed that 12% of all respondents had inadequate general HL and with 35 percent having problematic HL. It was further observed in HLS-EU that the problem of limited HL in Europe was not just a problem of a minority of the population (Sørensen *et al.*, 2015, HLS-EU CONSORTIUM, 2012). A similar observation has been made by WHO (2013) which reports that nearly half of all Europeans have inadequate and problematic HL skills. The situation seems not to be too well in the United States (US) where it is reported that an approximately of 80 million adults to have limited HL, with more than one-third of respondents (36 percent) who scored in the lowest two categories (“basic” and “below basic”), (Kutner, *et al.* 2006). Another study conducted in the US also reports that about 50 percent of all adults "have difficulties understanding and acting upon health information" (IOM, 2004). It is also reported that 60 percent of the Australian population has scored below a level regarded as optimal for health maintenance (IOM, 2004). Low HL may well be more prevalent in many low and middle-income countries as has been observed in this study. This implies that the lack of skills needed to manage health and prevent disease appears regardless of a country's level of development.

The existence of low, problematic and inadequate HL was found to be attributed to some facts as it was revealed in FGDs in this study. In an FGD at Mazimbu ward; one male participant claimed that:

“.....Health-related information has been very inadequateeven when it is available such information has been presented in a language which is difficult for us laypeople to understand....”

This claim from the FGDs is similar to what has been observed by Mboera *et al.* , (2007) during their survey, which among others, reported that despite health care facilities being the best place for rural Tanzanian individuals to receive health information, some of the brochures and posters that were prepared to provide health-related information did not apply to health risks of the respective local community

and were not at some points available for distribution to individual patients. This is an indication that sometimes failure to contextualize HL as it has been seen that information provided did not apply to health risks of the respective local community. If brochures and posters found at a health care facility did not apply to health risks of the local community, this has very negative consequences on the effectiveness of such efforts in educating people to become health literate. Indubitably, HL is context-specific, i.e. its function, acquisition and application should be in the light of distinct contextual conditions (Nutbeam, 2000; Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009). This implies that failure to contextualize HL could also contribute to the ineffectiveness of such efforts to educate people to become health literate.

A middle-aged male participant in an FGD at Mazimbu ward said:-

“Doctors and nurses are not the kind of people to be questioned a lotthey don’t welcome thatwhen you ask a lot they see you a much know person and interfering intoWhere else can we get such informationsee the radio and TV stations mostly are busy entertaining ...playing music and moviesnewspapers are mostly doing business ...politics and current issues are what mostly featuring in these newspapers ...We sometimes really like to know about our health and the like.... but where do we get such information ?....

Thaker (2008) argues that how patients connect with the healthcare professional also influences communication between the doctor and patient. The role of healthcare systems in addressing the challenges of predominantly low levels of health literacy in populations is very strong in the literature (Canadian Council on Learning, 2008; Nakayama *et al.*, 2015; Sorensen *et al.*, 2015), despite health systems continuing being less responsive to the issue of low health literacy (Paasche-Orlow, 2011; Penaranda *et al.*, 2012; Palumbo, 2017). It can be observed from the FGDs what people have been expecting from the health care sources and the kind of response they received. Apparently, the kind of response received from the healthcare systems has been hindering gaining access to, understanding and using health-related information. It is obvious that if such information is inadequate definitely,

individuals' demands for such information are likely not to be met. This implies that low HL is attributed to inadequacy of health information as explained by this participant in an FGD. Undeniably, the health professionals-patients interaction could have been the most effective source of health information when it is that effective. What has been learnt from the FGD is that these professionals have not been allowing a lot of questioning from their clients so this implies that this source has not been in a position to serve as an effective source. An almost similar observation has been made by Nutbeam (2018:4) who claims that sometimes patients find it very difficult to interact "with a person (like a doctor) whom they find unfamiliar and intimidating". It has also been observed that most of the leading information outlets (TVs, newspapers, and radios) have had less preference in circulating health-related information than entertaining, politics and advertisement. Other studies (Nelkin, 1996; Schwitzer *et al.*, 2005; Robotham, 2006; Vincent 2007; Näsi and Räsänen, 2013) confirm similar trends on having limited health communication in the mass media in other parts of the world. It has been observed that the mass media seem not to have interests to report on health-related issues, as what is covered in the mass media on health has been found to be "shallow and reactive, dominated by announcements of new drugs or official health promotion campaigns, and lacking in investigative depth"(Vincent, 2007 as quoted in Oronje *et al.*, 2011:2). Despite the mass media (print, television, radio and internet) potentiality in health and medical reporting (Gunther, 1998; Leask *et al.* , 2010), the major barrier to its effectiveness in health and medical reporting lies on lack of technical training for journalists and the commercial imperatives that drive story selection and headlines among others (Kitzinger and Reilly, 1997, Schwitzer *et al.*, 2005). This is how the mass media seem to fail the health and medical circles as a source of health-related information and consequently health literacy. It is no wonder that HL is observed to be low in the study area given these circumstances.

Another important aspect which emanated from the FGDs was on how health information is presented. Of interest concerning health information presentation is the language used. The most vital here is the level of simplification of the language used for the laypersons to understand. From the FGDs it came clear that the language used has sometimes not been simplified enough for lay person's consumption. This

by itself, unquestionably, stands as a barrier towards understanding and using such information in ways which promote and maintain good health. It is reported by Williams *et al.*, (1995) and Davis *et al.*, (2002) that barriers in language and communication are also associated with low HL and result in impaired communication with medical providers. One key informant from the ward office when asked on how they try to bring medical and health messages to lay people's understanding, he responded:-

“We have been trying to simplify our communication with laypeople whenever it has been possible. But sometimes it becomes difficult to get medical issues to such levels. We, healthcare professionals, have our own culture and language. It is the culture of medicine and the language of our speciality as a result of our training and work environment.”

It is therefore apparent that low HL is also being accelerated by how health professionals communicate with the general public. In a way if these professionals are the key source out of which lay people are expecting to gain knowledge on health matters are so much sticking to their culture and language then an obvious barrier is created when it comes to accessing such information. Another challenge that has been observed in the study emanates from the fact that even when health-related information is available sometimes is not presented in a plain language which patients can easily understand. This aspect has also partly been confirmed by a key informant in the study area. When a particular communication is in plain language there are higher chances that the listener or reader can understand what is communicated the first time they hear or read it. Communicating in plain language makes it possible for the provision of meaningful and reliable information. This has been the concern of the World Health Organization (2013) when it comes to building HL together with making health information materials sensitive to differences and diversity in cultures, sex, age and individuals in their content and format. PEN-3 is also concerned with the cultural aspects of health education interventions. HL problem is likely to be created when organizations or people create and give others health information that is too difficult for them to understand. However, there are a lot of challenges when it comes to make language plain. A language that is plain to certain readers might not necessarily be plain to others. But all in all, when an

audience is known and such materials are tested before, during, and after they are developed there stands an opportunity to overcome such challenges. It is worthwhile to note that that low level of health literacy is further accelerated by the fact that, Tanzania has no governing principles, act, regulations and guidelines established for health education, there are weak institutional linkages and low community engagement in health education as it is pointed out by URT-MoHCDGEC (2017:23). Other studies (Freudenberg, 2000; Freer, 2015) are arguing that for health education to be effective there is a need to address structural constraints.

Another observation made during the FGDs which also affects HL is on the interaction between health workers and patients. Level of interaction between health workers and patients is considered to influence the transfer of health information to the patients as stated by a participant in an FGD at Doma:-

.....when I go to the hospital I get to know at least on the symptoms, causes and preventive measures for certain disease(s)But this depends very much on how interactive a particular health worker would be when attending to yousometimes some of these health workers are not that much interactivethey will simply provide you with the medication and that's it

The Sick Role Theory explains that when a person is ill, he or she is expected to visit a doctor and this encounter involves a reciprocal set of obligations and privileges (Parsons, 2005). It is implied from the FGDs that in a way health professionals have so much focused on the medication aspects ignoring the role of providing information related to diseases (i.e on symptoms and prevention). Lalazaryan and Zare-Farashbandi (2014) argue that health workers have another role beyond just providing medication to patients. Transfer of health information by educating the patients and encouraging them to search for related information is considered to be a role that health workers have to play towards preventing diseases. This is supported by Making Every Contact Count Approach (NICE, 2007 as cited by NWPH⁷, n.d;)

⁷North West Public Health (n.d). Evaluation of Approaches to Health Literacy in Ashton, Leigh and Wigan <http://www.nwph.net/nwpho/Publications/NHS%20ALW%20Health%20Literacy%20Final%20Oct%202012.pdf>

and Beck, *et al.*, (2002). Definitely when individuals are well informed on the symptoms and causes of diseases such individuals are standing a better chance to take effective preventive measures for certain diseases. When an individual is well informed on health matters is likely, *inter alia*, to adhere to medical regimes; better understand the nature of their health; know about medical care and conditions; comprehend medical information; better understanding and use of preventive services (Weiss *et al.*, 1992; Baker, *et al.*, 1998; Moon *et al.*, 1998; Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999; Doak *et al.*, 1998; Kalichman *et al.*, 1999; Nichols-English, 2000; Nielsen-Bohlman *et al.*, 2004).

Acquisition of health information contributes to HL, but this seems also to be affected by the perception people have on what should be their responsibility when it comes to matters affecting their health. As it was noted from the FGDs that some people thought that knowing even symptoms for the diseases that affect them is a professional matter and should be left to the doctors and nurses. This implies that sometimes people might just decide not to involve themselves in searching for health-related information on the ground that such information was for the professionals. This perception has negative implications for HL. This can be noted from a participant at Kihonda Maghorofani who claimed that:-

“Knowing symptoms and treatments of illnesses is very complicated for usmuch as a lot of illnesses have almost similar symptoms....distinguishing which is very hard... And when it comes to treatments it is even difficult to know. I think these are professional matters ... should be left for doctors and nurses”

Incognizant of the influence of HI on Health Literacy, definitely such perceptions can affect HL. So it is important to know that HI is not for professionals only as HI affects HL which consequently affects everyone health. It is worth noting that Health literacy is essential for everyone, “as at some point in our lives, we all need to be able to find, understand, and use health information and services. Taking care of our health is part of everyday life, not just when we visit a doctor, clinic, or hospital. Health literacy can help us prevent health problems and protect our health, as well as

better manage those problems and unexpected situations that happen” (CDC, *n.d*)⁸. However, it is worthwhile for the professionals to make health information available, accessible and understandable by the common people.

The frequency at which households have been experiencing illnesses has also been attributed to the need of searching for health-related information which in turn contributes to HL. This can be deduced from what this male participant at Kihonda Maghorofani stressed:-

....When I had some of my family members falling sick now and thenI found myself searching for such informationinformation I got enabled our household to move into a higher level of health prevention and health carethis was simply that some of the illnesses were avoidable by abstaining from some health behaviours which we didn't know were contributing to such illnesses.....

What can be deduced here is that if individuals perceive a certain illness as serious, they will try to put in place preventive measures for themselves, their household members or their livestock. This reflects a particular disorder characteristic. This is in line with what Health Beliefs Model (HBM) is explaining (Rosenstock, Strecher and Becker, 1994; Sheeran and Abraham, 1995, cited by Hausmann-Muela *et al.*, 2003) that based on how one perceives themselves to be susceptible to a problem, and if they believe it will have serious consequences then there is a likelihood of taking preventive measures. It is obvious that taking a particular preventive measure has to start with getting information. For preventive measures to be effective the need for information on the effective or correct measures to be taken is unavoidable. What is implied here is the fact that after realizing that a particular illness was disrupting family, work and other social activities then search for information normally begins which leads to the recognition of particular symptoms and then choosing a particular preventive measure leading to health prevention and health care. A model by Kuoeger (1983) as cited in WHO (1995:5) is in support of this too.

⁸CDC , Understanding Health Literacy. <https://www.cdc.gov/healthliteracy/learn/Understanding.html>

5.2 Health Literacy based on Socio-Demographic Characteristics

The results indicate that AHL was observed among category comprised of the “not gone to school at all”, followed by those who had primary school education, with post-secondary education following, then those with secondary school education and lowest among those with university education in the AHL category. The results, therefore, reveal no association between educational attainment and the level of HL under OHA. This finding is supported by a study by Schrauben and Wiebe (2015) who found that a high level of education does not necessarily ensure a high level of HL. Thus, high educational attainment seems not to be the prime force driving high HL. Nutbeam (2018: 4) asserts that: “HL is mediated by the situational demands and complexities that are placed on people”. This implies that sometimes the situational demands and complexities can challenge even an individual with a higher level of education hence failing to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions. In line with this finding is what WHO (2013:1) argues: “health care systems are increasingly difficult to navigate (even for the best-educated people), and education systems too often fail to provide people with adequate skills to access, understand, assess and use the information to improve their health”. So this confirms the fact that sometimes it is possible to find best-educated people yet with low or inadequate if not problematic health literacy as it has been found in this study. Obviously, HL is not merely about educational attainment, there are several determinants to it.

The results further indicate that HL is lower among older individuals, with the majority of those who had IHL were from the elderly age category, followed by those from the middle-aged category, and then the aged while the young had the lowest in the category, and with no adolescent among those who were interviewed was found to have IHL. These findings are in line with findings by studies by Weiss *et al.*, (1992); Williams *et al.*, (1995); Gazmararian *et al.*, (1999); and U.S. Department of Education, Institute of Education Sciences, (2003) which are also reporting lower health literacy amongst older individuals. When the participants were asked as to why HL is lower among older individuals, an old participant said:-

“The youth living this time around have a wider chance of accessing a lot of information hence that by itself has made it possible for them to get to know a lot of facts. Most of them have access to TVs, radios and the internetfrom which they access information including health-related ones.....this is not the case with our generation ... we went to school ...but when we were at school a little was learnt concerning health those times”

This idea is supported by White (2009) who claims that unlike in the past, direct interaction with doctors and healthcare providers is not the sole source of information for the patients. This implies that much as doctors and healthcare providers can provide health information but there are a lot of other sources which the younger people have been in a position of making use to access HI and consequently enhance their HL.

The results from this study reveal that more females had IHL than males, while it was observed that more males were having AHL than females. Other studies (Foundation House, 2004; Lee *et al.*, 2012) also indicate an association between sex and the level of HL. Schrauben and Wiebe (2015; 2017) report similar findings in their study on HL in Zambia, where they found males had high health literacy than females. These findings connect very well with what this FGDs participant had to say:-

“For us, women, health knowledge is very importantBut the basics of health issues is what is important for attending to core health matters of the householdWe don’t have much knowledge beyond what is basicwe don’t know the complex health issues beyond what is basic ...I think that is for the professionals

AHL was observed among married respondents in the category followed by never married (singles), then widowers next were widows and finally those cohabitating. It has been observed by another study (Liu, *et al.*, 2015) that the independent influencing factors of HL were a race, occupation, household income, age and marital status ($p < 0.05$).

5.3 HB and HCSB under OHA plus individual's Attitudes towards HIBs

5.3.1 HB

Health behaviours have important consequences for both the quality and length of life by influencing disease outcomes (Conner and Norman, 1996; Conner, 2002). The findings from this study reveal that the majority of the respondents interviewed had exhibited health impairing behaviours (HIBs). The findings from this study are similar to what has been also observed by other studies conducted in Tanzania (see Kassuku, *et al.*, 1999; Cleaveland., *et al.*, 2002; Minja, 2002; URT, 2003a), which reported occurrences of HIBs which from time to time have resulted into a higher incidences of infectious diseases (including zoonotic ones i.e. tuberculosis, rabies, *taenia solium* infestation, human brucellosis etc.). These studies are reporting the occurrence of such practices despite the efforts of the government of Tanzania to improve health services and educating people to become more health literate i.e. people to cultivate the knowledge and skills needed to access, understand and use health information, thus, enabling and encouraging them to make healthier lifestyle choices (to achieve positive health outcomes for both humans and animals). The literature doesn't limit health impairing practices in the developing part of the world and Tanzania only, HIPs are a common occurrence in other parts of the world as reported in other studies too (Fuemmeler *et al.*, 2009; Tirosh *et al.*, 2011; Kann, 2016). It is claimed by WHO (2013:1) that "modern societies actively market unhealthy lifestyles."

In an FGD conducted in the study area, these incidences were further confirmed by the participants when they were asked on their involvement in certain identified health-related practices reflecting the interaction of the humans, animals and the environment. During the discussion, the participants confirmed the occurrence /performance of health impairing practices in the study area despite the detriments of such practices to the society being acknowledged. One participant at Doma acknowledged that:-

".....Some health-related practices/behaviours have been very detrimental to our health. Such behaviours have had a lot of harms to our health but given circumstances, we continued practising themIt is not that those

practising it do not know its side effects but rather it is poverty that makes it difficult to move away from such practicesEating naturally died animals is an obvious example here in our societyAsk anyone here..... if there is anyone who doesn't know which effects are connected to thatthere will be no one who will say s/he doesn't knowAlso, ask how many times have they been throwing a naturally died animalsif they will be sincere very few would report an incidence of burying or throwing it ”

This argument from FGD is similar to studies by Freudenberg (2000) and Freer (2015) which identified the systemic issues of poverty, structural constraints and culture among precluding factors for an individual to make a “rational” choice after even receiving the correct knowledge, hence the rational choice of positive behaviour change. It can be noted from the FGD that these practices have been performed while the members of the community are well aware of the consequences of such practices to their health. This implies that sometimes poverty has been the driving force towards people failing to observe health-enhancing behaviours as it is reflected in this case of some people consuming naturally died animals, as a participant in an FGD puts it clear. This claim by a member from an FGD is also reflected in URT (2003a) which report occurrences of health impairing practices despite the efforts of the government to educate people to become more health literate i.e. people to cultivate the knowledge and skills needed to access, understand and use health information, hence facilitating and encouraging them to make healthier lifestyle choices (to achieve positive health outcomes for both humans and animals). This implies that some of these behaviours have been performed regardless of people being aware of its detriments. The argument advanced during the FGDs is also reflected in Behavioural Economics and Choice Architecture approach (National Social Marketing Centre, 2011) which recognises that people don't always behave rationally, with behaviours often being governed by instinct, emotion, past events and the people around us.

The participants in the FGDs after putting it clear that sometimes health impairing practices were not entirely confined to lack of knowledge or awareness on the

consequences of such practices on health, they were asked what further motivated such practices. One elderly respondent had the following explanations:-

“The challenge faced by most of us here sometimes has been the financial difficulties we find ourselves inSome health-enhancing behaviours are costly to performThink of washing hands with soap regularlyIn most of the households where at times even soap for bathing and washing may not be available ...So where will we get soap for just washing hands?”

Financial difficulties faced by households have also been further attributed to the failure of some households to uphold some other important health-enhancing practices related to water, sanitary and hygiene (WASH). Absolutely in the context where the household is not in a position to get soap for its basic uses such as washing and bathing, it is obvious that the same household is likely to find it luxury committing another piece of soap for washing hands. This means that it is only when that soap (for washing and bathing) is available then household members can wash their hands after visiting lavatory and not beyond that. PEN-3 model explains this very well. The model assumes that there are enablers which are cultural, societal, systemic, or structural influences that may enhance barriers to change, pointing out to one of these enablers being the availability of resources (Airhihenbuwa, 1995:29-34; Freer, 2015:32). In the context of the argument from the FGDs what transpires here; there are individuals at some points who are willing to change their health behaviours but enablers are lacking, in this case, lack of resources.

It has been further observed in the FGDs that incidences of health impairing practices are attributed to factors related to traditions and customs aspects. The basic claim here is that certain practices have traditional and customary values in their society hence it is proving difficult for some members to abandon them despite its detriment to their health. When asked to explain how such practices have that traditional and customary worthiness/ value, one elderly participant to the FDG had the following to say:-

“Some of the behaviours (health-related ones) that we perform are considered to be valuable in our localities simply because they have their origins from our traditions and customs. Consuming raw meat and blood is

the symbol of heroism to a young person in our societyThis displays how brave one is”

Traditions and customs aspects have also been reported in other studies to have had a lot of negative influences on health particularly on health behaviours (Freudenberg, 2000; Dutta 2007, Shaw *et al.*, 2009, Rosén, 2015). In a study on Knowledge and health information communication in Tanzania by Mboera *et al.* , (2007) local beliefs were found to be among the major constraints in adopting health education messages. This aspect is also well captured in PEN-3 model, this model examines health beliefs and actions within the context of culture, history, and politics (Airhihenbuwa, 1995, 2007). In the context of this model, traditions and customs are considered to account for the differences in health behaviours, this model assumes that it is a cultural context that informs behaviours. The model acknowledges the presence of negative behaviours which are best explained in the cultural context. Negative behaviours are based on health beliefs and actions that are known to be harmful to health: Health providers must examine and understand them within their cultural, historical, and political context before attempting to change them (Airhihenbuwa, 1995:29-34). Similarly, in a study on Understanding the Role of Culture in the Health-Related Behaviours of Older Asian Indian Immigrants by Thaker (2008:68-69); cultural values were observed to influence health-related behaviours among older Asian Indian immigrants in the United States. The influence of culture in health behaviour is also plainly explained by Rosén (2015: 1) in a study of risk perception on unhealthy lifestyles in Babati town, Tanzania, who asserts “Attitudes, knowledge and perceptions issues have a much higher impact. Being overweight is often associated with the perception of wealth and health, this is why many strive to achieve that ideal, both men and women..... Everything that people do and what decisions they make can be linked to their cultural belonging, which ideals people aim for, food choices, perceptions of physical activity and risk perceptions about the illness. Culture cannot be excluded in interventions on health”. During a KII, one informant from the Health Department at Mvomero claimed:

.....Indigenous knowledge sometimes has retarded the efforts of the government and other stakeholders in promoting health, healthcare and prevention of diseases. People in the local communities have been sometimes

very conservative to adopt to some new ways and practices in the name of preserving their cultural values

It was further revealed from the discussion that some health impairing practices have been resulting from the way livestock is perceived in the community and the need to keep it secure from theft incidences. An elderly participant in the FGD at Doma had this to say: -

“I value my livestock very muchthey are the source of my wealth and livelihoodThe need to secure them is very obvious, that’s why I keep them very near to where we sleepSometimes even in the same shelter or buildingthis is our life and prosperity.....”

