ASSOCIATION BETWEEN SOCIO-ECONOMIC FACTORS AND NUTRITIONAL STATUS OF UNDER-FIVE YEARS OLD CHILDREN IN LUSAKA, ZAMBIA

By

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DECLARATION

I Beatrice Kankhuni hereby declare that this thesis represents my own work and it has not previously been submitted for a degree at this or any other university. It has also drawn ideas from other studies because without the sourced data my study would have been incomplete. This study was prepared in accordance with the guidelines for Master of Science in Human Nutrition in the School of Agricultural Science and the Directorate of Research and Graduate Studies of the University of Zambia.

Signature..... Date……

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1. I, Dr Sydney Malama, have read through this thesis and approved it for submission.

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Signature…… Date……

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APPROVAL

The thesis of BEATRICE KANKHUNI has been approved as fulfilling the requirements or partial fulfillment of the requirements for the award of the degree of MASTER OF SCIENCE IN HUMAN NUTRITION by the University of Zambia.

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ABSTRACT

Nutritional status of under- five children remains a sensitive indicator of Africa's health and socio-economic conditions. A few studies acknowledge the importance and the role of non-nutritional factors in determining the nutritional status of under- five children at household level. This study investigated the association between socio-economic factors and nutritional status of under- five children in selected residential areas in Lusaka district of Zambia. A cross-sectional descriptive study was conducted with a total of 406 children from different households who were randomly sampled and the nutritional status of every under- five child from each household was assessed using anthropometric measurements graded according to the World Health Organization classification. Data were collected using pre-tested questionnaires from the month of May 2017 to June 2017. Anthropometric measurements of weight, height and mid upper arm circumference were done using a Seca battery scale, height board and Mid Upper Arm Circumference tape respectively. Measurements from both the height and weight were used in computing weight-for-age and weight-for-height data using *World Health Organisation Anthroplus* ver.3.2.2. Data analysis was done using *World Health Organisation Anthroplus* ver.3.2.2 and Statistical Package for Social Sciences computer software ver.20.The Pearson Chi square significance of association was determined at level of significance less than 0.05.The study found the prevalence of wasting and underweight to be at 7.4 percent and 12.3 percent respectively. Children who were measured with Mid Upper Arm Circumference below 12.5cm were 3.4 percent while those between 12.5-13.5cm were 18.2 percent and those above 13.5cm were 78.3 percent .There was a significant association between children nutritional status (Weight-for-Age and Weight-for-Height) and some socio-economic factors such as residence (Weight-for-Age, P=0.002 and Weight-for-Height, P=0.014), education level (Weight-for-Age, P=0.001 and Weight-for-Height, P=0.001), sources of water (Weight-for-Age, P=0.001 and Weight-for-Height, P=0.001) and toilet availability (Weight-for-Age, P=0.018 and Weight-for-Height, P=0.001),employment status (Weight-for-Age, P=0.001 and Weight-for-Height,0.001).Type of toilet was not significantly related to (Weight-for-Height =0.215) but significantly related to nutritional status(Weight-for-Age, P=0.001) while household income had a significant relationship with (Weight-for-Age, P=0.002 but not with(Weight-for-Height (P=0.464).The results showed that poor nutrition is a major problem among the under- five children due to the poor socio-economic factors of their parents. Therefore, identification of the core factors influencing the nutrition of under- five children can improve and support strategies that can alleviate child malnutrition and its consequences in Zambia.

Keywords; Underweight, Wasting, Social-economic status, Nutritional Status and Mid Upper Arm Circumference

DEDICATION

I dedicate this thesis to my husband, children, my mother and sister who were supportive all times when things were challenging.

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ACRONYMS

AIDS:	Acquired Immune Deficiency Syndrome
CSO:	Central Statistical Office
DHS:	Demographic Health Survey
HIV:	Human Immunodeficiency Virus
MUAC:	Mid Upper Arm Circumference
PHI:	Presidential Housing Initiative
SD:	Standard Deviation
SPSS:	Statistical Package for Social Sciences
UN:	United Nations
UNICEF:	United Nation Children's Fund
VIP:	Ventilated improved pit latrine
WAZ:	Weight- for -Age Z-score
WHO:	World Health Organization
WHZ:	Weight –for- Height Z-score
ZDHS:	Zambia Demographic Health Survey

DEFINITION OF TERMS

For the present study a number of terms will be used;

Caregiver- is any person who cares for the under- five children at a household other than the parent.