The value of livestock is another serious concern in most of the pastoralists’ communities around the world. It is pointed out in numerous studies on how pastoralists have always tried to keep their herds of cattle at the expense of any other social or economic trait. Hodges (1999) argues: “For thousands of years everyone was in touch daily with domestic animals. Since animals are a resource of such great value, it is easy to understand why people have held them in high esteem and have sometimes regarded them as sacred. People live in close contact with their animals”.

5.3.2 HCSB

Health services play an important role in promoting the population’s health and livelihoods of communities (Ringo *et al.*, 2017). According to Montenegro *et al.*, (2011), health services result in improved community health status and its members regardless of age, gender, location and occupational background. Access and utilization of health services ensure healthy society and results in minimal health problems such as reduced incidences of under-five mortality and resources which could otherwise be used for productive activities (Enwerem *et al.*, 2014).

Healthcare seeking behaviour in this study signifies individuals’ preferences in terms of health care service sources. Health care can be sought in different sectors in society (Atwine *et al.*, 2015). The findings from this study show that majority of the respondents (58.8 percent) preferred formal health care sources/facilities (FHCSF) when seeking health care service for themselves and their animals.

Attending to FHCSF such as hospitals, health centres, dispensaries, and pharmacies when seeking health care service is similarly reported to dominate individuals' preferences in terms of health care service sources in other studies. In other parts of the world, almost a similar trend is reported on individuals' preferences in terms of health care service sources. A study by Atwine *et al.*, (2015) on health-care seeking behaviour and the use of traditional medicine among persons with type two diabetes in south-western Uganda revealed that health care was mainly sought from doctors and nurses in the professional health sector. Similarly, in a study conducted in Ethiopia on Health Care Seeking Behaviour by Begashaw *et al.*, (2016) it was found that the majority of the households sought health care from a public health centre. Of the sampled household heads, 377 (97.2 percent) (119 urban and 258 rural) who were successfully interviewed. Among these, 58.4 percent (95% CI, 53.3–63.3%) of the households sought care from modern health care. Another study in Laos on Care seeking behaviour and barriers to accessing services for sexually transmitted infections among female sex workers by Phrasisombath *et al.*, (2012) show a similar preference on formal health care sources than informal, whereby the findings indicate that the source of treatment for the last RTI/STI episode was the drop-in centre (53 percent) followed by a public hospital (23 percent), private clinic (12 percent), private pharmacy (9 percent), and herbalist (2 percent).

During the FDGs the participants were asked on their preferences in terms of health care seeking sources in their area. Several responses were given including the following. A young participant to an FDG at Mazimbu Reli had this to share:-

“For me to go to a hospital depends on my financial position at that particular time experiencing illnessI may feel ill but if I don't have money to pay hospital bills then I opt for an alternative healthcare source(s). But sometimes I choose not to go to a hospital if I find that illness is not so serious!”

Another participant at Kihonda Maghorofani said:-

“The truth is that proper medication can only be found in hospitals, dispensaries and health centres.....where professionalism is found. People do go to witch doctors and for prayers based on their beliefs on these other

sources or sometimes in despairthese have always been standing as alternativesone suffers for a long time ..s/he doesn't get healed then resort to such such

An elderly person during an FGD at Melela claimed:-

“These days, effective traditional healers are hard to findMost of the healers found are just on traditional medicine for the sake of meeting their daily needs. The knowledge of herbs is rare these days. In our times when the real healers were there..... Going to the hospital remained an alternative.....”

A middle-aged male participant had this to comment during FGDs at Mazimbu:-

“In our area, there are plenty of modern health facilities manned with professionalsthe distance to these facilities is walkableSometimes we don't have even to have cash as some of us have enrolled in health insurancesmodern health facilities remain our option

Another view came from an elderly woman at Mazimbu

“My health is very primeIt is my lifeI can't give a trial on itGoing to a witch doctor or any other kind of treatment like going for prayersThe trouble has always been getting with these sources is reliabilityWe have witnessed the presence of a lot of fake traditional healers and pastorsHow can we trust these other sources?

The choice to attend to FHCSFs is determined by an individual's financial capability at the time of illness plus the perceived seriousness of such disease among other factors. In this context the IHCSFs are being regarded as alternatives to the FHCSFs, this implies that an individual will only attend to IHCSFs after facing financial difficulties and after observing certain disorder characteristics. In the local communities, there have been beliefs that people have attached to certain symptoms accompanied with certain illnesses. Based on such symptoms local people prefer IHCSFs i.e going to traditional healers instead of hospitals or dispensaries. The failure of the IHCSFs to delivery is also another important factor that makes the FHCSFs dominate among health care source services as it was argued in the FGD,

this is due to the fact people seem to have lost trust on sources that form the IHCSFs. A participant in FGDs at Melela pointed out that “... *effective traditional healers are hard to find The knowledge on herbs is rare these days.....*” This view is shared by Cheikhoussef *et al.*, (2011) who are also attributing the possibility of relying more on traditional treatments when that traditional knowledge of plant species as medicines and traditional views on causes of diseases exists. In the absence of such knowledge, a disregard of traditional medicine practices and products among the members of the society is very obvious. Also, despite little evidence on the quality of care provided by IHCSFs, there is general acceptance that IHCSFs provide substandard care (WHO, 2001; Cross and MacGregor, 2010). During the FGDs, lack of trust and lack of professionalism on the services provided were among other factors pointed out as barriers towards IHCSFs preference. The participants to the FGDs pointed out that the IHCSFs have these days remained as alternatives to FHCSFs and particularly the participants claimed that those who have been using it have done so based on their beliefs or sometimes in despair or after suffering for a long time hence resorting to it. Ringo *et al.*, (2017:54) argue that: “In a situation where residents have challenges accessing health services, they are likely to seek traditional healers or traditional birth attendants or delay presenting themselves to appropriate health facilities”. What is argued by Ringo *et al.*, (2017:54) seem to support the arguments raised by the participants in the FGDs which concluded regarding IHCSFs as alternatives to FHCSFs. Similarly, URT (2017:11) also recognises the presence of IHCSFs complementing FHCSFs, as it can be quoted “Traditional and Alternative Medicine, (TAM), has been one of the components of healthcare in Tanzania”. This implies that FHCSFs have always been preferred except where there are difficulties in accessing FHCs, including the location of formal healthcare services, the inadequacy of resources to access FHCs, costs involved in reaching the FHCSFs and treatments at FHCSFs, plus trust given to traditional healers, among others. The findings from this study were favoured by the fact that the area involved in this study had plenty of modern health facilities manned with professionals, located within walkable distance and having residents who are enrolled into health insurance schemes. Other studies have associated similar qualities as influencing factors on health care sources preferences; such as difficulty

in accessing FHCSFs (Duba *et al.*, 2001; Caulfield *et al.*, 2016); due to location of the formal healthcare services (Mrisho *et al.*, 2009; Chauhan *et al.*, 2015); costs of treatment and medicines, lack of certain medicines at formal health facilities (Acacio *et al.*, 2015; Chauhan *et al.*, 2015), financial capability (Bloom *et al.*, 2011), and; cultural values and trust given to traditional healers (Chauhan *et al.*, 2015). In this study the challenges in accessing FHCSFs were found to be on the lower side hence discouraging the people to resort to IHCSFs as it has been found that most of the FHCSFs were located within walkable distance, some people residing in the area were members to health insurance schemes hence minimizing challenges related to costs of accessing FHCSFs. The experience of the majority of the community members found in the study area led to having low beliefs on the effectiveness of IHCSFs then discouraged to access it. Social Cognitive Theory (Social Learning Theory) attributes the choice of a particular health care source to the role of self-efficacy (Nutbeam *et al.*, 2010).

5.3.3 Attitudes towards HIBs

Attitude includes the beliefs and feelings related to a person or event and the resulting behaviour. Taken together, favourable or unfavourable evaluative reactions— whether exhibited in beliefs, feelings, or inclinations to act—define a person's attitude towards something (Olson and Zanna, 1993). It is definitely that in the course of responding quickly to something, how we feel about it can guide how we react (Sanbonmatsu and Fazio, 1990; Bassili and Roy, 1998).

Attitudes of the respondents towards certain identified health impairing behaviours /practices under OHA were assessed in this study. The results indicate that 30 percent of the respondents had a negative (unfavourable) attitude towards health impairing behaviours, 35 percent of the respondents had positive (favourable) attitude and 35 percent were undecided hence neutral attitude towards health impairing behaviours.

It is argued that overall evaluation of a particular behaviour can influence performing that behaviour; this is simply that an individual's evaluation on a certain behaviour (whether positive or negative) plus beliefs about the outcome of the behaviour have a lot of influence on performing or not performing it (Ajzen, 1985; Ajzen and Madden,

1986; Ajzen, 1988; Muhanga and Malungo, 2017b). This study further established an association between attitude towards HIBs and HB of the respondents. The results indicate that HIBs (Low Health Enhancing practices) were higher among those with favourable attitudes towards health impairing behaviours/practices constituting 45.8 percent within the HIBs category, while HEBs (Low Health Impairing practices) were higher among respondents with unfavourable attitudes towards health impairing behaviours/practices constituting 56.2 percent within the HEBs category. The results from a Chi-square test indicated a significant association between attitudes and health behaviours at the household level with $p\text{-value} = 0.001$. This implies that there is an association between attitudes and health behaviours, much as Low Health Enhancing practices were found with people who also had favourable attitudes towards such health impairing practices/habits and vice versa. It is acknowledged that improved knowledge and a change in attitude are the twin engines that generate expected outcomes in behaviour (Airhihenbuwa, 2007:177).

The findings from this study are in compliance with the Theory of Planned Behaviour (TPB) (Ajzen, 2002) which hypothesizes that a positive or negative evaluation of a particular behaviour and beliefs about the outcome of the behaviour is what directs behaviours; and behavioural intentions are the outcome of a combination of several beliefs. It can be observed from the findings of this study that individuals' attitudes towards HIBs were matching with their HBs, as those who had negative attitudes (unfavourable) towards HIBs were also exhibiting HEBs and those who had positive attitudes (favourable) exhibited HIBs. This implies that attitude is linked to behaviour. This reflects a match between an individual's evaluation of certain behaviour and performance of such behaviours.

Similar to the findings of this study are findings from previous studies by Bentler and Speckart, (1981); Ajzen and Timko (1986) Ajzen and Fishbein (2005) which acknowledge existence of an association between attitudes and health behaviour. PEN -3 model views perceptions as comprised of the knowledge, attitudes, values, and beliefs, within a cultural context, that may facilitate or hinder personal, family, and community motivation to change (Airhihenbuwa, 2007). The positive or negative evaluation of a particular behaviour and beliefs about the outcome of the behaviour

and its influence on behaviours also surfaced during the FGDs. Certain behaviours/practices were considered to have their origins from traditions and customs hence positively evaluated due to their traditional and customary values hence difficult for some members to abandon them despite its detriment to their health. As one elderly participant to the FDG said:-

“Consuming raw meat and blood is the symbol of heroism to a young person in our societyThis displays how brave one is”

This implies that behaviour of this nature is performed based on the fact that there is a positive evaluation to it. According to TPB (Ajzein, 2002) here what is considered important is subjective norm. This connects to the beliefs of important others about the behaviour, and the individual's motivation to comply with such beliefs. These are people who are important to an individual about to perform a certain behaviour. They are the ones who will approve if one does something; simply this individual needs their approval. This is just being seen by the society out there that one is brave. In this context, PEN-3 model contends that health behaviour within an African context can best be understood within the cultural identity of Africans, it is also important for education intervention to be attached to the African ways of knowing (Airhihenbuwa, 1995, 2007). As it can be seen from the FGDs that this element which constitute a risky behaviour has its own meaning in a cultural context despite being a negative behaviour. Negative behaviours are based on health beliefs and actions that are known to be harmful to health: Health providers must examine and understand them within their cultural, historical, and political context before attempting to change them (Airhihenbuwa, 1995, 2007).

5.4 Determinants of HL, HB and HCSB under OHA

5.4.1 Determinants of HL

Health literacy is “key to not only health, but to human development at a population level, and to realizing human potential” (Levin-Zamir *et al.*, 2017:133). Innumerable studies (see for example; Paasche-Orlow and Wolf, 2007; Sun *et al.*, 2013; WHO, 2013; Nutbeam *et al.*, 2017; Clouston *et al.*, 2017) have discussed the determinants of HL, the discussions in these studies have concluded that HL is influenced by, *inter alia*, the demands and complexities of the health systems, as well as the social

systems, workplaces, the environment, and the corporate world, particularly food and drink producers and markets. But it is known that HL is context specific then a need to assess it in a particular setting is very essential (Nutbeam, 2000; Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009). This applies to its determinants.

The results from the OLR for the determinants of HL indicates only nine (9) of the independent variables to have made a unique statistically significant contribution to the model. These variables are:-health information seeking (InfoSeekingScore), one health concern (Score OneHealthConcern), health behaviour (HealthBehaviourScore), individuals interactions with medical, veterinarians and environmental professionals (ScoresInteractMedicVetEnviron), prior knowledge on health related aspects (PriorKnowlegTotalScore), perceived influence of politics on health (InfluencePoliticsOHealth_Score) , perceived involvement of LGAs in health (ScoreonLGA), marital status (TransformedMarital) and occupation of the respondents (TransformedOccu).

Findings from a number of studies are comparable to the findings of this study. Sun *et al.*, (2013) in their research, a number of socio-demographic factors were tested. There was, however, a significant difference between the unmarried and married group in terms of their level of HL. In the same study on Determinants of health literacy and health behaviour regarding infectious respiratory diseases among Chinese adult residents, HL was found to be affected by prior knowledge ($\beta = 0.245$). Other studies are also reporting prior knowledge to influence HL (Lee *et al.*, 2004; Paasche-Orlow and Wolf, 2007; von Wagner *et al.*, 2009). The implication is here is that a person with more health knowledge is better able to obtain, comprehend and use health information.

5.4.2 Determinants of HB

The BLR results show the following independent variables to have made a unique statistically significant contribution to the model: -one health concern (scores), HL of the respondents (HL scores), prior knowledge on health related issues (scores), influence of politics on health (scores) and LGA involvement in health (scores). This implies that these variables have significant influence on determining health

behaviour in the interface of humans, animals and the environment. The strongest prediction can be observed for one health concern, HL of the respondents and LGA involvement in health, while prior knowledge on health related issues and influence of politics on health just making moderate significant contributions to the model.

The findings suggest that an increase in score in One Health Concern (expressed in scores) is associated with likelihood of performing health enhancing behaviour. This indicates that those in who are much more concerned with One Health related aspects were more likely to perform health enhancing behaviour than those who were not. It is obvious that much as one will be concerned with OHE aspects that particular individual stands a good chance of getting insights into understanding what to do and what not to do to improve their HB. The concern is likely to enhance individuals' awareness and understanding on health related issues and serve them with the possibility of refraining from certain health impairing practices if the practice was emanating from lack of understanding on impacts of such practices on health. Low awareness on the interaction between animals and humans and how such interactions impact on health and lack of a holistic systems approach to understanding health across all species are reported to have impact on public health outcomes under One Health Approach hence influencing certain health behaviours (Schwabe, 1984; Kambarage *et al.*, 2003; Karimuribo, *et al.*, 2007; Rweyemamu *et al.*,2012).

HL (expressed in HL scores) is another predictor of HB. The findings imply that an increase in the score in HL signifies an increase in the likelihood of HEBs to be performed than HIBs. This is to say individuals who have the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions, are likely to act/behaviour in ways which promote and maintain good health. These individuals are mostly expected to exhibit HEBs than HIBs. This connects very well to what WHO (2013: 1) has observed; "Weak health literacy competencies have been shown to result in less healthy choices, riskier behaviour, poorer health, less self-management and more hospitalization."This is also supported by Fleary *et al.*, (2018) who also observed a meaningful relationship between health literacy and adolescents' health behaviours in their study on Adolescent health literacy and health behaviours. It is worthwhile to

note that HL is extensively similarly connected to HB in numerous studies (Davis *et al.*, 2002; URT, 2003a; URT, 2003b; Schwartzberg and Wang, 2005; Miller *et al.*, 2007, Pappas *et al.*, 2007; Nutbeam 2008; Berkman *et al.*, 2010; U.S. Department of Health and Human Services, 2010; Sun *et al.*, 2013).

LGA involvement in HRA (expressed in LGA score) increase was associated with an increase in the odds of performing health enhancing practices. At the core of what LGAs have been doing the likelihood of influencing health enhancing practices is very obvious. In this context it is where a particular LGA formulates and issues bylaws, local policies and directives on health promotion, healthcare and diseases prevention. These bylaws, local policies and directives when implemented and closely monitored can lead to less health impairing practices. Moreover, LGAs have been in a number of ways involving themselves in health enhancing behaviour promoting initiatives in several other areas in Tanzania (URT, 2017). Various bylaws, policies and directives have been issued in Tanzania by the local government authorities to discourage health impairing practices/ behaviours and encourage health practices/ behaviours. Table 4.35 shows restrictions on certain health behaviours, encouraging certain health behaviours, encouraging meat inspection, best environmental management practices, directives on where and when to obtain pasture, location of businesses and selling outlets, on water sources access and use (which, for who, when) and village control on issues of livestock feed in the area nearby game reserve reflecting bylaws, policies and directives on health related aspects.

It is obvious that the findings in this study are in support of the campaigns that have been going on throughout the country on WASH. LGAs through the support of the Ministry of Health, Community Development, Gender, Elderly and Children have been implementing national wide campaigns on WASH which have always led to enhancing health behaviour. These initiatives by the LGAs have started yielding positive outcomes in other parts of the country through the motivational aspects accompanied with such campaigns. One key informant during KII at Melela (Kidayi) explained that:-

“In our village there has been a number of health promotion campaigns on sanitation and hygiene. We have a strict follow ups which are accompanied

with penalties for non-compliant. For example each and every one household is supposed to construct a toilet and use it, have a place to dispose wastes etc. ... So if it is found otherwise then that particular household has to be taken to taskThis has afforded this village to improve sanitation and hygiene

Meat inspection was found to be one of LGAs focus during the survey. PI and other researchers had an opportunity to observe the conduct of back –yard meat inspection in the study area (see Photo 2). During the observation the research team was informed that meat inspection was mandatory based on the bylaws of the LGAs in the area. Failure to conduct meat inspection can subject a particular owner of a butchery to prosecution. The influence of the local public policies, directives and bylaws as determinant of health and related aspects have been thoroughly discussed and acknowledged by Bambra, *et al* ., (2003); Williamson and Carr (2009)and Mackenbach (2014).

The increase in score in influence of politics on health (expressed in influence of politics on health total score) was associated with decrease in the odds of performing health impairing practices, hence HEBs. Health of the people is influenced far more by politics and power groups and by the distribution of land and wealth than it is by the prevention and treatment of disease (Werner, 1981).Obviously there are ways through which politics influence health. Health has increasing relevance for political legitimacy and the economy, it is critical to fiscal policies and to the social state. That means it affects the interests of many stakeholders and society at large. PEN-3 model acknowledges the influence of politics on health beliefs and actions, among others (Airhihenbuwa, 1995, 2007).

Prior Knowledge on health related issues was associated with HEBs whereas an increase in prior knowledge (expressed in prior knowledge total score) signified a decrease in the odds of performing health impairing practices. Knowledge is an important intervening variable in most of social and health related studies. This implies that an individual with health knowledge is much more capable to obtain, comprehend and use health information hence understand the impacts of health

related practices on health. Studies (Davis *et al.*, 1996; Baker *et al.*, 1997; Baker, *et al.*, 1998; Bennett *et al.*, 1998; Doak *et al.*, 1998) have discussed the influence of knowledge on health related aspects.

Similar findings to this study have been observed by Rotar *et al.*, (2012) in their study on Health Behaviours and Attitudes in Young and Middle-Aged Saint-Petersburg Citizens (Russia) in which lack of knowledge/information was found to determine health behaviours. Another observation which links knowledge to health behaviour has been made by Kambarage *et al.*, (2003: 62) who attribute inadequate knowledge and inappropriate perceptions and practices to health impairing behaviours, to quote them:

“Most of the producers or animal keepers are rural based and lack formal education and, although have some valuable indigenous knowledge, they possess inadequate knowledge about the whole range of diseases and their treatment and control strategies. For instance; most farmers would cull the animals when the cases become hopeless and even where such cases should be destroyed, owners are often reluctant to destroy them and such animals often are slaughtered for human consumption.A practice of this kind not only does it allow the availability of poor quality meat in the market, but also poses dangers related to drug residues and zoonotic diseases.....”

In a FGD, a similar argument was shared and agreed among participants which in a way connected lack of knowledge on the impacts of certain HIPs to performance of such practices hence falling into sickness. A male participant at Kihonda Maghorofani had this to say:-

.....*some of the illnesses were avoidable by abstaining from some health behaviours which we didn't know were contributing to such illnesses*.....

5.4.3 Determinants of HCSB

Health care seeking behaviour operationalized in this study as health care service source preference is reported to be determined by a number of factors. These determinants have been precisely discussed in innumerable studies (Geldsetzer *et al.*, 2014; Kantè *et al.*, 2015; Wiens *et al.*, 2015). The results from BLR indicates that marital status (being in a relationship), service characteristics score, beliefs on the

effectiveness of modern humans and animals health services had significant influence on determining preference of a source to seek health care from in the interface of humans, animals and the environment.

Marital status was found to be the strongest predictor in this study. This indicates that those in a relationship were more likely to choose formal health facilities than those who were not. Another predictor being service characteristics score. The findings imply that a unit increase in the score in the service characteristics signifies an increase in the likelihood of FHCSF preference over IHCSF. Belief in the effectiveness of human and animal services is indicated to significantly influence the preference of health facility. The odds of those who had belief in the effectiveness of human and animal health services to prefer FHCSF was higher 5 than that of those had no belief in the effectiveness of human and animal health services.

Similar findings to this study can be observed from a study by Kolola *et al.*, (2016) conducted in Ethiopia which amongst others assessed predictors of health care seeking behaviour for common childhood illnesses. Marital status of the caregivers (AOR = 2.84; 95%CI: 1.62–4.98) was found to predict health care seeking behaviour, whereby married caregivers were more likely to seek care from health facilities for their sick children than those who were not married (AOR = 2.84; 95%CI:1.62–4.98).

A study by Begashaw *et al.*, (2016) on health care seeking behaviour in Southwest Ethiopia also reports matrimonial status (being married) (AOR, 11.3; 95% CI, 1.2–110.2) among other predictors for health care seeking behaviour, a similar finding to this study. In their study the odds of health seeking behaviour among married participants was found to be 11 times higher than single ones (AOR = 11.3, 95% CI: 1.2, 110.2). Begashaw *et al.*, (2016) also found distance as a predictor for seeking health care from a health facility, whereby households located within 10 KM distance from health facility were 3 times (AOR, 3; 95% CI, 1.2–8.4) more than likely to seek healthcare than those located more than 10 KM. This finding is also conforming to finding of this study which identified service characteristics having significant influence in predicting health care seeking behaviour. Service

characteristics in this study included availability, costs and accessibility (proximity, distance) with respect to modern human and animal health services/facilities.

These findings are consistent with what transpired in the FGDs in the study area whereby participants among other factors associated their choice for a particular health with availability, costs and accessibility (proximity, distance). As it is revealed from the following discussions:-

“In our area there are plenty of modern health facilities manned with professionalsthe distance to these facilities is walkableSometimes we don't have even to have cash as some of us have enrolled into health insurancesmodern health facilities remain our option

The argument from the FGD with respect to decision to engage with particular medical channels is similar to what the Pathway model and Determinant Model of Illness Behaviour assumes. These models also regard decision to engage with particular medical channels to be influenced by access to services and perceived quality of service (Tipping and Segal, 1995; Akinnawo and Oguntimehin, 1997). The implication here is that the availability of modern (formal) health facilities which are also staffed with trained personnel within walking distance plus the affordable costs involved has made individuals residing in the area to rely on FHCSF for their health care services. The major observation that has been made is that the IHCSF is mostly considered as an alternative or a supplement to FHCSFs; this is very similar to what WHO (2013b) and consequently the government of Tanzania has been promoting with respect to traditional healers /medicine (URT, 2017). It is very strong in the literature (Duba *et al.*, 2001; Caulfield *et al.*, 2016; Ringo *et al.*, 2017) that in absence of challenges in accessing FHCSFs, such as location related (Mboera *et al.*, 2007; Mrisho *et al.*, 2009; Chauhan *et al.*, 2015); costs related, certain services unavailability (Mboera *et al.*, 2007; Acacio *et al.*, 2015; Chauhan *et al.*, 2015);, financial inability (Bloom *et al.*, 2011), poor quality of care, equity, and poor governance (Mboera *et al.*, 2007), and; lack of trust to traditional healers (Chauhan *et al.*, 2015), FHCSFs have always been preferred.

The findings from this study with respect to the determinants of health care preferences connect very well with Andersen's Behavioural Model of Health Care

Use. This model assumes, among others, an individual's access to and use of health services is considered to be a function of population characteristics, health care systems and the external environment (Andersen, 1995; Andersen and Newman, 1973). These characteristics partly include demographic characteristics and socio-cultural characteristics of individuals. In this study marital status was found to be the strongest predictor of health care source preference. Other predictors for health care source preferences were service characteristics score and belief in the effectiveness of human and animal services. These findings are also in line with Pathway model and Determinant Model of Illness Behaviour which demonstrate that the decision to engage with particular medical channels is influenced by a variety of socio-economic variables such as sex, age, the social status, the type of illness, access to services and perceived quality of service (Tipping and Segal, 1995; Akinnawo and Oguntimehin, 1997).

5.5 Collaborative Efforts and Strategies to Attain Optimal Health for People, Animals and the Environment in the Study Area

This study identified and assessed collaborative efforts and strategies of health professionals (medical and veterinary), social, economic, agricultural, environmental, wildlife and other interested parties in attaining optimal health for people, animals and the environment. Under this objective awareness on the concept and practices related to OHA and on technical collaboration on diagnosis and surveillance of diseases was assessed. Medical, veterinary and environmental personnel collaborations, potential hindrances towards effective collaboration, and reasons for the need for technical cooperation were identified. Also the extent to which people are likely to support for the institutionalization of technical collaboration between health professionals and other interested parties was analyzed.

The findings indicate low awareness on the concept and practice of OHE with only extraordinary few of the respondents managing to correctly describe OHA (. Awareness on the ways in which these professionals collaborated in the study area was very low with, with majority of the respondents not being aware, some other 5 claiming that they were no any collaborations observed within the specified period of time.

Similar findings to this study can be observed in a number of literature. URT- Prime Minister's Office (2015) recognises/acknowledges low awareness on OHA, as it is revealed in One Health Strategic Plan 2015 – 2020. Low awareness on OHA is also partly acknowledged by URT-MoHC DGEC (2017: 18) as it reports that: “.....there is limited coordination and collaboration between health sector and other sectors as well as participation of non-state actors in addressing emerging and re-emerging diseases”. OHA is reported to be at its infancy in many areas of the world (Miller and Olea-Popelka, 2013). During FGDs, it was apparent that individuals despite having knowledge and involving themselves with the concept and practices related to OHA but didn't know it when it is being referred to as OHA:-

“From the explanations you have given us we have really come to understand what is being regarded as One Health Approach. I can see opportunities that are obvious with the approach towards attainment of optimal health for humans, animals and the environment. This is very important aspect if good health has to be maintained in the society.....it is true that sometimes our animals have been a cause of our ill health, I have understood from the explanations you have also given us explanations on how we (human being) could affect animals healththe environment quality and its effects on health for both humans and animals have been very obvious to me even before I attended this session with you here

Identified potential hindrances towards effective collaboration among personnel dealing with health related aspects in the study area, included; lack of good health policies, unavailability of veterinary services in their area, lack of government support and majority were not aware on the factors that are hindering such collaboration. Attainment of optimal health for animals, humans and the environment was by about one third associated with a need for technical collaboration between medical professionals, veterinarians and environmentalists, the rest two thirds did not know whether there was such a need. Those who acknowledged the need for technical cooperation claimed that technical collaboration between medical professionals, veterinary and environmentalists help to save lives of both humans and animals, while others attributed it to its potentiality to help conserving the environment. Awareness on collaboration on diagnosis and

surveillance of zoonotic or non-zoonotic diseases was very low. The majority of the respondents were in favour of such collaboration if institutionalized.

Policy issues are also reported by Mbugi *et al.*, (2012) to attribute to low awareness on collaboration on diagnosis and surveillance of zoonotic or non-zoonotic diseases. According to Mbugi *et al.*, (2012) lack of participatory health policy that focuses on multi-sectoral contributions towards One Health is a major hurdle, particularly in resource-poor countries. Low awareness can also be contributed by lack of transparency in the sector; as cited in URT (2017: 1), which claims that transparency and social accountability is amongst challenges facing Health sector in Tanzania. During a KII, one informant claimed that:-

.....In absence of directives, guidelines or policies on such collaboration it is not possible to expect much from such collaboration the government has to put in place such directives, guidelines or policies

It is apparent that health policy (policy objectives 2.4.6) does not explicitly insist on the veterinarian's collaboration with human health professionals, despite emphasizing on promoting awareness among government employees and the community at large. The policy however declares that health problems can only be adequately solved through multisectoral cooperation involving such sectors as education, agriculture, water, private sector including NGOs, civil society and central ministries, as regional administration and local government, and community development, gender and children (URT, 2003b). Mbugi (2012:2) claims that "despite advocating 'One Health' approaches in infectious disease surveillance in developing countries such as Tanzania, the concept may be challenged and compromised by the existing health policies in the country. The current health policy and the Tanzanian Veterinary Act (the tool that provides guidelines for veterinary practice activities) may not have a common point of intersection. This could be a result of parallel working organs that do not interact or a habitually conservative notion that 'a vet should be a vet' and 'a medic should be a medic'. During KII, it was observed that there has been a feeling that has sometimes made it difficult for effective collaboration between medical and veterinary professionals, as one participant claims:-

“It is just the way human health professionals have their views /perceptions on animals health professionals that has always been a hindrance towards effective collaboration. Our colleagues have always been considering themselves superior than usThat has had a lot of negative influence towards collaboration”

Despite all these drawbacks, Tanzania has already put in place enabling environment for the effective collaboration between various professionals towards attaining optimal health for humans, animals and the environment. Tanzania’s 5-year *One Health Strategic Plan* (2015–2020) is the country’s first national One Health strategic plan to be developed using a multisectoral approach and has drawn expertise from various sectors reflecting shared commitment to enhanced collaboration among human, animal, and wildlife health sectors to reduce the burden of zoonotic diseases (URT- Prime Minister’s Office,2015; CDC, 2017; 2018).It is evident that the government has realized the importance of OHA towards attaining optimal health for humans, animals and the environment that’s why even the National health policy has recently introduced an aspect of one health on policy issue (URT, 2017:29) (refer to subsections 5.11 and 5.11.1 of the 2017 Health policy) under Emergency Preparedness and Response. The Tanzania’s National Health Policy of 2017 (URT, 2017:29) states that “The government has undertaken several measures including completion of all -hazard preparedness and response plan, initiation of one- health approach and build capacity to respond to emergencies”. This indicates the fact that a way has been paved towards effective collaborative efforts between various professionals towards attainment of optimal health for humans, animals and the environment. As discussed earlier in this same subsection (5.5, pg. 207) of this study, it can be recalled that Mbugi *et al.*,(2012:2-3) attributed lack of participatory health policy that focuses on multi-sectoral contributions towards One Health being a main impediment towards effective working collaboration among health and related stakeholders. Obviously, this policy statement (URT, 2017:29) is setting a good basis towards effective working collaboration among health and related stakeholders under OHA.

5.6 Linkages between HL, HB and HCSB under OHA

This sub-section discusses findings with respect to objective five of this study.

5.6.1 The linkage between HL and HB

The linkage (association) between HL and HB has been a focus of discussion in countless studies (URT, 2003a; Dewalt *et al.*, 2004; URT, 2007a; 2007b; Lee *et al.*, 2012). This is due to the fact that HL focuses on the capacity to obtain, communicate, process, and understand health information and services needed to make appropriate health decisions. Apparently, some of the health decisions are those connected to refraining from performing certain practices which are considered to have negative consequences on health.

The results from the Pearson's correlation coefficient, contingency table (cross tabulation) and chi square test indicate an existence of connections /associations between HL and HB. The results from the cross tabulation indicate that HIBs (Low Health Enhancing practices) were mostly found amongst the respondents who had IHL and very marginal of those who had HEBs were found to have IHL. On the other side, the majority of those who were reported to have HEBs were found in the AHL category and only very few under HIBs. A strong, negative correlation between the HL (scores) and HB (scores) was observed. This implies that high scores on HL are associated with lower scores on health impairing behaviours/practices. Definitely, this connotes that the higher the HL scores the lower the scores on HIB (hence HEBs). Likewise a very strong association between HB categories and HL levels was observed from a chi-square test of independence. The implication from these results is that individuals who are health literate are exhibiting a low level of health impairing practices, other factors remaining constant, health literate individuals have always been at the forefront of accessing health information and have developed capacity to use it effectively to make appropriate health decisions to promote and maintain good health.

Tombrink and Vanasse (2013: 2) argue that through "health literacy it is possible to reframe the different components of health knowledge in a way that can lead to a new understanding of health behaviour". Sørensen *et al.*, (2012) contend that being health literate means placing one's own health and that of one's family and

community into context, understanding which factors are influencing it, and knowing how to address them. An individual with an adequate level of HL has the ability to take responsibility for one's own health as well as one's family health and community health. These arguments suggest that a health literate individual given the information obtained, communicated, processed, and understood there is a greater chance of shaping his/her health related practices/behaviours to achieve good health. Similar findings are reported from a study by Fleary *et al.*, (2018) which found a meaningful relationship between health literacy and adolescents' health behaviours. In a study by Sun *et al.*, (2013) on Determinants of Health Literacy and Health Behaviour regarding Infectious Respiratory Diseases, HL has been observed to be a direct influencing factor of health behaviour ($\beta = 0.101$). Other studies (von Wagner, *et al.*, 2007; Speirs, *et al.*, 2012; Adams, *et al.*, 2013; Geboers; *et al*, 2014; Husson, *et al.*, 2015) have also found an association between IHL with unhealthy behaviours.

5.6.2 The linkage between HL and HCSB

This study used cross tabulation and its concomitant chi-square test to establish an association (linkage) between HL levels and HCSB (operationalized in this study as individuals' preferences in seeking health care service from a particular source). The results from the both contingency table (cross tabulation) and chi square test indicate an existence of connections /associations between HL and HCSB.

The results from the cross tabulation indicate that 42.4 percent of the interviewed respondents who preferred IHCSFs (Informal Health sources/facilities) had IHL, whereas 33.3% had MHL and 24.2 percent had AHL. For the case of FHCSFs, it was found that this source was preferred by 39.0 percent of the respondents who had AHL, followed by 31.9% with IHL and 29.1 percent with MHL. A significant association between HCSB and HL levels was indicated from chi-square test of independence $\chi^2 (2, n=1440) = 5.966$ $p=.051$, $\phi=.158$. However, the effect of the strength of association between the variables was found to be small. The implication from these findings is that individuals who are health literate are likely to prefer formal health care service source than those who are having inadequate, limited or problematic health literacy. This is obvious the function of the health information that these health literate individuals have had an opportunity to interact with, simply

this connotes that using health information accessed these individuals are in a position to make appropriate health decisions with respect to which source health care should be sought. Substantial evidence support this by indicating how HL affects a person's ability to access and use health care, to interact with providers, and to care for himself or herself (Paasche-Orlow and Wolf, 2007; AHRQ, 2007) impacts on health care costs and health care utilization (Weiss, *et al.*, 1992; Gazmararian, *et al.*, 2003; Nielsen-Bohlman, *et al.*, 2004; Weiss and Palmer, 2004; Weiss *et al.*, 2005).

5.6.3 The Linkage (Association) between HB categories and HCSB

Contingency table, and Chi square (χ^2) were used to establish the association (relationship) between HB categories and individuals preferences for seeking health care (referred to HCSB). The results from cross tabulation show that 68.7 percent of those who preferred informal health care sources /facilities were those who exhibited HIBs and only 31.3% of the respondents who had HEBs preferred seeking health care from informal health care sources /facilities. The majority of the respondents (67.7 percent) who had HEBs preferred seeking health care from formal health care sources/facilities. a moderate association between Health Behaviours Categories and health care source preferences, $\chi^2 (1, n=1440)=4.70$, $p= .03$, $\phi=-.149$ was recorded from a chi-square test for independence (with Yates Continuity Correction). It can therefore be deduced that preference of informal health care source corresponded with HIBs and likewise formal health care source preference matched with HEBs.

5.7 Stakeholders' Initiatives in Building Public Health Capacity, Developing HL and Empowering People to Manage their Health

This sub-section discusses findings for objective six of the study. Various stakeholders' and numerous initiatives in building public health capacity, developing HL and empowering people to manage their health are reported in the literature. Perceptions on effectiveness of the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health was used to assess effectiveness of those initiatives.

Of the bylaws, local policies and directives on health promotion, healthcare and diseases prevention, 10.0 percent focused on restrictions on certain health

behaviours, 12.5 percent on encouraging certain health behaviours, while 10.0 percent on meat inspection, 27.5 percent on environmental management practices, 15.0 percent on where and when pasture and selling outlets businesses can be located, 15.0 percent on water sources use (which, for who, when) and 10.0 percent on village control issues of livestock feeding in the area nearby game reserve. LGAs have been dealing with public health and related aspects through its capacity; LGAs involvement in public health through the services it commissions and delivers (8.8 percent), through its regulatory powers (67.4 percent), through community leadership (8.8 percent) and the remaining 15.0 percent could not identify any ways.

These findings indicate that LGAs have been attending to their roles of ensuring communities are responsible in taking care of their own health as stipulated in the National Health policy (URT, 2003a) despite low level of such initiatives. However, it should be noted that the low reported level of such initiatives can also be emanating from a number of factors including lack of transparency in the health sector as reported in URT (2017: 1). It is reported by URT (2017: 1, 4) the country to have made impressive gains in various aspects in health sector despite the challenges.

The findings from the study indicated that the focus of the identified initiatives included: -seminars/workshops on diseases prevention (7.5 percent). Of the identified public announcements, 55 percent focused on diseases prevention, whereas only 2.5 percent of public announcements were on health promotion. Village/wards/street meetings on diseases prevention accounted for 95 percent of the identified village/wards/street meetings, and village/wards/street meetings were on health promotion 2.5 percent. Visits by health officials from the wards on diseases prevention accounted for 50 percent of the identified visits by health officials from the wards. Parents meetings at school, 32.5 percent were on diseases prevention. The findings further reveal that 55 percent of the leaflets distributed were on diseases prevention and none on health promotion and health care.

Similarly, public meetings and print materials were the most frequently used channels of health information communication as reported by Mboera *et al.*, (2007). In a study by Rains and Ruppel (2013) it was found that information seekers utilize

multiple sources including health care providers and print media in the process of acquiring information. Freer (2015:16) identifies dissemination of fact-based pamphlets and the placement of posters, among others as source of health information.

The results reveal that 70 percent of the respondents identified hospitals, 27.5 percent schools and 2.5 percent NGOs as institutions which facilitate health initiatives in building public health capacity on human in the society.

The results further indicate that 80 percent of the respondents identified hospitals and 20 percent schools as institutions which facilitate health initiatives in developing HL in human health in the society. Health care facilities were similarly found to be the best place to receive health information by rural Tanzanian individuals in a study by Mboera *et al.*, (2007). Rains and Ruppel (2013) found that information seekers used health care providers as sources of health information too.

All the respondents interviewed identified schools as the only institution which has been involving itself in facilitating health initiatives in building public health capacity on livestock health in the society.

The scores on the perceptions on effectiveness of the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health reveal that 30 percent of the respondents perceived the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health to be effective; while 70 percent perceived it being ineffective. During FGD, one participant had this to say: -

“There could be a lot of initiatives that the government may be putting in place related to healthcare, promoting health and preventing diseases in our area. But it is very difficult to us to know them all. It is rarely that common people like us are involved in initiating or even executing such initiatives”

5.8 Health Literacy –Health Behaviour-Healthcare Seeking Nexus Analytical Framework (HL-HB-HCSB Nexus Analytical Framework)

This study is proposing an analytical framework from the findings obtained from Morogoro, (Fig. 10). This framework is on the connection between HL, HB and HCSB, it informs on how health education and consequently HL interventions can effectively lead to health behavioural change in the context of OHA. This analytical frame work is grounded on the following aspects:-

(i) Health promotion and education

For health education and consequently HL interventions to effectively lead to health behavioural change in the context of OHA there is a need for guided stakeholders' involvement, governing principles, act and regulations. This will involve identification of potential stakeholders at specific local reality much HL is context specific. It has further followed by the need to make such interventions interactive to enable to penetrate and share such health messages with the community. Together with that, it is worthwhile to have interventions which are culturally appropriate, as it is obvious that sometimes people have been engaging themselves certain health impairing practices which connect very much with their culture so there is a need to understand this. The interventions should also consider or put in place Motivation to change (facilitators and hindrances) very well. Context specificity and OHA focus (to attain optimal health) are key attribute of effective for health education and consequently HL interventions to effectively lead to health behavioural change. In this context definitely Communities & individuals capacity on health promotion will be built.

(ii) Health information dissemination

The need for up scaling of health information from various sources is considered important. The most important for health information dissemination to be effective it requires improved interaction between health workers and patients. This has to be preceded by identification of health information gaps, in this sense then dissemination has to focus on filling of HI gaps identified. This can only be achieved if there guided stakeholders' involvement, governing principles, act and regulations. This element is lacking in Tanzanian context, as it has been observed that Tanzania has no governing principles, act, regulations and guidelines established for health

education, weak institutional linkages and community engagement. The materials which are to be developed should use plain language (for clarity of health communication), but also there is a need to test the materials before, during and after have been developed. Together with all these it is considered worthwhile to prepare health information materials sensitive to cultures, sex, and age. Along with that dissemination of health information has also to consider the context in which that information is disseminated (contextualization of HI dissemination) to guarantee effectiveness.

(iii)Health literacy

Effective HL interventions requires Policy frameworks on HL, such frameworks should focus on Creating HL organizations. Stakeholders' identification and involvement has also to be taken very serious. After identification of stakeholders institutional linkages on promoting healthier lifestyles have to strengthened. Incognizant of the fact that health workers have significant contributions towards dissemination of health information there should be initiatives directed towards empowering health systems towards HL, this in a way will enhance multi-way communication and sharing of information among clinicians, patients, and caregivers. To be able to reinforce HL initiatives, there is a need also to prioritize HL researching and documenting. These researches will create a pool of information which will inform policy and interventions initiatives.

(iv)Health behaviour

Health behavioural aspects can best be dealt with in the context of presence of Clear understanding of HBs in the Context of culture, history, and politics. On top of that Understanding of Communities' or individuals' evaluation of their HBs (attitudes) remains important. This by itself will avail an opportunity to explore into cultural aspects of a particular setting before attempting to create an intervention to change it. LGAs have a considerable influence on encouraging or discouraging certain HBs, so it is useful to Enhance LGAs & political interventions on health, Bylaws and policies have been found to influence HBs.

(v) Health care seeking behaviour

Health care seeking behaviours should be addressed by understanding Perceptions people have on health care sources. It is then becomes important to Address Individuals, service source and environmental factors on health care access. The need of assessing negative behavioural patterns on cultural lens prior to attempting to change them is also necessary. The knowledge on diseases and how to manage such diseases is also a very important aspect towards an individual's decision to engage with a particular health care service source, this then call for enhancing diseases knowledge and management.

(vi) Healthy living

Healthy living will be attained after taking into consideration those aspects presented in the analytical framework which focus on health issues by underlining the fact that attained optimal health for humans, animals and the environment requires collaborative efforts from various professionals. Health living will lead to quality population which will affect positively the economy, society and politics much as in return quality of population will be affected by these sectors.

5.9 Limitations of the study

This study had several limitations. First, there may have been selection bias, as study participants were not recruited proportionally on each socio-demographic subcategories, i.e. an equal number of respondents for each category based on sex, education levels, etc. This approach may have brought on board a wider room for comparison within variables. Studies which take this into consideration will be needed in the future. Second, HL and HB were measured based on self-reported questionnaires. It is possible that these participants may report own HL and HB in a better way. This may have resulted in over-estimation of HL. Further studies could also think of a different methodology to avoid getting convenient responses from the respondents when reporting their HL and HBs. A longitudinal study will be needed to address this issue.

This study did not cover a large geographical locations in Tanzania to capture social and economic diversity. Also, the study findings may not be generalised to the whole of Tanzania due to a limited number of provinces and districts which were included

in this research. A study of this nature can be conducted involving a larger sample to solicit wider findings. Some of the terms used i.e OHA had no direct translation in Kiswahili, the language of the subjects of this research. To make respondents understand, illustrative elaboration was given on what reflects OHA.

5.10 Directions for Future Research

Based on the findings of this study, the following directions for future research in Tanzania and sub- Saharan Africa are suggested:

1. Furthermore, future research would benefit from studies with larger sample sizes i.e nationwide HL assessment under OHA.
2. Further research is needed to examine the role of health literacy and the linkages between health literacy, health promotion behaviours, and subsequent health status at-risky populations.

Summary of the Discussion

The chapter presents a summary of a discussion on the findings of this study. Generally what has been observed here is that there are several studies whose findings are similar to this. Theories and approaches that were identified from the review of literature have had a lot to reflect on the findings of this study. The guiding theory (PEN-3 model) has afforded to lead us to understand that health behavioural change are also influenced by culture, history, and politics.

The HL-HB-HCSB Nexus Analytical Framework

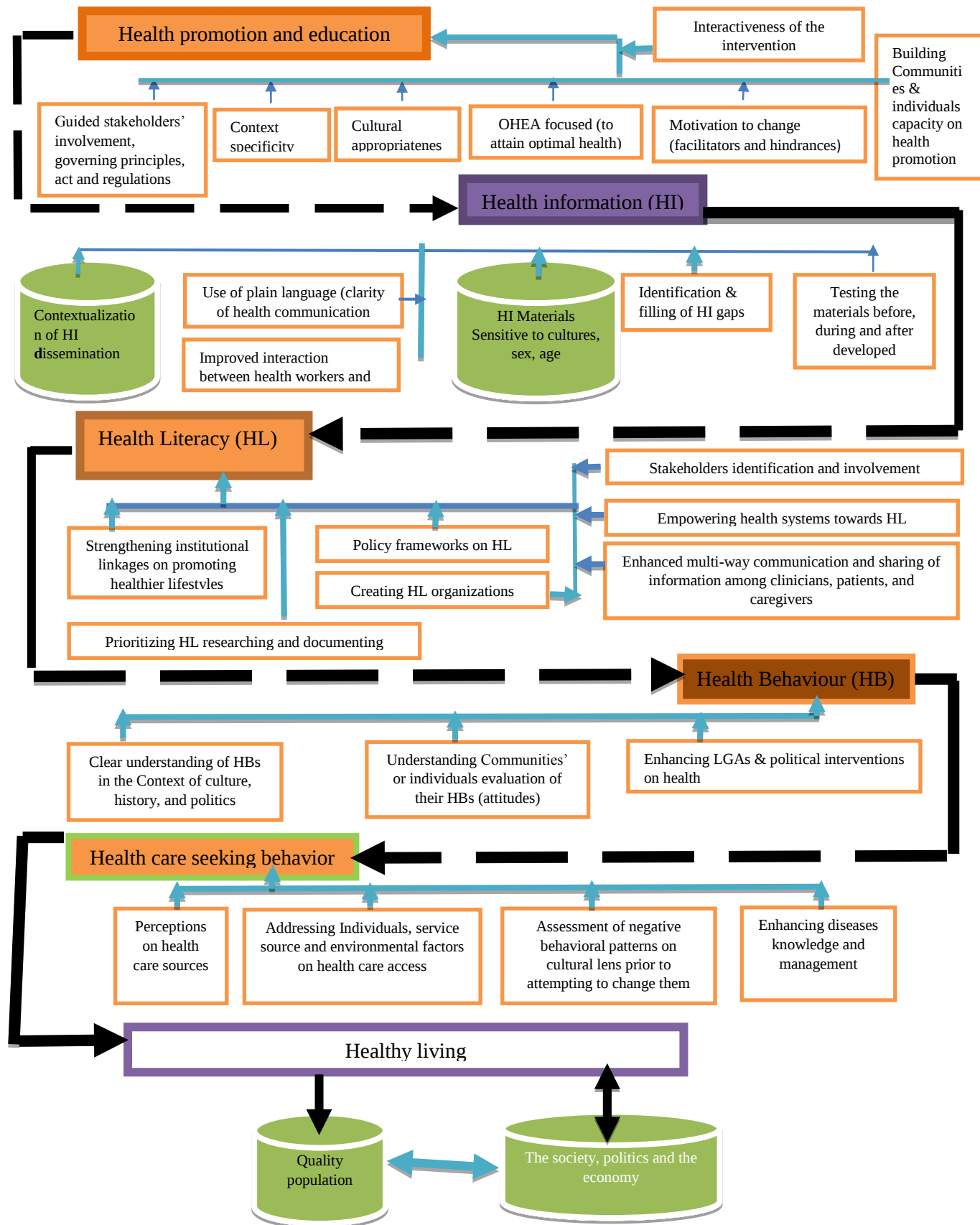


Fig. 10: The HL-HB-HCSB Nexus Analytical Framework

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The findings from this study indicate that the majority of households were below half of the HL scores. Based on this finding, it is concluded that HL is a problem among household surveyed. During literature search for this study, it also became apparent that not only the respondents in the study area had inadequate HL, but very little has been researched and also documented on HL, despite the importance of health information which partly forms HL and the fact that health information being listed among priorities under Tanzania's National Health Research Priorities, 2006-2011. It was also observed that national health and related datasets have not managed to include variables on health literacy. Based on this, it can be concluded that HL has not been accorded its due importance in Tanzania.

It has been observed from the findings of the study that a significant proportion of the respondents have been exhibiting favourable (positive) attitudes towards certain health impairing practices. During the FGDs it was revealed that some of these HIBs were considered in the cultural context to be valuable. This has undoubtedly led to these HIBs despite the efforts of the government to educate people to become health literate to cultivate healthier lifestyles. This leads to a conclusion that the failure of government efforts is also explained better from a cultural context much as attitudes are also influenced by cultural aspects.

The findings from the study on HL from the FGDs show that there has been inadequate HI dissemination in various outlets despite the importance of such information even available such information has been presented in a language which is difficult for lay or common people to understand. Hospitals which were identified in the FGDs as the main source of health information are reported of having provided little from what was expected, professionals (i.e.doctors and nurses) and patients interactions have not facilitated much of HI exchange. This leads to receivers of such information to figure out health services with many unfamiliar, confusing or even conflicting steps, hence the creation of a health literacy problem.

It was revealed from the FGDs that the mass media coverage on health-related issues was very minimal. Due to this finding, it is concluded that the need for health information cannot be met under the current situation where the majority of the sources do not significantly disseminate HI, little that is available is in a language that cannot be comprehended by common people and with the existence of limited interactions between medical professionals and patients. It can be concluded that there is a gap existing between health information currently accessible and the kind of skills individuals have to comprehend and use this information to make life-altering decisions. The study established that engagement in discussion in health-related issues, health behaviour, interaction with medical veterinarians and environmentalists, prior knowledge on health issues, the influence of politics on health, score on LGA involvement in health-related activities, to have a significant influence on determining HL in the interface of humans, animals and the environment. Since HL is still inadequate, it is concluded that enhancement in these aspects would assist in improving HL.

The findings from the study indicate that majority of the respondents interviewed had exhibited high health impairing practices (performing low health-enhancing practices) hence falling under health impairing behaviours (HIBs) category while the rest of the interviewed respondents had high health impairing practices (performing low health-enhancing practices) hence falling under health-enhancing behaviours (HEBs) category. These health impairing practices are on existence despite the efforts of the government of Tanzania to improve health services and educating people to become more health literate and encourage them to make healthier lifestyle choices (to achieve positive health outcomes for both humans and animals). From the FGDs, it was noted that some incidences of health impairing practices are attributed to factors related to traditions and customs aspects. These traditions and customary aspects have partly nurtured positive Attitudes of the respondents towards certain identified health impairing behaviours /practices. Based on these findings, it can be concluded that the efforts of the stakeholders on HL on health behavioural changes have not met its goals. The study established that one health concern, HL of the respondents, prior knowledge on health-related issues, the influence of politics on health and LGA involvement in health to have a significant influence on

determining HB in the interface of humans, animals and the environment. But as it has been observed a significant proportion of individuals are exhibited HIBs. This concludes there is a need to improve on these determinants.

Furthermore, it was observed from the study that majority of the respondents preferred formal health care sources/facilities (FHCSF) and only below half of the respondents preferred informal health sources/facilities (IHCSF) when seeking health care service for themselves and their animals. During the FGDs, issues related to financial capabilities were identified as barriers towards accessing FHCSF. From this finding, it is concluded that the majority of the people prefer using medical source than other sources like traditional healers, self-treatment, no treatment and pharmacy despite the challenges faced. Other sources were regarded as alternatives to FHCSF. The findings from the study about the determinants of HCSB showed that the factors that were most associated with preferences for sources of healthcare, according to the respondents' views, were marital status (being in a relationship), service characteristics score, beliefs on the effectiveness of modern humans and animals health services. Based on this finding, it is concluded that improvement in these factors would help increase the proportion of people preferring modern health care services and reduce that of people preferring getting health services from traditional healers.

Furthermore, the findings indicate low awareness on the concept and practice of OHE, with only an extra few of the interviewed respondents managing to correctly describe OHA. Awareness of how these professionals collaborated in the study area was very low. Lack of good health policies, unavailability of veterinary services in their area, and lack of government support were identified as potential hindrances towards effective collaboration among personnel dealing with health-related aspects in the study area. Those who acknowledged the need for technical cooperation claimed that technical collaboration between medical professionals, veterinary and environmentalists help to save lives of both humans and animals also attributed it to its potentiality to help to conserve the environment. The majority of the respondents were in favour of such collaboration if institutionalized. Based on these findings, it

can be concluded that OHA is not very popular in the study area though it is evident that the need for the approach is very obvious in the area.

It is worth noting that several context-specific stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health were identified and assessed. The perceptions on the effectiveness of the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health reveal that only one-third of the respondents perceived the stakeholders' initiatives in building public health capacity, developing HL and empowering people to manage their health to be effective while the majority perceived it being ineffective. Given this finding, it is concluded that despite these initiatives a lot has to be done. This connects very well with other findings in this study on the assessment of HL and HB, where inadequate HL and HIBs were found to dominate.

6.2 Recommendations

Centred on the conclusions made the following recommendations are made on how various aspects related to HL, HB and HCSB under OHA can be addressed to achieve optimal health for humans, animals and the environment. These recommendations are directed to various development stakeholders at various levels.

6.2.1 Recommendations to research institutions, decision and policymakers

Prioritizing HL in the national health research agenda and encouraging further research and documentation. Pushing for an agenda for the inclusion of HL variable in the national health and related datasets. The policies related to health should be amended to make HL a mandatory variable in the national health data sets as health literacy has a role in health decision-making.

Directing further efforts in scaling up health information dissemination using the mass media (print, television, radio and internet) which has proved to have substantial power in setting agendas hence utilize the persuasive power of the mass media to influence health-enhancing practices. This can include strategies for increasing news coverage of significant health and medical issues i.e Tanzania Communications Regulatory Authority should make it mandatory to both public and

private broadcasters to have a certain level of air time on public health-related aspects, amendment of Newspapers Act to accommodate a mandatory column on health issues in every registered newspaper. This should go hand in hand with training journalists on health and medical information reporting much as the media has been noted to have not been that effective in accurately reporting health and related information partly due capacity to report scientific matters related to health and medicine.

Formulating policies towards making health care facilities Health Literate organizations. Formulation of policies which will translate what is in National One Health Strategic Plan at the local level. Health care policies and programs' planning based on knowledge about healthcare-seeking behaviour for early diagnosis, effective treatment and appropriate intervention implementation. Early health care utilization and adherence to effective treatment can reduce morbidity, disability and mortality.

The following policy implications can be summarized:-

- **Promoting access to health information**
 - Consider setting guidelines about health information access and design.
 - Change the way health information is designed and delivered
 - Encourage professional health care provider organizations to distribute understandable materials for their members to use with their patients and families
- **Supporting health education and health professional standards.** National standards designed to improve primary and high school students' health literacy skills have not been widely adopted. Most professional schools do not require proficient communication skills for graduation. Improving the skills of both the population and health professionals can help patients and providers "speak the same language."

6.2.2 Recommendations to the development partners

Supporting initiatives in place by various stakeholders that are concentrating on building public health capacity, developing HL and empowering people to manage

their health. That will supplement the efforts available which seem not to have resolved the challenges around those circles. Definitely, low HL leads to poor health which affects the quality of population consequently impact negatively in any nation's development. Quality population is a crucial parameter for economic development as it provides labourers and consumers of various products and services. Committing to continue working with the government to ensure that the just-launched National One Health Strategic Plan and One Health Coordination Desk plan realizes its objectives.

6.2.3 Recommendations to the LGAs

Scaling up health behaviour campaigns by encouraging health-enhancing behaviours and discouraging health impairing behaviours through its regulatory function. LGAs can positively impact on health outcomes through more bylaws, local policies and directives on health promotion, healthcare and diseases prevention.

LGAs should also translate the on-going national wide call to implement One Health Initiatives into the local realities by encouraging and putting in place a local arrangement for humans, animals and the environment professionals to work collaboratively. Creating awareness through family health promotion that the responsibility for one's health rests in the individuals as an integral part of the family, community and nation is very important.

6.2.4 Recommendations to health personnel and health service providers

Improving their interactions with patients, as it has been observed health care services (hospitals, dispensaries etc.) and health personnel are the main sources of health information dissemination. The principal obligation for improving health literacy is at the hands of health professionals and the healthcare and public health systems, fulfilling this responsibility effectively will lead to the adequacy of health information hence the enhancement of HL.

Developing health information and services that are in plain-language that can easily be understood by patients based on their differences and diversity in cultures, sex, age and life orientations. This points to the fact that sometimes patients fail to understand a certain simply on the fact that it has been presented in a language that

cannot easily be understood by them. Obviously, availing meaningful and reliable information is a prerequisite dimension to health literacy.

6.2.5 Recommendations to the household

Prioritizing health information access and consequently HL hence likelihood of better health outcomes. Once provided with better information households stand a good chance of refraining from certain health impairing behaviours which they didn't know their impacts on health given the will to refrain. The household is a very important stakeholder in HL initiatives as it is very obvious that Health literacy is also shaped by factors earlier in the life course –the role of family in HL, HB is inevitable. Nurturing positive attitudes on HEBs and negative attitudes on HIBs respectively regardless of its cultural (traditional and customary) value has to begin earlier.

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APPENDICES

Appendix I: Health Behaviours and Practices in the Interface of Humans, Animals and the Environment

2.16.1 Eating Habits, Food Preparation and Consumption

- o Consumption of game meat without veterinary clearance
- o Consuming meat from naturally died animals
- o Consuming raw blood, meat (or undercooked meat) and milk,
- o Washing hands before and after eating
- o Drinking sour milk prepared without boiling
- o Slaughtering small ruminants and pigs in the backyards without or with minimal inspection
- o Meat inspection before being turned into the market
- o Consumption of home-made milk products

2.16.2 Animals Handling

- o Touching diseases infected game meat i.e. anthrax-infected hippo meat
- o Handling wildlife trophies without veterinary clearance
- o Washing hands after attending animals
- o Handling without gloves aborted farm animals calves or placentas that were infected with the Brucella species
- o Wearing a face mask attending an animal who is suffering from respiratory disease
- o Wearing gloves when handling animals i.e assisting during animal delivery (birth).

2.16.3 Interaction of Animals and Humans

Interaction of Wild animals and livestock

- o Livestock sharing water sources with wildlife
- o Cattle interaction with the wild animals in the grazing areas

Interaction of animals and humans

- o Use of shared water sources between animals and humans
- o Sharing houses with their animals (people living in the same house with livestock)

2.16.4 Environmental Management Practices and Related Habits

- o Installing and maintaining drains
- o Removing pools of stagnant water
- o Managing vegetation i.e clearing grasses and bushes around the home to prevent malaria
- o Irrigating intermittently
- o Altering rivers to create more fast-flowing water, reduction of mosquito breeding grounds
- o Using Insecticide-Treated Net (ITN)
- o Indoor Residual Spraying (IRS)

2.16.5 Healthy Living and Lifestyle

- o Health information-seeking for both humans and animals i.e. diseases their causes, symptoms and treatments
- o Hygienic measure to keep the household free of rats, snakes, and mosquitoes,
- o Hand washing after lavatory visit
- o Culling the animals when the cases become hopeless and even where such cases should be destroyed, owners are often reluctant to destroy them and such animals often are slaughtered for human consumption
- o Thorough use of latrines
- o Sick animals culled instead of healthy ones for selling or consumption
- o Reluctance to destroy animals unfit (hopeless) for consumption and such animals often are slaughtered for human consumption
- o Ensuring maximum room ventilation
- o Purchasing meat from unreliable outlets (not guaranteeing meat inspection)

Appendix II: Health Literacy Assessment tool

I Human Health

On a scale from very easy to very difficult, how easy would you say it is to: ...

S.	Health Related Tasks	Scale
1.	Find information about symptoms of illnesses that concern you?	1 2 3 4
2.	Find information on treatments of illnesses that concern you?	1 2 3 4
3.	Find out what to do in case of a medical emergency?	1 2 3 4
4.	Find out where to get professional help when you are ill?	1 2 3 4
5.	Understand what your doctor says to you?	1 2 3 4
6.	Understand the leaflets that come with your medicine?	1 2 3 4
7.	Understand what to do in a medical emergency?	1 2 3 4
8.	Understand your doctor's or pharmacist's instruction on how to take a prescribed medicine?	1 2 3 4
9.	Judge how information from your doctor applies to you?	1 2 3 4
10.	Judge the advantages and disadvantages of different treatment options?	1 2 3 4
11.	Judge when you may need to get a second opinion from another doctor?	1 2 3 4
12.	Judge if the information about illness in the media is reliable?	1 2 3 4
13.	Use the information the doctor gives you to make decisions about your illness?	1 2 3 4
14.	Follow the instructions on medication?	1 2 3 4
15.	Call an ambulance in an emergency?	1 2 3 4
16.	Follow instructions from your doctor or pharmacist?	1 2 3 4
17.	Find information on how to manage unhealthy behaviour such as smoking, physical inactivity and drinking too much?	1 2 3 4
18.	Find information on how to manage mental health problems like stress or depression?	1 2 3 4
19.	Find information about vaccinations and health screenings that you should have?	1 2 3 4
20.	Find information on how to prevent or manage conditions like being overweight, high blood pressure or high cholesterol?	1 2 3 4
21.	Understand health warnings about behaviour such as smoking, low physical activity and drinking too much?	1 2 3 4
22.	Understand why you need vaccinations?	1 2 3 4
23.	Understand why you need health screenings?	1 2 3 4
24.	Judge how reliable health warnings are, such as smoking, low physical activity and drinking too much?	1 2 3 4
25.	Judge when you need to go to a doctor for a check-up?	1 2 3 4
26.	Judge which vaccinations you may need?	1 2 3 4
27.	Judge which health screenings you should have?	1 2 3 4
28.	Judge if the information on health risks in the media is reliable?	1 2 3 4
29.	Decide if you should have a flu vaccination?	1 2 3 4
30.	Decide how you can protect yourself from illness based on advice from family and friends?	1 2 3 4
31.	Decide how you can protect yourself from illness based on information in the media?	1 2 3 4
32.	Find information on healthy activities such as exercise, healthy food and nutrition?	1 2 3 4
33.	Find out about activities that are good for your mental well-being?	1 2 3 4
34.	Find information on how your neighbourhood could be more health-friendly?	1 2 3 4
35.	Find out about political changes that may affect health?	1 2 3 4
36.	Find out about efforts to promote your health at work?	1 2 3 4
37.	Understand advice on health from family members or friends?	1 2 3 4
38.	Understand information on food packaging?	1 2 3 4
39.	Understand information in the media on how to get healthier?	1 2 3 4
40.	Understand information on how to keep your mind healthy?	1 2 3 4
41.	Judge where your life affects your health and well-being?	1 2 3 4
42.	Judge how your housing conditions help you to stay healthy?	1 2 3 4
43.	Judge which everyday behaviour is related to your health?	1 2 3 4
44.	Make decisions to improve your health?	1 2 3 4
45.	Join a sports club or exercise class if you want to?	1 2 3 4
46.	Influence your living conditions that affect your health and wellbeing?	1 2 3 4
47.	Take part in activities that improve health and well-being in your community?	1 2 3 4

Key: 1= very difficult, 2= fairly difficult, 3=fairly easy, 4=very easy

I1 Animal Health

On a scale from very easy to very difficult, how easy would you say it is to: ...

S.	Health Related Tasks	Scale
1.	Find information about symptoms of illnesses that concern your animals?	1 2 3 4
2.	Find information on treatments of illnesses that concern your animals?	1 2 3 4
3.	Find out what to do in case of a medical emergency?	1 2 3 4
4.	Find out where to get professional help when your animals are ill?	1 2 3 4
5.	Understand what veterinarian says to you?	1 2 3 4
6.	Understand the leaflets that come with medicine for your animals?	1 2 3 4
7.	Understand what to do in a medical emergency?	1 2 3 4
8.	Understand your veterinarian's instruction on how to take a prescribed drug for your animals?	1 2 3 4
9.	Judge how information from your veterinarian applies to your animals?	1 2 3 4
10.	Judge the advantages and disadvantages of different treatment options for your animals?	1 2 3 4
11.	Judge when you may need to get a second opinion from another veterinarian?	1 2 3 4
12.	Judge if the information about animals' illness in the media is reliable?	1 2 3 4
13.	Use information the veterinarian gives you to make decisions about your animals' illness?	1 2 3 4
14.	Follow the instructions on medication for your animals?	1 2 3 4
15.	Call a veterinarian in an emergency?	1 2 3 4
16.	Follow instructions from your veterinarian or pharmacist?	1 2 3 4
17.	Find information about how to manage unhealthy behaviour related to human-animals interactions?	1 2 3 4
18.	Find information on how to manage animal health problems?	1 2 3 4
19.	Find information about vaccinations and health screenings that you should have for animals?	1 2 3 4
20.	Find information on how to prevent or manage conditions that are likely to cause ill health for animals?	1 2 3 4
21.	Understand health warnings about risks behaviour in the interactions of humans and animals?	1 2 3 4
22.	Understand why animals need vaccinations?	1 2 3 4
23.	Understand why animals need health screenings?	1 2 3 4
24.	Judge how reliable health warnings for the animals?	1 2 3 4
25.	Judge when you need to go to vet clinic animals' check-up?	1 2 3 4
26.	Judge which vaccinations animals may need?	1 2 3 4
27.	Judge which health screenings animals should have?	1 2 3 4
28.	Judge if the information on animal health risks in the media is reliable?	1 2 3 4
29.	Decide if you should have a flu vaccination?	1 2 3 4
30.	Decide how you can protect animals from illness based on advice from family and friends?	1 2 3 4
31.	Decide how you can protect animals from illness based on information in the media?	1 2 3 4
32.	Find information on animals' healthy activities such as healthy pasture and nutrition?	1 2 3 4
33.	Find out about activities that are good for your animals' well-being?	1 2 3 4
34.	Find information on how your neighbors' animals could be more health-friendly?	1 2 3 4
35.	Find out about political changes that may affect animals' health?	1 2 3 4
36.	Find out about efforts to promote your animals' health at your area?	1 2 3 4
37.	Understand advice on animals' health from family members or friends?	1 2 3 4
38.	Understand information on pasture harvesting?	1 2 3 4
39.	Understand information in the media on how to get animals healthier?	1 2 3 4
40.	Understand information on how to keep your mind healthy?	1 2 3 4
41.	Judge where interactions sometimes with animals affects your health and well-being?	1 2 3 4
42.	Judge how environmental conditions can affect animals healthy?	1 2 3 4
43.	Judge which everyday behaviour is related to your animals' health?	1 2 3 4
44.	Make decisions to improve your animals' health?	1 2 3 4
45.	Join farmers, pastoralists club or farmers field school if you want to?	1 2 3 4
46.	Influence your living conditions that affect your health and wellbeing?	1 2 3 4
47.	Take part in activities that improve animal health and well-being in your community?	1 2 3 4

Key: 1= very difficult, 2= fairly difficult, 3=fairly easy, 4=very easy

III Environmental Health

On a scale from very easy to very difficult, how easy would you say it is to: ...

S.	Environmental Related Tasks	Scale
1.	Find information about symptoms of illnesses caused by untidy environment that concern you?	1 2 3 4
2.	Find information on treatments of illnesses caused by untidy environment that concern you?	1 2 3 4
3.	Find out what to do in case of a medical emergency caused by untidy environment?	1 2 3 4
4.	Find out where to get professional help when you are ill caused by untidy environment?	1 2 3 4
5.	Understand what your environmental and medical professionals say to you on illness caused by untidy environment?	1 2 3 4
6.	Understand the leaflets that come with your medicine to treat illness caused by untidy environment?	1 2 3 4
7.	Understand what to do in a medical emergency caused by untidy environment?	1 2 3 4
8.	Understand your doctor's or pharmacist's instruction on how to take a prescribed medicine?	1 2 3 4
9.	Judge how information from your doctor applies to you?	1 2 3 4
10.	Judge the advantages and disadvantages of different treatment options?	1 2 3 4
11.	Judge when you may need to get a second opinion from another doctor?	1 2 3 4
12.	Judge if the information about illness in the media is reliable?	1 2 3 4
13.	Use information the doctor gives you to make decisions about your illness?	1 2 3 4
14.	Follow the instructions on medication?	1 2 3 4
15.	Call an environmentalist in an emergency?	1 2 3 4
16.	Follow instructions from your doctor or pharmacist?	1 2 3 4
17.	Find information about how to manage unhealthy behaviour such as?	1 2 3 4
18.	Find information on how to manage environmental health problems like?	1 2 3 4
19.	Find information about vaccinations and health screenings that you should have?	1 2 3 4
20.	Find information on how to prevent or manage conditions which damages the quality of environment	1 2 3 4
21.	Understand environmental health warnings about behaviour such as?	1 2 3 4
22.	Understand why you need vaccinations?	1 2 3 4
23.	Understand why you need health screenings?	1 2 3 4
24.	Judge how reliable environmental health warnings are, such as on overgrazing,?	1 2 3 4
25.	Judge when you need to go to a doctor for a check-up?	1 2 3 4
26.	Judge which vaccinations you may need?	1 2 3 4
27.	Judge which health screenings you should have?	1 2 3 4
28.	Judge if the information on health risks caused by untidy environment in the media is reliable?	1 2 3 4
29.	Decide if you should have a flu vaccination?	1 2 3 4
30.	Decide how you can protect yourself from illness caused by untidy environment based on advice from family and friends?	1 2 3 4
31.	Decide how you can protect yourself from illness caused by untidy environment based on information in the media?	1 2 3 4
32.	Find information on keeping environmental healthy and safe?	1 2 3 4
33.	Find out about activities that are good for your environmental well-being?	1 2 3 4
34.	Find information on how your neighbourhood could be more environmental-friendly?	1 2 3 4
35.	Find out about political changes that may affect the quality of the environment?	1 2 3 4
36.	Find out about efforts to promote your environmental health at home?	1 2 3 4
37.	Understand advice on environmental health from family members or friends?	1 2 3 4
38.	Understand information in the media on how to keep your environment healthier?	1 2 3 4
39.	Understand information on how to keep your environment safe?	1 2 3 4
40.	Judge whether the environment affects your health and well-being?	1 2 3 4
41.	Judge how your environmental conditions help you to stay healthy?	1 2 3 4
42.	Judge which everyday behaviour is related to your environmental health?	1 2 3 4
43.	Judge how the rest of the community members behaviours affects environmental management?	1 2 3 4
44.	Make decisions to improve your environment health?	1 2 3 4
45.	Join an environmental club or class if you want to?	1 2 3 4
46.	Influence your environmental conditions that affect your health and wellbeing?	1 2 3 4
47.	Take part in activities that improve environmental health and well-being in your community?	1 2 3 4

Key: 1= very difficult, 2= fairly difficult, 3=fairly easy, 4=very easy, 5= don't know

Appendix III: Methods of Bivariate Analysis

	Nominal	Ordinal	Interval/ratio	Dichotomous
Nominal	Contingency table +Chi square (x^2) +Cramer's V	Contingency table +Chi square (x^2) +Cramer's V	Contingency table +Chi square (x^2) +Cramer's V If the interval/ratio variable can be identified as the dependent variable ; compare means +eta	Contingency table +Chi square (x^2) +Cramer's V
Ordinal	Contingency table +Chi square (x^2) +Cramer's V	Spearman's rho (p)	Spearman's rho (p)	Spearman's rho (p)
Interval/ratio	Contingency table +Chi square (x^2) +Cramer's V If the interval/ratio variable can be identified as the dependent variable ; compare means +eta	Spearman's rho (p)	Pearson's r	Spearman's rho (p)
Dichotomous	Contingency table +Chi square (x^2) +Cramer's V	Spearman's rho (p)	Spearman's rho (p)	phi
Source:	Bryman (2008: 326)			

Appendix IV: Publications from this thesis

Journal Articles

Muhanga, M.I and Malungo, J.R.S. (2017a).The What, Why and How of Health Literacy. International Journal of Health. 5 (2) (2017) 107-114. doi: 10.14419/ijh.v5i2

Muhanga, M.I and Malungo, J.R.S. (2017b). Does Attitude Associate, Correlate, or Cause Behaviour? An Assessment of Attitude towards Health Behaviour under One Health Approach in Morogoro, Tanzania. International Journal of Advanced Research and publications, Vol.1 issue 3, September 2017.

Muhanga, M.I and Malungo, J.R.S. (2018). Health Literacy and Some Socio-Demographic Aspects under One Health Approach in Eastern Tanzania: Connections and Realities. Urban Studies and Public Administration. Vol. 1, No. 1, 2018. doi:10.22158/uspa.v1n1p89.

Muhanga, M.I and Malungo, J.R.S. (2018). Health Literacy and Its Correlates in the Context of One Health Approach in Tanzania. Journal of Co-operative and Business Studies (JCBS). Vol. 1, Issue 1, 2018 ISSN 0856-9037.

Conference proceeding(s)

Muhanga, M.I and Malungo, J.R.S. (2019). Health Literacy and its Associates in the Context of One Health Approach: A Research Agenda Towards an Industrial Economy in Tanzania, 285- 300._Proceedings of the 1st Scientific Conference on Transforming Agriculture and Natural Resources for Sustainable Development to Attain Industrial Economy in Tanzania, April, 10th -11th , 2019, Sokoine University of Agriculture, Morogoro-Tanzania.

Appendix V: Questionnaire



**The University of Zambia
School of Humanities and Social Sciences
Department of Population Studies**

Questionnaire for Research on:

*Health Literacy and Health Behaviour in the Context of One Health Approach in Tanzania:
Connections, Realities and Perceptions*

Introduction

I ama PhD student at the School of Humanities and Social Sciences of the University of Zambia (UNZA). I am interested in understanding households' levels and perceptions on health literacy and its connections to health behaviour and health care seeking behaviour in the interface of humans, animals and the environment- One Health.

I do not plan to talk to all residents in this area, but have selected several to ask to represent views of all residents in this area. You are one of those selected to give your views, if you are willing, for our research. The answers we get from you and several others will be analyzed to get the general residents' knowledge and opinions concerning the main problems households face and what can be done to address these. This survey will take approximately one hour to complete. This research is purely academic and information is gathered from many households by using numbers. After that, we will save the information and report what we learn using numbers, not names. Participating in this survey is voluntary. If you participate, you are free to skip any questions you do not wish to answer or to stop any time.

Are you willing to participate? No

☐

Yes

☐

QUESTIONNAIRE IDENTIFICATION

Date of interview

Questionnaire Number

Region District Ward

Village/street Enumerator's Name

Starting time Ending time

A: SOCIO –ECONOMIC & DEMOGRAPHIC CHARACTERISTICS

A1 Respondent's profile (Use the options provided under A2)

A1.1 Sex	A1.2: Marital status	A1.3: Highest education
0 1	1 2 3 4 5 6 7	1 2 3 4 5 6 7
A1.4: Relationship with household head (if not the household head)	A1.5: Occupation	A1.6: Place of residence
1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9 10 11	1=MU, 2=MV

A2: Asset Ownership

A2.1 Do you own any asset? (1 =Yes, 0=No)

A2.2 Assets ownership (Multiple responses allowed)

Assets	Ownership (1=Yes, 0=No)	Asset	Ownership (1=Yes, 0=No)	Assets	Ownership (1=Yes, 0=No)
A3.2.1 Radio	0 1	A3.2.9 Motorcycle	0 1	A3.2.17 Clock/watch	0 1
A3.2.2 TV	0 1	A3.2.10 Motor Vehicle	0 1	A3.2.18 Own Land	0 1
A3.2.3 Internet modem	0 1	A3.2.11 Satellite dish	0 1	A3.2.19 Sofa	0 1
A3.2.4 Mobile phone	0 1	A3.2.12 Satellite decoder	0 1	A3.2.20 Wooden Bed	0 1
A3.2.5 House	0 1	A3.2.13 Refrigerator	0 1	A3.2.21 Electric iron	0 1
A3.2.6 Mosquito net	0 1	A3.2.14 Bicycle	0 1	A3.2.22 Wardrobe	0 1
A3.2.7 Water pump	0 1	A3.2.15 Livestock	0 1	A3.2.23 Sewing Machine	0 1
A3.2.8 Poultry	0 1	A3.2.16 Fan	0 1	A3.2.24 Cassette/CD player	0 1

A3: WATER AND SANITATION

A3.1 Main source of drinking water for HH 1. piped into residence 2. rain water harvesting 3. public tap 4. vendor 5. river, canal, spring 6. Public well 7. Private well	A3.2 Time in minutes to the main water source (Walking)	A3.3 Main energy source for cooking in HH 1. Electricity, propane, or solar, 2. biogas, kerosene or charcoal, 3. firewood, 4. crop residue, coconut husks, sawdust, animal dung, chaff, grass, 5. Any other
1 2 3 4 5 6 7		1 2 3 4 5

	A3.4 Do you have different sources of water for animals and humans in your area? 0. NO 1. YES 2. I don't know	A3.5 Are there variations on sources of water depending on the season of the year? 0. NO 1. YES 2. I don't know	A3.6 Water sources depending on the season of the year
Animals	0 1 2	0 1 2	Dry Throughout

A3.7 Do wild animals encroach such water sources? 0. No 1. Yes 2. I don't know	A3.8 Which season of the year do they encroach (Mention)
0 1 2	

B SICKNESS, HEALTH STATUS AND CONCERN

Individuals' health status and concern for the past 12 months

CODE	Variables	1	2	3	4	5	6	7	8	9	10	HH
B1	Health status on the date of interview (1.Ill,0.Not ill)											
B2	Did any person suffer from any disease within the past 12 months? (0. No,1. Yes) If yes go to B4											
B3	Hospitalization for the past 12 months (0=No, 1=YES)											

B.3 How do you generally perceive your health status? (1=Very good, 2=Good, 3=I don't know, 4=Very bad, 5=Bad)

B.4 Using a 5 point self reporting scale ask the respondent his degree of health concern (personal health, animal health or the environment) for the past 12 months

Health aspects	Did you do/engage 0. No 1. Yes	Degree of Health Concern/extent (1= Very frequent, 2=Frequently, 3=Not at all, 4=Very rare, 5=Rarely)
B4.1 Personal health	0 1	
B4.1.1 Screening	0 1	1 2 3 4 5
B4.1.2 Specific disease or medical problem	0 1	1 2 3 4 5
B4.1.3 Certain medical treatment or procedure	0 1	1 2 3 4 5
B4.1.4 Exercising	0 1	1 2 3 4 5
B4.1.5 Obtain information about health, illness,	0 1	1 2 3 4 5
B4.1.6 Obtain information about health promotion	0 1	1 2 3 4 5
B4.1.7 Obtain information about risks to health	0 1	1 2 3 4 5
B4.1.8 Visiting a medical personnel	0 1	1 2 3 4 5
B4.1.9 Diet, nutrition, vitamins, or nutritional supplements	0 1	1 2 3 4 5
B4.1.10 Problems with drugs or alcohol	0 1	1 2 3 4 5
B4.2 Animal health	0 1	
B4.2.1 Specific disease or medical problem for your animals	0 1	1 2 3 4 5
B4.2. 2 Certain medical treatment or procedure for your animals	0 1	1 2 3 4 5
B4.2.3 screening	0 1	1 2 3 4 5
B4.2.4 Vaccinations	0 1	1 2 3 4 5
B4.2.5 Obtain information about health, illness,	0 1	1 2 3 4 5
B4.2.6 Obtain information about health promotion	0 1	1 2 3 4 5
B4.2.7 Obtain information about risks to health	0 1	1 2 3 4 5
B4.2.8 Visiting a veterinarian	0 1	1 2 3 4 5
B4.2.9 Diet, nutrition, vitamins, or nutritional supplements for animals	0 1	1 2 3 4 5
B4.2.10 Finding information on drugs or medication for your animals	0 1	1 2 3 4 5
B4.3 The environment	0 1	
B4.3.1 Use of Insecticide-Treated Net (ITN)	0 1	1 2 3 4 5
B4.3.2 Indoor Residual Spraying (IRS)	0 1	1 2 3 4 5
B4.3.3 Clear grasses and bushes around the home to prevent malaria	0 1	1 2 3 4 5
B4.3.4 reduction of mosquito breeding grounds	0 1	1 2 3 4 5
B4.3.5 Altering rivers to create more fast flowing water	0 1	1 2 3 4 5
B4.3.6 Installing and maintaining drains	0 1	1 2 3 4 5
B4.3.7 Removing pools of stagnant water	0 1	1 2 3 4 5
B4.3.8 Managing vegetation	0 1	1 2 3 4 5
B4.3.9 Environmental health hazards	0 1	1 2 3 4 5
B4.3.10 Obtaining information about environmental quality promotion and risks	0 1	

B.5 At which frequency and with who do you engage in health-related discussions

B5.1 Health related item discussed	B5.2 Frequency of engagement in discussion 1. Very frequently 2. frequently 3. Not at all 4. Very rare 5. Rarely 6. NA	B5.3 What prompted the discussion 1. Need to know 2. Part of medical treatment 3. Clear worries and doubts on diseases 4. Any other (specify) 5. I had developed symptoms 6. prevent from diseases 7. NA	B5.4 Who discussed with 1. Medical personnel 2. Veterinarian 3. Environmentalist 4. Family members 5. Neighbors 6. Political leaders 7. Religious leaders 8. Traditional healer 9. NA
Fitness	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
symptoms	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Screening	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Diagnosis	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
obtain information about health, illness	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
obtain information about health promotion	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
obtain information about risks to health	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Health care	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Diseases prevention	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Health promotion	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Specific disease or medical problem	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Certain medical treatment or procedure	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Diet, nutrition, vitamins, or nutritional supplements	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Exercise or fitness	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Prescription or over-the-counter drugs	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
A particular doctor or hospital	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Health insurance	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Alternative treatments or medicines	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Depression, anxiety, stress, or mental health issues	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Environmental health hazards	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Experimental treatments or medicines	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Immunizations or vaccinations	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Dental health information	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Medicare or Medicaid	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Sexual health information	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
How to quit smoking	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9
Problems with drugs or alcohol	1 2 3 4 5 6	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9

C: ACCESS TO HEALTH CARE FOR HUMANS AND ANIMALS

C1. How do you meet the costs for healthcare? (*Main source only*)

	1. From my salaries 2. Health insurance 3. Family members assistance 4. Selling livestock 5. Selling crops 6. Income from causal labouring 7. Assisted by employer 8. Any other (Specify)
Animals healthcare	1 2 3 4 5 6 7 8
Humanshealthcare	1 2 3 4 5 6 7 8

D: ACCESS TO GENERAL AND BASIC HEALTH INFORMATION

D1: Access to General and Basic Health Information for past 12 months (*Multiple responses allowed D1.1, D1.2,D1.3,D1.4,D1.7*)

Sources	D1.1 Access to a Source 0. No 1. Yes	D1.2 If yes, items/programs accessed ⁹ 1. Political and related issues 2. Sports and Entertainment 3. environment issues 4. health issues 5. academic 6. any other, specify 7. NA	D1.3 If No, why (barriers to seeking information) 1. Expensive to access 2. Not informative 3. No time 4. Not available 5. No reason 6. Don't have a TV 7. Don't have a decoder 8. Expensive to pay for the decoder 9. No interesting programs aired 10. Sources Self-efficacy 11. No Intentions to seek for information 12. No Reasons for seeking information 13. No skills to access (cognitive access) 14. NA	D1.4 Media/Website accessed in the past 1 week	D1.5 How often do you access 1. Daily 2. Weekly 3. Monthly 4. pressing news or information 5. I have money to buy/pay 6. I have time to read/watch/browse 7. NA
N ^o papers	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9 10 11 12 13 14		1 2 3 4 5 6 7
TV	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9 10 11 12 13 14		1 2 3 4 5 6 7
Radio	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9 10 11 12 13 14		1 2 3 4 5 6 7
Internet	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9 10 11 12 13 14		1 2 3 4 5 6 7

D1.6 Access to health related information in the last 12 month 0. No 1. Yes,	D1.7 If No, why 1. I don't need such information 2. information not available 3. Not comprehensible 4. Sources Self-efficacy 5. No Intentions to seek health information 6. No Reasons for seeking health information 7. Expensive to access 8. Not informative 9. No time 10. Not available 11. Don't have a TV 12. No skills to access (cognitive access) 13. NA	D1.8 Did you access health related information from the internet? 0. No 1. Yes	D1.9 Do you know any website(s) that provide(s) health information in Tanzania? (0=No,1=Yes, 2=NA)	D1.10 If yes, Mention
0 1	1 2 3 4 5 6 7 8 9 10 11 12 13	0 1	0 1 2	

⁹Listened, watched, read

Health information searching/seeking (Multiple responses allowed)

D1.11 Did you search for health information in the past 3 months? 0. No, 1. yes) <i>If No , go to D1.22</i>	D1.12 What were you searching for? 1. Fitness 2. symptom (a/h) 3. Screening (a/h) 4. obtain information about health, illness (a/h) 5. Diagnosis (a/h) 6. obtain information about health promotion (a/h) 7. obtain information about risks to health 8. Health care (a/h) 9. Diseases prevention (a/h) 10. Specific disease or medical problem (a/h) 11. Certain medical treatment or procedure (a/h) 12. Diet, nutrition, vitamins, or nutritional supplements (a/h) 13. Prescription or over-the-counter drugs (a/h) 14. A particular doctor/veterinarian or service hospital (a/h) 15. Health insurance 16. Alternative treatments or medicines (a/h) 17. Depression, anxiety, stress, or mental health issues 18. Environmental health hazards 19. Experimental treatments or medicines 20. Immunizations or vaccinations (a/h) 21. Dental health information 22. Medicare or Medicaid 23. Sexual health information 24. How to quit smoking 25. Problems with drugs or alcohol 26. NA	D1.13 Why did you search for that information? 1. Had health problem 2. My animals had health problem 3. Wanted to broaden knowledge on health 4. There was a health risk 5. stressed and uncertain about my health 6. Searching for prescriptions for my patients/client 7. interest in self-health management 8. Any other (specify) 9. NA	D1.14 Did you get what you were searching for? 0. No 1. Yes	D1.15 Why (barriers to seeking health information) 1. Not informative 2. No time 3. Not available 4. No reason 5. Don't have a TV 6. Don't have a decoder 7. No interesting health programs aired 8. Sources Self-efficacy 9. No Intentions to seek health information 10. No Reasons for seeking health information 11. No skills to access (cognitive access) 12. did not know where to get it 13. Expensive to access 14. Any other (specify) 15. NA
0 1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	1 2 3 4 5 6 7 8 9	0 1	1 2 3 4 5 6 7 8 9 10 11 12 13

D1.16 Do you think health and related information were adequately disseminated in the mass media and other sources in the last 3 months? (1=Not adequate at all, 2= Not adequate, 3= No opinion, 4=Adequate, 5= Very adequate)

D1.17 In your opinion, which information do you think were not adequately disseminated? Mention

D1.18 From which sources did you access the following Health information in the last 3 months?

CODE	Health Information	Source
		1. TV 2. Newspapers 3. Internet 4. Local health personnel 5. Radio 6. Public gatherings 7. Health centres/hospitals

		8. Local government authorities 9. Political leaders 10. Social networks
1.	Health care (a/h)	1 2 3 4 5 6 7 8 9 10
2.	Diseases prevention (a/h)	1 2 3 4 5 6 7 8 9 10
3.	Health promotion (a/h)	1 2 3 4 5 6 7 8 9 10
4.	Specific disease or medical problem (a/h)	1 2 3 4 5 6 7 8 9 10
5.	Certain medical treatment or procedure (a/h)	1 2 3 4 5 6 7 8 9 10
6.	Diet, nutrition, vitamins, or nutritional supplements (a/h)	1 2 3 4 5 6 7 8 9 10
7.	Exercise or fitness	1 2 3 4 5 6 7 8 9 10
8.	Prescription or over-the-counter drugs	1 2 3 4 5 6 7 8 9 10
9.	A particular doctor/veterinarian, service or hospital (a/h)	1 2 3 4 5 6 7 8 9 10
10.	Health insurance	1 2 3 4 5 6 7 8 9 10
11.	Alternative treatments or medicines (a/h)	1 2 3 4 5 6 7 8 9 10
12.	Depression, anxiety, stress, or mental health issues	1 2 3 4 5 6 7 8 9 10
13.	Environmental health hazards	1 2 3 4 5 6 7 8 9 10
14.	Experimental treatments or medicines	1 2 3 4 5 6 7 8 9 10
15.	Immunizations or vaccinations (a/h)	1 2 3 4 5 6 7 8 9 10
16.	Dental health information	1 2 3 4 5 6 7 8 9 10
17.	Medicare or Medicaid	1 2 3 4 5 6 7 8 9 10
18.	Sexual health information	1 2 3 4 5 6 7 8 9 10
19.	How to quit smoking	1 2 3 4 5 6 7 8 9 10
20.	Problems with drugs or alcohol	1 2 3 4 5 6 7 8 9 10

D1.19 Would you kindly rank the following sources of health information, according to your preference for you and your household members? (Circle the applicable)

D1.19.1 Source of information	D1.19.2 Rank 1. Not preferred at all 2. Not preferred 3. No idea 4. Very much preferred 5. Preferred 6. NA	D1.19.3 Reason for using the source	D1.19.4 Reasons for not using the source
TV	1 2 3 4 5		
Medical personnel	1 2 3 4 5		
Newspaper	1 2 3 4 5		
Radio	1 2 3 4 5		
Internet	1 2 3 4 5		
Public gatherings	1 2 3 4 5		
Health centres/hospitals	1 2 3 4 5		
LGAs	1 2 3 4 5		
Political leaders	1 2 3 4 5		

D1.20 How do you perceive the costs involved in accessing and how simplified it is for lay person's consumption the following sources of information?

Source	Perceived costs 1. Very expensive 2. Expensive 3. I have no idea 4. Very cheap 5. Cheap 6. NA	How simplified for lay persons consumption 1. Not simplified at all 2. Not simplified 3. No opinion 4. Completely Simplified 5. Simplified 6. NA	Perceived Adequacy of dissemination 1. Not adequate at all 2. Not adequate 3. No opinion 4. Adequate 5. Very adequate 6. NA
TV	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Newspapers	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Internet	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Local health personnel	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Radio	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Public gatherings	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Health centres/hospitals	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
LGAs	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Political leaders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Religious leaders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
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D1.21 In a scale of 1-5 (where 1 is "Never" and 5 is "Always") which one of the following resources and channels of health information do you seek health information?

Health information channels and resources

Channels and resources	Always	Often	Sometimes	Never	No response	NA
Print resources						
Book						
Newspapers						
Journal						
Brochure						
Non-print resources						
TV						
Radio						
Internet						
Health specialists						
Attending seminars and congresses						
Discussions with health professionals						
Interpersonal sources						
Discussions with family, relatives or close friends						
Others						
Public gatherings						
Promotional forum						
Local Government						
Political leaders						
Mosque/churches						

D1.22 Social network – Please tell me about your social contacts

	Outside of your own household, is there any one you go to most frequently for advice? 0. NO 1. Yes	Relation 1. Relative 2. Friend 3. Village elder 4. Local 5. government official 6. Traditional 7. healer 8. Health worker 9. Leader of community group 10. School teacher 11. NA	Is this person of the same religion as you? 0. No 1. Yes 2. I don't know 3. NA	Does this person belong to the same tribe as you? 0. No 1. Yes 2. I don't know 3. NA	Does this person belong to the same political party as you? 0. No 1. Yes 2. I don't know 3. NA
Economic matters	0 1	1 2 3 4 5 6 7 8 9 10 11	0 1 2 3	0 1 2 3	0 1 2 3
Health matters	0 1	1 2 3 4 5 6 7 8 9 10 11	0 1 2 3	0 1 2 3	0 1 2 3
Social matters	0 1	1 2 3 4 5 6 7 8 9 10 11	0 1 2 3	0 1 2 3	0 1 2 3

E: APPLICATION OF INFORMATION OBTAINED (Skip this if No to D1.11)

General use/application of health information on decisions related to health

E1 Do you apply the information accessed in everyday health decisions? (0=No, 1=Yes, 2=Sometimes, 3=NA)

E2 If yes, how do you use/apply health information accessed to improve your health?

E3 If No, why don't you apply that information?

F: Impact of Health Information on Health Care and Health Behaviour, Health Care Seeking and Health Literacy
Say to what extent health information you lastly accessed affected the following on 5 point self reporting scale (*Skip this if No to D1.11*)

	Perceived effect of information accessed 1. No impact at all 2. No impact 3. I have no opinion 4. Minor impact 5. Major impact 6. NA
sharing feelings of concern with their veterinarian	1 2 3 4 5 6
Affected a decision about whether to see a veterinarian.	1 2 3 4 5 6
Changed the way they think about feeds for their animals	1 2 3 4 5 6
Lead them to ask a veterinarian new questions or to get a second opinion from another veterinarian	1 2 3 4 5 6
Changed their overall approach to maintaining health or the health of their animals	1 2 3 4 5 6
Affected a decision about how to treat an illness or condition for their animals.	1 2 3 4 5 6
sharing feelings of concern with their doctors	1 2 3 4 5 6
Affected a decision about whether to see a doctor.	1 2 3 4 5 6
Changed the way they cope with a chronic condition or manage pain	1 2 3 4 5 6
Changed the way they think about diet, exercise, or stress management.	1 2 3 4 5 6
Lead them to ask a doctor new questions or to get a second opinion from another doctor.	1 2 3 4 5 6
Changed their overall approach to maintaining health or the health of someone they help take care of	1 2 3 4 5 6
Affected a decision about how to treat an illness or condition.	1 2 3 4 5 6
Your sanitary behaviours	1 2 3 4 5 6
Health information seeking behaviour	1 2 3 4 5 6
Choose of health care services	1 2 3 4 5 6
Immunizations or vaccinations	1 2 3 4 5 6
Screening	1 2 3 4 5 6
Health care	1 2 3 4 5 6
Diseases prevention	1 2 3 4 5 6
Environmental health hazard	1 2 3 4 5 6
Alternative treatments or medicines	1 2 3 4 5 6
Preparation and consumption of livestock products	1 2 3 4 5 6
Use of latrines	1 2 3 4 5 6
Decision on Where to purchase livestock products	1 2 3 4 5 6
How to handle your animals (i.e where to keep them, washing hands after attending them)	1 2 3 4 5 6
Use of insecticides and Indoor Residual Spraying (IRS)	1 2 3 4 5 6
Removing pools of stagnant water	1 2 3 4 5 6
Use of shared water sources between animals and humans	1 2 3 4 5 6

G: HUMANS, ANIMALS AND THE ENVIRONMENT: THE INTERACTIONS

G1 Do you keep animals? (0=No, 1=Yes) (*If No , go to G3*)

G5 Have natural factors ever been responsible for causing human ill-health conditions in the village? (0. No, 1=Yes, 3=I don't know)

G6 What environmental factors do you think are responsible for causing which human ill-health conditions in the village?

G6.1 Environmental factors	G6.2 Human ill-health conditions associated with environmental factors	G6.3 Season when the ill-health conditions are commonest

G7 Have natural factors ever been responsible for causing livestock ill-health conditions in the village? (0. No, 1=Yes, 3=I don't know)

G14 Would you kindly state, according to your views, the extents to which each of the statements below is applicable?

Statements for evaluation of the Island biogeography and the parasite-stress theory	1*	2	3	4	5
1. Wild animals are the main source of disease-causing micro-organisms to livestock in the village					
2. Livestock are the main source of disease-causing micro-organisms to wild animals					
3. Wild animals are the main source of disease-causing micro-organisms to humans in the village					
4. Humans are the main source of disease-causing micro-organisms to wild animals					
5. Livestock are the main source of disease-causing micro-organisms to humans in the village					
6. Humans are the main source of disease-causing micro-organisms to livestock in the village					
7. Wild animals are the main source of disease-causing micro-organisms to other wild animals					
8. Livestock are the main source of disease-causing micro-organisms to other livestock					
9. Humans are the main source of disease-causing micro-organisms to other humans					
10. Environmental factors are the main source of disease-causing micro-organisms to wild animals					
11. Environmental factors are the main source of disease-causing micro-organisms to livestock					
12. Environmental factors are the main source of disease-causing micro-organisms to humans					

* 1. Does never apply; 2. Hardly applies; 3. Undecided; 4. Applies; 5. Applies to a large extent

H: PRIOR KNOWLEDGE (Health, Diseases and Environmental Management Practices)

H1 Mention diseases that you know which are associated with the interface of humans, animals and the environment which are occurring in your area plus their causes, symptoms and treatments (Circle the diseases mentioned)

H1.1 Diseases	H1.2 Symptoms	H1.3 Causes	H1.4 Treatments
	1. Fever 2. Rash 3. Cough that lasts longer than 3 weeks 4. Coughing up blood 5. Severe headache 6. Nausea 7. Weight loss 8. Fever without clear cause that lasts more than 7 days 9. Chest pain 10. Shortness of breath 11. Ongoing fatigue 12. Do not know	1. Tsetse flies bite 2. Dog bites 3. Mosquitoes bites 4. Drinking raw milk, meat and blood 5. Unsanitary environments 6. Inadequate meat inspection 7. Through handshakes 8. Through the air when a person with TB coughs or sneezes 9. Through sharing dishes 10. Through eating from the same plate 11. Through touching items in public places (doorknobs, handles in transportation, etc.)	1. Traditional healer 2. Vaccination of cattle against diseases 3. Promotion of good husbandry practices 4. Community orientated bio-sanitation 5. Use medicines 6. Drink a lot of water 7. Get a lot of rest 8. Buy medicines from pharmacy 9. Any other (specify)
Malaria	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Diarrhea	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Schistosomiasis	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Rabies	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Brucellosis (Human)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Brucellosis (Animals)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Tuberculosis	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Worms	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Trypanosomosis,	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Foot and Mouth Disease	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Contagious Bovine Pleuropneumonia (CBPP)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Severe Acute Respiratory	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9

Syndrome (SARS),			
Tick-borne diseases	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Anthrax	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Canine distemper epidemics	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Cryptosporidiosis in animals and humans	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Porcine	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Bovine cysticercosis	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9
Taeniasis	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9

H2 Where did you first learn about the following diseases? (Check all that are mentioned.)

	H2.1 Diseases	H2.2 Source of information
		1. Newspapers and magazines 2. Radio 3. TV 4. Billboards 5. Brochures, posters and other printed materials 6. Health workers 7. Family, friends, neighbors and colleagues 8. Religious leaders 9. Teachers 10. Other (please explain):
1.	Malaria	1 2 3 4 5 6 7 8 9 10
2.	Diarrhea	1 2 3 4 5 6 7 8 9 10
3.	Schistomiasis	1 2 3 4 5 6 7 8 9 10
4.	Rabies	1 2 3 4 5 6 7 8 9 10
5.	Brucellosis (Human)	1 2 3 4 5 6 7 8 9 10
6.	Brucellosis (Animals)	1 2 3 4 5 6 7 8 9 10
7.	Tuberculosis	1 2 3 4 5 6 7 8 9 10
8.	Worms	1 2 3 4 5 6 7 8 9 10
9.	Trypanosomosis,	1 2 3 4 5 6 7 8 9 10
10.	Foot and Mouth Disease	1 2 3 4 5 6 7 8 9 10
11.	Contagious Bovine Pleuropneumonia (CBPP)	1 2 3 4 5 6 7 8 9 10
12.	Severe Acute Respiratory Syndrome (SARS),	1 2 3 4 5 6 7 8 9 10
13.	Tick-borne diseases	1 2 3 4 5 6 7 8 9 10
14.	Anthrax	1 2 3 4 5 6 7 8 9 10
15.	Canine distemper epidemics	1 2 3 4 5 6 7 8 9 10
16.	Cryptosporidiosis in animals and humans	1 2 3 4 5 6 7 8 9 10
17.	Porcine	1 2 3 4 5 6 7 8 9 10
18.	Bovine cysticercosis	1 2 3 4 5 6 7 8 9 10
19.	Taeniasis	1 2 3 4 5 6 7 8 9 10

J: KNOWLEDGE, ATTITUDES AND PRACTICES (KAPs)

J1 PERCEPTIONS OF PEOPLE ON HL, HB AND HCSB AND ITS LINKAGES UNDER OHA

	Attitudinal statement	1=Strongly disagree, 2=Disagree, 3=Undecided 4=Agree 5=Strongly agree
1.	The animal health service delivery system is undeveloped mainly in rural areas	1 2 3 4 5
2.	Handling wildlife trophies without veterinary clearance can cause harm to our health	1 2 3 4 5
3.	Health information for both humans and animals i.e. diseases their causes, symptoms and treatments contributes to better health for both humans and animals	1 2 3 4 5
4.	Due to rudimentary nature of animal health delivery farmers treat cases themselves	1 2 3 4 5
5.	Reducing mosquito breeding grounds is not a desirable environmental management practice	1 2 3 4 5
6.	Veterinarians, human health and environmental professionals can work together to improve helth of humans , animals and the environment	1 2 3 4 5
7.	Small ruminants and pigs are slaughtered in the backyards without or with minimal inspection.	1 2 3 4 5
8.	Animal keepers in many rural communities have maintained a close association with animals	1 2 3 4 5

9.	Sharing water sources with animals is detrimental to our health	1 2 3 4 5
10.	Health care seeking is influenced by both health literacy and health behaviour	1 2 3 4 5
11.	Low-literacy affect non-compliance with the drugs recommended	1 2 3 4 5
12.	Most of the producers or animal keepers are rural based and lack formal education	1 2 3 4 5
13.	Most of the producers or animal keepers have some valuable indigenous knowledge,	1 2 3 4 5
14.	Health literate person can give full information about the history of a health problem to doctor	1 2 3 4 5
15.	Choice of a source of healthcare is significantly influenced by SES	1 2 3 4 5
16.	Low Health literacy can lead to frequent hospitalization	1 2 3 4 5
17.	Limited health literacy has effects on health and health care costs	1 2 3 4 5
18.	Health care is an important determinant of health	1 2 3 4 5
19.	Use of Insecticide-Treated Net (ITN) is a panacea to malaria	1 2 3 4 5
20.	Most of the producers or animal keepers possess adequate knowledge about the whole range of diseases and their treatment and control strategies.	1 2 3 4 5
21.	Interaction of wild animals and livestock i.e. use of the same water sources is harmless to health	1 2 3 4 5
22.	Limited HL has no any effect on healthcare seeking behaviour	1 2 3 4 5
23.	Choice of health care service do not rely on the perceived affordability of a particular service	1 2 3 4 5
24.	Consuming raw meat and blood has positive health consequences to humans	1 2 3 4 5
25.	Health impairing behaviours are mostly commonly experienced among the low SES individuals	1 2 3 4 5
26.	Health enhancing behaviours are costly to maintain	1 2 3 4 5
27.	Unpasteurized milk tastes sweet than pasteurized one	1 2 3 4 5
28.	Health Behaviours have indirect impact on health	1 2 3 4 5
29.	Poor health literacy has no association with health problems	1 2 3 4 5
30.	Undercooked meat has high nutritive value	1 2 3 4 5
31.	Health literate persons have problem with the usage of drugs given to them from hospital	1 2 3 4 5
32.	Maintaining good health requires efforts among human medicine professionals only	1 2 3 4 5
33.	It is difficult to understand the terminologies used by the doctor if one is health illiterate	1 2 3 4 5
34.	Eating habits with special reference to preference for consumption of raw or undercooked meat; raw blood and milk can enable us obtain high nutritive values	1 2 3 4 5
35.	in the rural areas, proper meat inspection is adequately carried out than in the urban areas	1 2 3 4 5
36.	People sharing houses with animals has no harms and is encourage for the welfare of the livestock	1 2 3 4 5
37.	Small ruminants and pigs meat do not require inspection before consumed	1 2 3 4 5
38.	Lifestyles are not important determinants of health.	1 2 3 4 5

K: INDIVIDUALS BEHAVIOURS IN THE HUMANS, ANIMALS AND THE ENVIRONMENT INTERFACE

K1 Communication with health care providers in past 12 months

	K1.1.1 Communication with health care providers in past 12 months 0. No 1. Yes	K1.2 How often do you communicate? 1. Everyday 2. Weekly 3. Monthly 4. One a year 5. Need arises 6. I don't communicate 7. NA	K1.3 Purpose of communication 1. Attending to medication 2. Information on diseases 3. Screening for diseases 4. Vaccination 5. NA 6. Any other (Specify)	K1.4 Accomplishment of your purpose 1. Very much 2. Much 3. No idea 4. Not accomplished 5. Not at all accomplished 6. NA
Medical Professionals	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6	1 2 3 4 5 6
Veterinarians	0 1	1 2 3 4 5 6 7	1 2 3 4 5 6	1 2 3 4 5 6

K2 Interactions between the Medical Personnel/Veterinarians and the Community Members
K2.1 In the last 12 months did you visit/ were you visited by any of the following?

	K2.1.1 Visits 0. No 1. Yes	K2.1.2 Purpose of visit 1. Attending to animals 2. Informing us on environmental aspects 3. Following up quarantine issues 4. Medical treatments 5. Other (Specify)	K2.1.3 How do you perceive your communication (as a patient or client) with health care providers? 1=very good, 2=good, 3=no idea, 4=poor, 5=very poor
Medical Personnel	0 1	1 2 3 4 5	1 2 3 4 5
Veterinarians	0 1	1 2 3 4 5	1 2 3 4 5
Environmentalist	0 1	1 2 3 4 5	1 2 3 4 5

K2.2 Interactions				
K2.2.1 Guiding on the ways individuals and communities can be engaged and encouraged to change health behaviours 0. No 1. Yes 2. I don't know	K2.2.2 If yes, how? Mention	K2.2.3 Do health care practitioners discuss with patients issues to do with lifestyle or behaviour? 0. No 1. Yes 2. Not sure	K2.2.4 Have you ever discussed such issues with health care practitioner? 0. No 1. Yes	K2.2.5 What did you discuss, mention?
0 1 2		0 1 2	0 1	

K3 Provider-Patient interaction

Source of healthcare	Level of interaction (Use 1,2 3,4,5)				
	No interaction at all	No interaction	No opinion	Interactive	Very interactive
K3.1 Traditional healer					
K3.2 Medical personnel					
K3.3 Pharmacy					
K3.4 Self-treatment					
K3.5 No treatment					

K4 Screening (If No to K4.1 Go to K5)

	K4.1 Did you screen for diseases in the last 12 months 0. No 1. Yes If No, why?	K4.2 How frequently do you screen? 1. Everyday 2. Weekly 3. Monthly 4. One a year 5. Need arises 6. NA	K4.3 When did you lastly do that?	K4.4 Which diseases did you screen?	K4.5 Why did you screen? 1. Illness conditions 2. Regular schedule 3. Advised by medical personnel 4. Advised by veterinarian 5. Advised by family members 6. Advised by a school teacher 7. Any other 8. NA
For yourself	0 1	1 2 3 4 5 6			1 2 3 4 5 6 7
For your animals	0 1	1 2 3 4 5 6			1 2 3 4 5 6 7

K8 Are there any ways that humans, animals or the environmental health can be affected from the listed human habits/practices?

S. No	K8.1 Habits/practices	K8.2 Have you ever in the past 3 months 1. Yes 0. No	K8.3 How frequently? 1. Very frequently 2. Frequently 3. I don't recall 4. Not at all 5. Rarely	K8.4 Any ways that humans, animals or the environmental health can be affected from the listed humans habits/practices? How? 0. NO 1. Yes 2. I don't know
1.	Consuming meat from naturally died animals	0 1	1 2 3 4 5	0 1 2
2.	Consuming raw blood	0 1	1 2 3 4 5	0 1 2

3.	Consuming raw meat	0 1	1 2 3 4 5	0 1 2
4.	Consuming raw milk	0 1	1 2 3 4 5	0 1 2
5.	consumption of home-made milk product	0 1	1 2 3 4 5	0 1 2
6.	Failure to Use latrines	0 1	1 2 3 4 5	0 1 2
7.	People sharing houses with their animals (living in the same house)	0 1	1 2 3 4 5	0 1 2
8.	Purchasing meat from reliable outlets (assuring meat to be inspected)	0 1	1 2 3 4 5	0 1 2
9.	Poor Room ventilation	0 1	1 2 3 4 5	0 1 2
10.	Sharing of water sources between people and cattle	0 1	1 2 3 4 5	0 1 2
11.	Slaughtering Small ruminants and pigs in the backyards without or with minimal inspection	0 1	1 2 3 4 5	0 1 2
12.	Handling trophies without veterinary clearance	0 1	1 2 3 4 5	0 1 2
13.	Failure to wash hands after attending animals	0 1	1 2 3 4 5	0 1 2
14.	Handling animals i.e assisting during animal delivery (birth) without Wearing gloves	0 1	1 2 3 4 5	0 1 2
15.	Failure to Wash hands after visiting lavatory	0 1	1 2 3 4 5	0 1 2
16.	Not wearing a face mask attending an animal who is suffering from respiratory disease	0 1	1 2 3 4 5	0 1 2
17.	Reluctance to destroy animals unfit (hopeless) for consumption and such animals often slaughtered for human consumption	0 1	1 2 3 4 5	0 1 2
18.	Failure to observe Hygienic measure to keep the household free of rats, snakes, and mosquitoes and tsetse flies	0 1	1 2 3 4 5	0 1 2
19.	Failure to seek Health information for both humans and animals i.e. diseases their causes, symptoms and treatments	0 1	1 2 3 4 5	0 1 2
20.	Failure to Use of Insecticide-Treated Net (ITN)	0 1	1 2 3 4 5	0 1 2
21.	Failure to effect Indoor Residual Spraying (IRS)	0 1	1 2 3 4 5	0 1 2
22.	Failure to Clear grasses and bushes around the home to prevent malaria	0 1	1 2 3 4 5	0 1 2
23.	Failure to reduce mosquito breeding grounds	0 1	1 2 3 4 5	0 1 2
24.	Altering rivers to create more fast flowing water	0 1	1 2 3 4 5	0 1 2
25.	Failure to Install and maintain drains	0 1	1 2 3 4 5	0 1 2
26.	Failure to Remove pools of stagnant water	0 1	1 2 3 4 5	0 1 2
27.	Failure to Manage vegetation	0 1	1 2 3 4 5	0 1 2
28.	Irrigating intermittently	0 1	1 2 3 4 5	0 1 2
29.	Overgrazing	0 1	1 2 3 4 5	0 1 2
30.	Interaction of Wild animals and livestock i.e use of the same water sources	0 1	1 2 3 4 5	0 1 2
31.	Consuming game meat without veterinary clearance	0 1	1 2 3 4 5	0 1 2
32.	handling wildlife trophies without veterinary clearance	0 1	1 2 3 4 5	0 1 2
33.	consuming or touching anthrax-infected meat	0 1	1 2 3 4 5	0 1 2
34.	Preferring drinking sour milk prepared without boiling	0 1	1 2 3 4 5	0 1 2
35.	Use of shared water sources between animals and humans	0 1	1 2 3 4 5	0 1 2
36.	Handling aborted farm animals calves or placentas	0 1	1 2 3 4 5	0 1 2

L: HEALTH CARE SEEKING BEHAVIOUR

L1 Healthcare services available in your area <i>(Multiple responses allowed)</i> - Private clinic - Government clinic or hospital - Traditional or homeopathic healer - Clinic run by an nongovernmental organization or church - Pharmacies - Other:	L2 What is your preference in terms of healthcare services seeking (Multiple responses allowed) - traditional healers, - self-treatment, - pharmacies - no treatment - hospital	L3 How often do you generally seek health care - Twice a year or more - Once per year - Less than once a year but at least twice in past 5 years - Once in past 5 years - Never in past 5 years - When I feel sick - Other:
1 2 3 4 5 6	1 2 3 4 5	1 2 3 4 5 6 7

L4 In your opinion, how serious the following diseases are in your area?

L4.1 Diseases	L4.2 How serious is a disease in your area? 1. Very serious 2. Somewhat serious 3. I have no idea 4. Not very serious 5. Not Serious	L4.3 health care treatment preference for the listed below illnesses 1. Traditional healer 2. Medical personnel 3. Pharmacy 4. Self-treatment 5. No treatment
Malaria	1 2 3 4 5	1 2 3 4 5
Diarrhea	1 2 3 4 5	1 2 3 4 5
Typhoid	1 2 3 4 5	1 2 3 4 5
Salmonellosis	1 2 3 4 5	1 2 3 4 5
Rabies	1 2 3 4 5	1 2 3 4 5
RFV	1 2 3 4 5	1 2 3 4 5
African Swine Fever	1 2 3 4 5	1 2 3 4 5
Anthrax	1 2 3 4 5	1 2 3 4 5
Bovine Tb	1 2 3 4 5	1 2 3 4 5
Brucellosis	1 2 3 4 5	1 2 3 4 5
Fasciolosis	1 2 3 4 5	1 2 3 4 5
Cystersecosis	1 2 3 4 5	1 2 3 4 5
Toxocariosis	1 2 3 4 5	1 2 3 4 5
Trypanosomiasis	1 2 3 4 5	1 2 3 4 5

L5 Do you believe in the effectiveness of the human health services provided in the nearest health facility?
(1=No belief, 2=Low belief, 3=I have no idea, 4=Moderate belief, 5=High belief)

If you have no belief in the services, to what extent is each of the following factors applicable?

Factors for low or no belief in the services (L5.1-5.5)	Extent of applicability 1. Not at all 2. Not 3. No idea 4. Applies 5. Applies a lot
1. Household members are susceptible to common infectious diseases for which the health services are provided in the health facilities	1 2 3 4 5
2. The services are concerned about household members' health matters	1 2 3 4 5
3. Common human infectious disease are severe	1 2 3 4 5
4. It is difficult to go there for health services because they are not there	1 2 3 4 5
5. It is difficult to go there for health services because of feeling ashamed of the providers of the services and other people	1 2 3 4 5

L6 To what extent can each of the following items prevent you from going for modern health services for yourself and for your household members?

Items which may prevent the respondent from going for modern human health services	Extent to which the aspects can prevent one from going for modern health services (1 = Cannot at all, 2 = Cannot, 3 = Undecided, 4 = Can to a small extent, 5 = Can to a large extent)				
1. Lack of cash to pay for health services					
2. Lack of information about health services					
3. Belief in traditional healing being better than modern medicine					
4. Being convinced by relatives and friends about human health services					
5. Being not ready to spend many hours waiting for services					

L7 Would you kindly rank the following sources of healthcare, according to your preference for you and your household members?

Source of service	Rank	Reason for using the source	Reasons for not using the source
Traditional healer			
Medical personnel			

Pharmacy			
Self-treatment			
No treatment			

L8 To what extent are the human health services affordable at the modern health facility where you mostly get services?

Level of affordability	Explanation on the cheapness or expensiveness of the human health services
1.Cheap	
2.Affordable	
3.Expensive but affordable	
4.Too expensive to afford	

L9 To what extent are the health services acceptable at the modern health facility where you mostly go?

Level of acceptability	Explanation of the acceptability
1.Not acceptable at all	
2.Not acceptable	
3.I have no opinion about this	
4.Acceptable	
5.Very acceptable	

L10 What are the factors affecting delivery of human health services in your areas?

.....

L11 Would you kindly explain the extent to which your decision to seek modern health care (for yourself and for your household members) is based on your own ideas or on ideas of relatives and friends?

Statements about dependence on own ideas or on relatives'/friends' ideas about where to seek human health care	(1=Not at all, 2=Not, 3=Undecided, 4=To a small extent, 5=To a large extent)
1. Cannot go or take a household member to hospital if not advised by relatives and friends	
2. Must go or take household members to a source of healthcare advised by relatives and/or friends	
3. Relatives and friends have more reliable information about the best sources of health care for various human diseases	
4. Government advertisements about human health services provided are deceitful	
5. Advertisements about human health services provided by private operators are deceitful	
6. If one violates relatives' or friends' advice about where to go for treatment one isn't cured	
7. It is ridiculous to sell assets including livestock to get cash for human health care services	

L12 Do you believe in the effectiveness of the livestock health services provided in the nearest livestock health facility where you normally get health services for your livestock? (1=No belief, 2=Low belief, 3=Moderate belief, 4=High belief)

L13 If you have no or have low belief in the livestock health services, to what extent does each of the following factors explain your low or lack of belief?

Factors for low or no belief in livestock health services for livestock	Level of perception (1=Not at all, 2=Not, 3=No idea, 4=Applies, 5=Applies a lot)				
	1	2	3	4	5
1. Perception of the extent to which the household's livestock are susceptible to common infectious diseases for which the health services are provided					
2. Readiness to be concerned about household's livestock health matters					
3. Perception of the extent to which common livestock infectious diseases are severe					
4. Perceived benefits of preventive or therapeutic health practices for household's livestock					
5. Perceived material and psychological barriers with regard to sources of preventive and therapeutic					

livestock health care for household's livestock					
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L14 Would you kindly rank the following sources of health care, according to your preference for you and for your household members?

Source of service	Rank	Explanation
Traditional healer		Reason for the rank: Enabling factors: Constraints:
Medical personnel		Reason for the rank: Enabling factors: Constraints:
Pharmacy		Reason for the rank: Enabling factors: Constraints:
Self-treatment		Reason for the rank: Enabling factors: Constraints:
No treatment		Reason for the rank: Enabling factors: Constraints:

L15 Would you kindly strongly disagree, disagree, agree or strongly agree with each of the following statements to reflect your attitude towards using modern health facilities for humans?

Attitudinal statements about using modern health facilities	Levels of agreement and disagreement 1. Strongly disagree 2. Disagree 3. Undecided 4. Agree 5. Strongly agree
1. No need of going to hospital because there are no medicines	1 2 3 4 5
2. No need of going to hospital because traditional healers treat better	1 2 3 4 5
3. Hospitals charge too much money	1 2 3 4 5
4. Common human diseases in the village are not very serious	1 2 3 4 5
5. No need of going to hospital because there are poor facilities	1 2 3 4 5
6. Hospitals are too far from home	1 2 3 4 5
7. It is important to go to hospital to get the correct diagnosis to know which medicines to use	1 2 3 4 5
8. Hospitals provide scientific treatment unlike traditional healers	1 2 3 4 5
9. It is not good to go to traditional healers, although their charges are low and can be paid in kind	1 2 3 4 5
10. Most diseases are cured by modern medical personnel, not by traditional healers	1 2 3 4 5
11. Traditional healers are not good at diagnosing diseases	1 2 3 4 5
12. Traditional healers claim to know even human health problems which they don't know about	1 2 3 4 5

If you take any of the following practice/ actions/ decisions will the majority of community members have a positive view of that practice?

	Community members views 1. Very Positive view, 2. Positive view 3. I have no idea 4. Very Negative view 5. Negative view	Why? Give brief explanation
If you go (or take your household member) to public hospital	1 2 3 4 5	
If you go (or take your household member) to private hospital	1 2 3 4 5	
If you go (or take your household member) to Traditional healer	1 2 3 4 5	
If you go (or take your household member) to visit Medical personnel at his/her home	1 2 3 4 5	
If you go (or take your household member) to Pharmacy without screening/diagnosis	1 2 3 4 5	
If you (or your household member) opt for Self-treatment	1 2 3 4 5	

If you (or your household member) opt for No treatment	1 2 3 4 5	
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M: Health and Politics

M1 Do you think that medical practitioners are working more closely with the local authority and local communities on health related aspects? 0. No (h/v) 1. Yes (h/v) 2. I don't know	M2 Are there any benefit of having LGAs and Medical & Veterinarians working together? 0. No (h/v) 1. Yes (h/v) 2. I don't know	M3 What do you think are the benefits (Mention)
0 1 2	0 1 2	

M4 Do you think the politicians are aware of the impacts of infectious diseases on the society, economy and even the political systems? (1=Yes, 2=No, 3=I don't know)

M5 Do you think politicians are interested parties or they display levels of commitment on the issues related to health?

M6 If they are interested parties, explain how

.....
.....
.....

M7 If they are displaying commitment, explain how

.....
.....

M8 Levels of commitment on issues related to health

	levels of commitment on the issues related to health 1. Very high 2. High 3. Not aware 4. Very low 5. Low	Levels of commitment on Advocating and campaigning around on the public health issues in the past 3 months? 1. Very high 2. High 3. Not aware 4. Very low 5. Low	Which specific public health issues did they advocate and campaign in the past 3 months? 1. health promotion, 2. diseases prevention and health care 3. meat inspection , livestock feeding practices , 4. water sources handling 5. Human –wild animals-livestock interactions and its consequences on health 6. Policies and by laws at the local level affect individual and population health 7. addressing the problems of relatively poor health among deprived sections of society 8. Issuing directives and by laws Imposing Restrictions i.e quarantines, on health impairing behaviours 9. Promoting health enhancing behaviours 10. Health information needs and seeking aspects 11. Any other (specify)
Political leaders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6 7 8 9 10 11
Religious leaders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6 7 8 9 10 11
Health committees	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6 7 8 9 10 11
LGAs	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6 7 8 9 10 11
School teachers	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5 6 7 8 9 10 11

M9 Is there any role played by political, religious leaders and LGAs towards health care, diseases prevention and health promotion

	any role played 0. No 1. Yes 2. I don't know	Roles played (Mention)	If yes, clarify
Local councilor	0 1 2		
Member of Parliament	0 1 2		
Village Chairperson	0 1 2		
Sheikh/Imam	0 1 2		
Pastor/	0 1 2		
School teachers	0 1 2		

M10 Did the political posts aspirants in the 2015 General Elections address health related issues?

0. NO , 1. Yes , 2. I don't know

M11 Which can determine the chance for a politician to be voted for in your area? (Multiple responses allowed)

1. If he campaigns and advocates for health promotion, diseases prevention and health care
2. If he campaigns and advocates for Land access and use issues
3. If he campaigns and advocates for Education issues
4. If he campaigns and advocates for Water resources handling
5. If he campaigns and advocates for Women's rights
6. If he campaigns and advocates for Livestock feeding practices
7. If he campaigns against Human –wild animals-livestock interactions and its consequences on health
8. None of the above
9. I don't know

M12 Are there any policies (or directives) and by laws at the local level affecting individual and population health.

(0=No, 1. =Yes 2=I don't know)

M13 Are there policies which are dis/encouraging certain health impairing or enhancing behaviours?

(0. =No 1. =Yes 2=I don't know)

M14 Do you think community involvement in creating public policy or by laws in health is vital? (0- No, 1-Yes , 3-I don't know)

M15 Which of these ways that people have you ever used to get involved in policy or bylaws formulation?

1. Speak with Municipal/District Council members, as well as officials on issues related to enacting health policy legislation.
 2. Join a citizen advocacy group that focuses on policy changes to improve health.
 3. Vote for candidates who make community health and health care a priority
 4. Discussing such issues in village or streets meetings
- Any other (Specify)

M16 The connections between Politics and health

	Statements	Levels of agreement and disagreement with the attitudinal statements (1=Strongly disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly)
1.	Health is political	1 2 3 4 5
2.	Health of the people is influenced far more by politics, power groups and by the distribution of land and wealth than it is by the prevention and treatment of disease	1 2 3 4 5
3.	Most affluent people are likely to be healthier than the less affluent	1 2 3 4 5
4.	Some social groups have more access to health care services than others	1 2 3 4 5
5.	To effectively address the problems of relatively poor health among deprived sections of society clearly should have a local dimension	1 2 3 4 5
6.	By laws can improve community health by promoting activities that support individual and community health efforts to improve the health of a large number of people	1 2 3 4 5
7.	Local laws influence the health status of people	1 2 3 4 5

8.	By laws can improve community health by reducing or eliminating unhealthy conditions	1 2 3 4 5
9.	local government activities that impact on the social determinants of health	1 2 3 4 5
10.	Health is politics simply because the failure to promote health enhancing behaviours is likely to put considerable strain on health and other socio-political-economic activities	1 2 3 4 5
11.	Traditionally, local government has played a crucial role in public health through its work on sewers and sanitation, food hygiene and environmental health	1 2 3 4 5
12.	Health status is contrary to the conception of politics (<i>who gets what when where and how</i>)	1 2 3 4 5
13.	Politics and public policy are the only determinants of health	1 2 3 4 5
14.	Community involvement in creating public health policy has insignificant impact towards health promotion	1 2 3 4 5
15.	The actions of local authorities have less influence on the health of their residents	1 2 3 4 5
16.	It is unfair for LGAs and political to talk of measures which try to help people eat sensibly and exercise appropriately	1 2 3 4 5
17.	There is no possibility for By laws to improve community health by reducing or eliminating unhealthy conditions	1 2 3 4 5
18.	A political position aspirant who campaigns and advocates for health promotion, diseases prevention and health care seem to lack focus	1 2 3 4 5
19.	Directives and by laws Imposing Restrictions i.e quarantines, on health impairing behaviours etc needs no inputs from the local community	1 2 3 4 5
20.	Political actions outweighs personal actions when it comes to health, promotion, diseases prevention and healthcare	1 2 3 4 5
21.	Political leaders have only interest without any commitment to health related aspects	1 2 3 4 5
22.	Health issues are strictly issues to do with medical doctors only hence there is no place for politics	1 2 3 4 5

M17 LGAs and policies plus by laws on OHA and health behaviours

Ways through which Local government can tackle public health through its capacity? (<i>Don't read, tick whichever is applicable</i>)	Are there by laws or local policies (even directives) on:-
- as an employer - through the services it commissions and delivers - through its regulatory powers - through community leadership - through its well-being power - Any other - I don't know	- Meat inspection - Human-animals interactions - village control issues of livestock feed in the area nearby the game reserve - Water sources use which for who when - Cooperation between the park and the society - where and when pasture and selling outlets businesses can be located, - environmental mgt practices near residential areas; - restrictions on certain health behaviours - encouraging certain health behaviours - treating certain disadvantaged groups (older people and women) towards accessing to health services - set and regulate standards on various aspects of life to better health - Any other - I don't know
1 2 3 4 5 6 7	1 2 3 4 5 6 7 8 9 10 11 12 13

N One Health Approach

N1 Are you Aware about OHA? 0. No 1. Yes If No go to N6	N2 If yes, What do you know about OHA?	N3 How do you perceive the technical collaboration between medical and veterinary doctors 1. Very good 2. Good 3. I don't know 4. Very poor 5. Poor
0 1		1 2 3 4 5

N4 Ways in which medical, para-medical, veterinary and para-veterinary personnel have collaborated within the previous 12	N5 Factors which may hinder collaboration between medical and veterinary officers -----
---	--

months 0=No, 1=Yes	-----
0 1	

N6 Do you think there is a need for technical collaboration between medical professionals, veterinary and environmentalists (0. No , 1. Yes , 2. I don't know	N7 If yes/No, why	N8 Are zoonotic diseases existent in your area? (0. No , 1. Yes , 2. I don't know	N9 If yes any collaboration o diagnosis of a zoonotic disease or a non-zoonotic disease 0=No, 1=Yes, 2=Dont know o disease surveillance exercise 0=No, 1=Yes, 2=Dont know
0 1 2		0 1 2	

N10 If the technical collaboration between medical veterinary doctors and environmentalists will be institutionalized would you support it? (0. No, 1. Yes, 2=I don't know)

N11 At the district, ward and village levels, some human health, animal health, and wildlife workers could be collaborating in some of the areas. Would you encourage such collaboration? 1=Yes, 2=No.

M12 One health is defined as the collaborative efforts of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, plants and our environment. To what extent would you support its practice? (1=Not at all, 2=Not, 3=No opinion, 4=Support, 5=Support to a large extent)

P GOVERNMENT AND NON GOVERNMENTAL INITIATIVES IN HEALTH ISSUES

	P1 Are you aware about any government initiatives 0. No 1. Yes	P2 Which institutions facilitate health initiatives in the society	P3 How do you perceive such initiatives 1. Very effective 2. Effective 3. I don't know 4. Very ineffective 5. Ineffective
In building public health capacity on human	0 1		1 2 3 4 5
Developing health literacy in human health	0 1		1 2 3 4 5
Empowering people to manage their health	0 1		1 2 3 4 5
In building public health capacity on livestock health	0 1		1 2 3 4 5
Developing health literacy under OHA	0 1		1 2 3 4 5
Empowering people to manage their animals health	0 1		1 2 3 4 5

P4 Has there been any of the following conducted in this area in the past 12 months?

	1. Diseases prevention 2. Health care 3. Health promotion	Offered by 1. School management 2. NGOs 3. Researchers 4. Village authorities 5. LGAs 6. MP	Did you benefit 0. No 1. Yes
Seminars/Workshop	1 2 3	1 2 3 4 5 6	0 1
Leaflets distribution	1 2 3	1 2 3 4 5 6	0 1
Public Announcements	1 2 3	1 2 3 4 5 6	0 1
Village/wards/street meetings	1 2 3	1 2 3 4 5 6	0 1
Visits by Health Officials from the wards	1 2 3	1 2 3 4 5 6	0 1
Parents meetings at school	1 2 3	1 2 3 4 5 6	0 1
Information dissemination on research	1 2 3	1 2 3 4 5 6	0 1
Political Campaigns	1 2 3	1 2 3 4 5 6	0 1

Appendix VI : HB Total scores (n=1440)

Scores	Frequency	Percent
12	36	2.5
13	36	2.5
14	36	2.5
16	36	2.5
19	144	10.0
20	144	10.0
21	72	5.0
22	36	2.5
23	36	2.5
24	114	7.9
25	210	14.6
26	72	5.0
27	180	12.5
28	108	7.5
29	108	7.5
30	72	5.0
Total	1440	100.0

Appendix VII: Scores on Attitudes towards HIBs (n=1440)

Scores	Frequency	Percent
103	72	5.0
105	72	5.0
106	72	5.0
107	36	2.5
108	36	2.5
110	108	7.5
111	36	2.5
112	144	10.0
113	36	2.5
114	216	15.0
115	72	5.0
116	36	2.5
117	72	5.0
118	108	7.5
119	36	2.5
121	72	5.0
122	36	2.5
123	36	2.5
125	72	5.0
131	72	5.0
Total	1440	100.0

**Appendix VIII: Scores on Engagement in One Health Related Activities
(n=1440)**

Scores	Frequency	Percent
29	24	1.7
30	12	.8
31	90	6.2
32	66	4.6
33	288	20.0
34	192	13.3
35	162	11.2
36	240	16.7
37	162	11.2
39	24	1.7
40	30	2.1
41	6	.4
44	66	4.6
45	36	2.5
50	36	2.5
55	6	.4
Total	1440	100.0

Appendix IX: Information Seeking Scores

Scores	Frequency	Percent
7	48	3.3
8	312	21.7
9	288	20.0
10	240	16.7
11	324	22.5
12	144	10.0
13	12	.8
14	72	5.0
Total	1440	100.0

Appendix X : Scores on Engagement in Health Related Discussions (n=1440)

31	36	2.5
32	36	2.5
33	180	12.5
34	72	5.0
35	72	5.0
36	108	7.5
37	108	7.5
38	72	5.0
39	36	2.5
40	72	5.0
42	36	2.5
43	36	2.5
44	90	6.2
45	144	10.0
46	72	5.0
47	36	2.5
49	72	5.0
50	72	5.0
51	36	2.5
53	18	1.2
56	36	2.5
Total	1440	100.0

Appendix XI: Scores on Interactions with Professionals on Health Matters (n=1440)

Scores	Frequency	Percent	95% Confidence Interval	
			Lower Bound	Upper Bound
3.00	102	7.1	5.6	8.6
4.00	474	32.9	29.9	35.8
5.00	612	42.5	39.4	45.6
6.00	252	17.5	15.2	20.1
Total	1440	100.0		

Appendix XII: Scores on Interactions with Professionals on Health Matters (n=1440)

Scores	Frequency	Percent	95% Confidence Interval	
			Lower Bound	Upper Bound
3.00	102	7.1	5.6	8.6
4.00	474	32.9	29.9	35.8
5.00	612	42.5	39.4	45.6
6.00	252	17.5	15.2	20.1
Total	1440	100.0		

Appendix XIII: A Guide for FGD with community members

Guiding questions for Focus Groups

My name is Mikidadi Muhanga, a PhD student at the School of Humanities and Social Sciences of the University of Zambia (UNZA), Lusaka, Zambia. I am interested in understanding households' HL levels and perceptions and its connections to health behaviour and health care seeking behaviour in the interface of humans, animals and the environment- One Health. You have been invited to participate in a discussion group that is part of our study.

This focus group discussion/interview will consist of two researchers (note taker and a moderator) and 8-10 people from your village/street. The discussion will take about 75 minutes. During the group discussion you will be asked to share your opinions. There is no right or wrong answer to anything that will be discussed in the group. To protect your privacy, no names or personal information will be used in any of the reports or papers we write about the discussion group. It is completely up to you whether to participate. You are free to not answer any questions and to stop your participation at any time. What questions do you have for me right now? You may ask more questions any time during or after our discussion. Do you agree to participate in the focus group?

Topic Area 1: HL

- (i) What is the level of HL of the people in the study area with reflection on One Health Approach?
 - a) How difficult is it to access information on medical or clinical issues, understand medical information and derive meaning, interpret and evaluate medical information and to make informed decisions on medical issues?
 - b) How difficult is it to access information on risk factors, understand information on risk factors and derive meaning, interpret and evaluate information on risk factors and to judge the relevance of the information on risk factors?
 - c) How difficult is it to update oneself on health issues, understand health related information and derive meaning, to interpret and evaluate information on health related issues and to form a reflected opinion on health issues?
- (ii) Health information and Social Networks: Sources, reasons for seeking HI, barriers, efficacy of sources
 - (a) Where do you usually get information about health issues?
 - (b) Where do you usually get information about diseases in particular?
 - (c) What type of information do you get and how often?

Topic Area 2: Health care seeking +health facilities

c. Health care

i) Local facilities

- where do local people go when they are ill
- what are the differences according to people and diseases
- are there any obvious obstacles to health care
- distance from residential areas

ii) Availability of treatment/advice

- pharmacies
- antibiotics over the counter
- who gives advice on different diseases

3. General use of health care facilities

a) Specific questions (dependent on local situation):

- Do you ever visit - health centre, hospital, other doctor (eg private), pharmacy, other healers?
- Are there any difficulties using any of these?
- How much do they cost?
- When were you last ill? What did you have then, and what did you do?

Topic Area 2: Determinants of HB, health care seeking and HL under OHA

- (i) What are the environmental, political and socio-economical determinants of health behaviour, health care seeking and HL under OHA?
- (ii) What do you think can impair or enhance your (plus animals) health?

- (iii) Why do people behave in certain ways that endangers their health and why others don't? Is it lack of knowledge, not caring for their health or what?
- (iv) What marks the difference between health literate individuals and health illiterate ones?

Topic Area 3: Prior Knowledge Risks on close contacts of humans and animals and diseases

- a. What do you think transmits various diseases?
- b. What are the symptoms and signs of such diseases?
- c. How can animals and humans transmit diseases to each other?
- d. What factors affect the quality of the environment in your community?
- e. What can be done to improve the quality of the environment in your community?
- f. What do you think are the risks of maintaining close contacts between the livestock, wildlife and the humans?
- g. What can be done to protect yourself or other community members from such diseases/risks?
 - i. How much would each of these actions/methods cost?
 - ii. How much time would it take to perform each of these actions?
- h. Which of these methods do you feel is most effective at preventing such risks/diseases?
- i. How do people in your community generally determine whether or not someone (including their animals) has such a disease? Do people diagnose themselves, or do they visit health facilities (including vet clinics) to determine whether or not they have such diseases?
- j. Which drugs do people use to treat diseases in this community? Where do people obtain drugs? How effective are the drugs that people use?
- k. Where do most of the community members prefer to seek treatment for their animals and themselves? Why do you prefer that?

Topic Area 4 – Environmental Management Practices and Community Participation

- 1. Have you ever performed any of the following activities in order to reduce mosquito populations?
 - i. Install drains
 - ii. Remove stagnant water
 - iii. Manage vegetation
 - iv. Change irrigation techniques
- a. If yes, do you feel the technique(s) are effective?
- b. If no, would you consider performing any of these activities for future malaria control?
- 2. Let's say that a malaria control program was started in your community which required everyone to manage vegetation and remove stagnant water from the area around their homes. If the majority of households participated, this program would help to reduce mosquito populations in the village.
 - i. Would you be willing to participate in this program? Why or why not?
 - ii. Do you feel that other members of your community would participate in a program like this? Why or why not?
 - iii. What factors would make a person in your community more/less likely to participate in a program like this?
- 3. Does your village currently perform any other activities (health, education, social, economic, etc.) which require most or all of the community members to participate?
- 4. Would you say your community is composed mainly of people whose families have lived in the village for many generations, or is there a lot of immigration/emigration in the village?

Topic Area 5: HB and HCSB in the interface of humans, animals and the environment

- (i) What people do impacting on their health and which health care services they resort to in the case of ill health in the context of OHA? Why do you resort to that?
- (a) Identify kind of Knowledge, Attitudes and Practices in place to reflect the HB and consequently HCSB in the interface of humans, animals and the environment.

Themes for discussion:-

- How they handle livestock products (meat, milk, etc) before consuming
- If they do screen their animals and themselves for diseases
- How they aborted materials from their animals
- Their awareness on issues such as meat inspections
- Their awareness on vaccination for their animals

- How and where they accommodate their animals
 - Which healthcare services do they resort to when their animals and themselves are sick
 - Issues related to keeping their environment tidy to avoid diseases i.e how to treat breeding ponds for mosquitoes and cutting tall grasses around their residences
 - Issues of hygiene after attending to their animals
 - Their interaction with professionals (medical, veterinarians, environmentalists)
- (b) Any other Indigenous Knowledge and or Practices under interface
- (ii) Knowledge on the impacts of their behaviours on health

Topic Area 6: One Health Approach

What is the situation pertaining to the collaborative efforts and strategies bringing together those professionals in human medicine, veterinary and environmental cycles?

Themes for discussion:-

- a) Awareness about one health approaches
- b) Attitude towards technical collaboration between medical and veterinary doctors
- c) Ways in which medical, para-medical, veterinary and para-veterinary personnel have collaborated within the previous 12 months
- d) Factors which may hinder collaboration between medical and veterinary officers
- e) Collaborative clinical approaches to current and emerging zoonotic diseases
- f) Including common laboratory animal medicine in curricula of para-medical, medical, para-veterinary, and veterinary students
- g) Any diagnosis of a zoonotic disease or a non-zoonotic disease that has been done with
- h) collaboration between medical and veterinary personnel
- i) Any disease surveillance exercise which has been done with collaboration between medical and veterinary personnel
- j) Any forms of reporting diseases containing both veterinary and medical data which have been used by medical and veterinary personnel
- k) Whether medical personnel have used veterinary databases, and vice versa
- l) Collaborative research on zoonotic diseases which medical and veterinary personnel have collaboratively participated in
- m) Any animal diseases that medical personnel learnt/teach
- n) Any human diseases that veterinary personnel learnt/teach

Topic Area 7: Politics of Health

- a) The role of political, religious leaders and LGAs towards health care, diseases prevention and health promotion
- b) Is health political or apolitical?
- c) Does health status reflect on the Harold Laswell's conception of politics as *who gets what when where and how?*
- d) Most affluent people are likely to be healthier than the less affluent?
- e) Does the health of the people is influenced far more by politics and power groups and by the distribution of land and wealth than it is by the prevention and treatment of disease
- f) How important is politics and public policy as determinants of health?
- g) Do politicians advocate and campaign around on the public health issues?
- h) Do some social groups have more access to health care services than others?
- i) How Policies at the local, state, and federal level affect individual and population health. Increasing taxes on tobacco sales, for example, can improve population health by reducing the number of people using tobacco products. Are there policies which are dis/encouraging certain health impairing or enhancing behaviours?
- j) Some policies affect entire populations over extended periods of time while simultaneously helping to change individual behaviour. LGAs to set and regulate standards on various aspects of life. This led to an increase in i.e meat inspection , livestock feeding practices , water sources handling

Appendix XIV: Summary of Data Collection Methods, Level of Measurement and Indicators

Variable	Data Collection Method	Level of Measurement	Indicators
Sex		Nominal	1=male , 0= female
Age	Household questionnaire	Ratio Interval	Age in years
Education	Household questionnaire	Ordinal Ratio	Levels of education, Numbers of years spent schooling
Occupation	Household questionnaire	Nominal	1= self employed , 0= employed by other organization/individual
Distance	Household questionnaire	Ratio	Distance in kilometers
Cost Effectiveness	Household questionnaire	Self perceived affordability of health care services access 5 point self reporting Measured at nominal level	1=very cheap, 2=cheap, 3=no idea, 4= very expensive, 5=expensive
HL	Household questionnaire, schedule of interview	Standardized Indices related to HL Interval	HL Index score general health index comprising 141 items calculated with score of minimum of 141 and a maximum of 564
HB	Household questionnaire, schedule of interview , FGDs, Key informants interview	5 point self reporting items related to Health Impairing and Health Enhancing Behaviours reflecting on OHE Practices. Measured at nominal level	Analysis of the frequency at which one involves in HI or HE behaviours
HCSB	Household questionnaire, schedule of interview	Nominal level	Health care service 1=formal 0=informal health care sources preferences
One Health	Household questionnaire, schedule of interview , FGDs, Key informants interview	5 point self reporting items related to collaboration under OHA. Measured at Nominal and Ordinal levels	Existence or lack of collaboration among health experts dealing with humans and animal diseases Level of collaboration where it exists. An index shall be used

Perceived Self efficacy	Household questionnaire, schedule of interview , FGDs,	Nominal	Expected benefits from treatment
Beliefs	KAPs	Nominal	Various attitudes and practices
Disorder characteristics	Household questionnaire, schedule of interview	Nominal	1=Chronic, 2=acute 3=Severe, 4= trivial
Interaction with family, community, etc	Household questionnaire, schedule of interview	Nominal	Level of interaction based on an index developed
Accessibility	Household questionnaire, schedule of interview	Nominal	Distance to the health care service Time spent walking Waiting time
Acceptability	KAPs FGDs	Nominal Content Analysis	Verbal statements based on 5 point self reporting scale
Membershipto various organizations		Nominal	1=member, 0= not a member

Appendix XV: A Guide for Key informants interview

Topic Area 1: Health Literacy

- (i) What is the level of HL of the people in the study area with reflection on One Health Approach?
 - (a) How difficult is it to access information on medical or clinical issues, understand medical information and derive meaning, interpret and evaluate medical information and to make informed decisions on medical issues?
 - (b) How difficult is it to access information on risk factors, understand information on risk factors and derive meaning, interpret and evaluate information on risk factors and to judge the relevance of the information on risk factors?
 - (c) How difficult is it to update oneself on health issues, understand health related information and derive meaning, to interpret and evaluate information on health related issues and to form a reflected opinion on health issues?
- (ii) Health information and Social Networks: Sources, reasons for seeking HI, barriers, efficacy of sources
 - (d) Where do people usually get information about health issues?
 - (e) Where people usually get information about diseases in particular?
 - (f) What type of information do people get and how often?

Topic Area 2: Health care seeking +health facilities

- i) Local facilities
 - are there any obvious obstacles to health care
 - distance from residential areas
 - what are the differences according to people and diseases
 - where do local people go when they are ill
- ii) Availability of treatment/advice
 - pharmacies
 - antibiotics over the counter
 - who gives advice on different diseases

Topic 3: General use of health care facilities

- a) Specific questions (dependent on local situation):
 - Do people use/ visit - health centre, hospital, other doctor (eg private), pharmacy, other healers?
 - Are there any difficulties using any of these?

Topic Area 4: Determinants of HB, health care seeking and HL under OHA

- (v) What are the environmental, political and socio-economical determinants of health behaviour, health care seeking and HL under OHA?
- (vi) What do people think can impair or enhance their (plus animals) health?
- (vii) Why do people behave in certain ways that endangers their health and why others don't? Is it lack of knowledge, not caring for their health or what?
- (viii) What marks the difference between health literate individuals and health illiterate ones?

Topic Area 5: Prior Knowledge Risks on close contacts of humans and animals and diseases

- a. What do people think transmits various diseases?
- b. What are the symptoms and signs of such diseases?
- c. How can animals and humans transmit diseases to each other?
- d. What factors affect the quality of the environment in your community?
- e. What can be done to improve the quality of the environment in your community?
- f. What do people think are the risks of maintaining close contacts between the livestock, wildlife and the humans?
- g. What can be done to protect yourself or other community members from such diseases/risks?
 - i. How much would each of these actions/methods cost?
 - ii. How much time would it take to perform each of these actions?

- h. Which of these methods do you feel is most effective at preventing such risks/diseases?
- i. How do people in your community generally determine whether or not someone (including their animals) has such a disease? Do people diagnose themselves, or do they visit health facilities (including vet clinics) to determine whether or not they have such diseases?
- j. Which drugs do people use to treat diseases in this community? Where do people obtain drugs? How effective are the drugs that people use?
- k. Where do most of the community members prefer to seek treatment for their animals and themselves? Why do you prefer that?

Topic Area 6 – Environmental Management Practices and Community Participation

1. Have you ever performed any of the following activities in order to reduce mosquito populations?
 - i. Install drains
 - ii. Remove stagnant water
 - iii. Manage vegetation
 - iv. Change irrigation techniques
 - a. If yes, do you feel the technique(s) are effective?
 - b. If no, would you consider performing any of these activities for future malaria control?
2. Let's say that a malaria control program was started in your community which required everyone to manage vegetation and remove stagnant water from the area around their homes. If the majority of households participated, this program would help to reduce mosquito populations in the village.
 - i. Would you be willing to participate in this program? Why or why not?
 - ii. Do you feel that other members of your community would participate in a program like this? Why or why not?
 - iii. What factors would make a person in your community more/less likely to participate in a program like this?
3. Does your village currently perform any other activities (health, education, social, economic, etc.) which require most or all of the community members to participate?
4. Would you say your community is composed mainly of people whose families have lived in the village for many generations, or is there a lot of immigration/emigration in the village?

Topic Area 7: HB and HCSB in the interface of humans, animals and the environment

- (iii) What people do impacting on their health and which health care services they resort to in the case of ill health in the context of OHA? Why do you resort to that?
- (c) Identify kind of Knowledge, Attitudes and Practices in place to reflect the HB and consequently HCSB in the interface of humans, animals and the environment.

Themes for discussion:-

- How they handle livestock products (meat, milk, etc) before consuming
- If they do screen their animals and themselves for diseases
- How they aborted materials from their animals
- Their awareness on issues such as meat inspections
- Their awareness on vaccination for their animals
- How and where they accommodate their animals
- Which healthcare services do they resort to when their animals and themselves are sick
- Issues related to keeping their environment tidy to avoid diseases i.e how to treat breeding ponds for mosquitoes and cutting tall grasses around their residences
- Issues of hygiene after attending to their animals
- Their interaction with professionals (medical, veterinarians, environmentalists)

- (d) Any other Indigenous Knowledge and or Practices under interface

- (iv) Knowledge on the impacts of their behaviours on health

Topic Area 8: One Health Approach

What is the situation pertaining to the collaborative efforts and strategies bringing together those professionals in human medicine, veterinary and environmental cycles?

Themes for discussion:-

- o) Awareness about one health approaches
- p) Attitude towards technical collaboration between medical and veterinary doctors
- q) Ways in which medical, para-medical, veterinary and para-veterinary personnel have collaborated within the previous 12 months
- r) Factors which may hinder collaboration between medical and veterinary officers
- s) Collaborative clinical approaches to current and emerging zoonotic diseases
- t) Including common laboratory animal medicine in curricula of para-medical, medical, para-veterinary, and veterinary students
- u) Any diagnosis of a zoonotic disease or a non-zoonotic disease that has been done with
- v) collaboration between medical and veterinary personnel
- w) Any disease surveillance exercise which has been done with collaboration between medical and veterinary personnel
- x) Any forms of reporting diseases containing both veterinary and medical data which have been used by medical and veterinary personnel
- y) Whether medical personnel have used veterinary databases, and vice versa
- z) Collaborative research on zoonotic diseases which medical and veterinary personnel have collaboratively participated in
- aa) Any animal diseases that medical personnel learnt/teach
- bb) Any human diseases that veterinary personnel learnt/teach

Topic Area 9: Politics of Health

- k) The role of political, religious leaders and LGAs towards health care, diseases prevention and health promotion
- l) Is health political or apolitical?
- m) Does health status reflect on the Harold Laswell's conception of politics as *who gets what when where and how?*
- n) Most affluent people are likely to be healthier than the less affluent?
- o) Does the health of the people is influenced far more by politics and power groups and by the distribution of land and wealth than it is by the prevention and treatment of disease
- p) How important is politics and public policy as determinants of health?
- q) Do politicians advocate and campaign around on the public health issues?
- r) Do some social groups have more access to health care services than others?
- s) How Policies at the local, state, and federal level affect individual and population health. Increasing taxes on tobacco sales, for example, can improve population health by reducing the number of people using tobacco products. Are there policies which are dis/encouraging certain health impairing or enhancing behaviours?
- t) Some policies affect entire populations over extended periods of time while simultaneously helping to change individual behaviour. LGAs to set and regulate standards on various aspects of life. This led to an increase in i.e meat inspection , livestock feeding practices , water sources handling

Appendix XVI: Information Sheet

INFORMATION SHEET

Research Title: Health Literacy and Health Behaviour in the Context of One Health

Approach in Tanzania: Perceptions, Attitudes, Connections and Realities

What is this study about?

This is the research project being conducted by Mikidadi Idd Muhanga, a PhD student at the University of Zambia, School of Humanities and Social Sciences under the supervision of Prof J.R.S Malungo of the University of Zambia in Zambia.

We would like to invite you to participate in a study whose aim is to assess health literacy (HL), its influence on health behaviour (HB) and health care seeking behaviour (HCSB), attitudes of people on health impairing behaviours (HIBs) and its influence on health behaviours (HBs) under One Health Approach, which recognises the interactions of humans, animals and the environment and its influence on health generally. This is because the area you are living in is an area where these interactions are significant and also there has been livestock products sold here then there are chances of facing such risks. Your participation is completely voluntary. Before agreeing to take part in the study, kindly read this form. This form describes the purpose of the study, the risks, benefit and your alternatives to participation in the study.

There has been a problematic nature of HBs observed through existence of HIBs sometimes resulting into a higher prevalence of infectious diseases (including zoonotic ones) and varying preferences for Tanzanians in terms of seeking healthcare services (instead of going to hospital), despite the efforts of the government of Tanzania to improve health services and educating people to become more health literate. Obviously what was observed was that the government was putting some efforts to educate people to become HL. What is not known is the fact that why people have not been changing regardless of the efforts of the government.

Your district has been selected due to the area being where these interactions are significant and also there has been livestock products sold here then there are chances of facing such risks.

What will I be asked to do if I agree to participate?

Participants will be voluntarily requested to participate in this study by answering questionnaire set for household head or his/her representative. The information collected from you will be used only for the purposes explained to you in this form.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, your name will not appear with the information pertaining to the findings of research.

What are the risks of this research?

There are no risks concerning this research except that you will spend some little time to respond to questionnaire.

What are the benefits of this research?

By participating in this study, you provide to gain more understanding on the health literacy (HL), its influence on health behaviour (HB) and health care seeking behaviour (HCSB). This will provide you with the best ways to improve your health literacy so that you can understand which health related practices are worthwhile and which ones are not.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You have the right to choose whether or not to participate in the study.

Incentives/compensation

No incentives or compensation will be paid to you for participating in this study.

Sharing the data and the results

This research is for academic purposes and the information that will be obtained will be shared at the district offices. We will publish the results in journals and might present it in seminars. Feedback on the results will be made to you in a meeting involving all participants and local leaders.

What if i have questions?

This research is being conducted by Mikidadi Idd Muhanga under the supervision of Prof J.R.S Malungo of the University of Zambia in Zambia. Should you have any questions regarding this research and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Prof. J.R.S Malungo

Supervisor

Department of Population Studies,
School of Humanities and Social Sciences,

The University of Zambia,

Tel: +260 977805997

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Appendix XVII: Consent form

CONSENT FORM

This is the research project being conducted by **Mikidadi Idd Muhanga**, a PhD student at the University of Zambia, School of Humanities and Social Sciences under the supervision of Prof J.R.S Malungo of the University of Zambia.

We would like to invite you to participate in a study whose aim is to assess health literacy (HL), its influence on health behaviour (HB) and health care seeking behaviour (HCSB), attitudes of people on health impairing behaviours (HIBs) and its influence on health behaviours (HBs) under One Health Approach, which recognises the interactions of humans, animals and the environment and its influence on health generally. This area has been selected due to the fact that the area being where there interactions which are significant and also there has been livestock products sold here then there are chances of facing such risks Your participation is completely voluntary. Before agreeing to take part in the study, we request you to fill this form.

Name: I

Having been fully informed, on the purpose of this study and confidentiality. I have agreed to participate willingly.

Sign/Thumb Print.....

Date:

Sign:

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