Education level: Education level is a level from grade 7 and beyond.

Household: This is a shelter where individuals live together; recognize one person as a final decision maker, and eat together from one table. Furthermore, the food is cooked from one pot and one kitchen.

Nutritional Status: Well-being of an individual in terms of having a good diet

Parent: This is either a father or mother of the child.

Poor household: A household with an income of less than $100 per month.

Stunting (chronic malnutrition): this refers to retarded growth or growth failure in children and occurs over a period of time due to bad feeding which cause them to become short for their age or younger than their real age.

Under- five children: Are young human beings within the age of 6-59 months.

Underweight: Children under the age of five suffering from acute weight loss as compared to their age assessed by weight for age index.

Wasting (acute malnutrition): Growth failure as a result of recent rapid weight loss or failure to gain weight; wasting is assessed by the weight-for-height index.

Wealthy household: A household with an income of $500 or more per month.

Well-nourished under-five child – is a child that attains weight above -2 Z score.

Acute malnourished child- is when a child attains weight below -2 Z score.

CHAPTER ONE
INTRODUCTION

1.1. Introduction

Malnutrition is a global health problem, which contributes to high levels of morbidity and mortality especially in developing countries. According to UNICEF-WHO and World Bank group (2012) chronic malnutrition has been a worldwide and continuous problem among children under the age of five. Malnutrition is also responsible for elevated levels of short height for age (stunting) in most countries. Therefore, it is important to assess the under-five old children nutritional status as it is a significant sign of child wellbeing as a household living standard. According to Central Statistics Office (2014) one third of child deaths in Zambia is caused by malnutrition even with meaningful interventions by the government and other stakeholders little improvement in reducing under–five malnutrition has been seen. Currently in Zambia studies by Zambia Demographic Health Survey (2014) describes malnutrition at 40 percent for stunting, 6 percent wasting and 15 percent for underweight.

1.2. Background of the study

In any given society its future development depends on the children, it is therefore important to make sure that these children especially the under-five years old are in good health. Hence measures are needed to determine the health of these children through assessing their nutritional status.

Despite Zambia experiencing rapid economic growth in the region over the past ten years as well as graduating from a low to lower-middle-income country among the 22 African countries, it has average levels of wasting with 6 %, high levels of stunting 40% and average underweight 15%.

This is due to deficiencies in macro and micronutrients such as carbohydrates, proteins, fats, vitamin A, iron, zinc, and iodine and also a number of socio- economic and cultural factors in the communities where these children live. In addition, Zambian trends of poor nutritional status among under-five old children has been average to high and there are a number of factors that affect the nutritional status of these under-five old children. (CSO, 2014: UNICEF, 2013).

The poor nutritional status of children can be affected by inadequate food intake and frequent infections, or both (Kavosi et al., 2014). Other factors that can have an effect on the nutritional status of children include; the child's poor feeding, low household income by the parent, poor sanitation, low birth weight, breastfeeding patterns, duration of breastfeeding and frequency of food intake especially protein-energy rich foods, family headship, parental education, maternal nutritional knowledge, age of both the mother and the child, and gender headed households (Bwalya, 2013).

In general, most studies by ZDHS (2014), on health and nutrition of children under the age of five focuses on the effects of nutrient consumption, breastfeeding and food availability, this present study acknowledges the importance of non-nutritional factors and the role socio-economic factors play in determining nutritional status at household level because of the average to high levels of malnutrition addressed in the country.

Therefore, there is need to include the importance and role of non- nutritional factors and socio-economic factors in studies on health and nutrition of children under the age of five years.

1.3. Statement of the problem

Research done by Asfaw et al. (2015) showed that socio-economic factors play an important role in determining the nature of under-five nutritional status at household level. In Zambia, there has been numerous measurements on socio-economic factors and nutritional status of under-five children at national and provincial level which has been used to demonstrate the relationships country wide (CSO, 2014). Even with the government and stakeholders efforts in improving malnutrition among children, malnutrition has continuously demanded a lot of lives in under-five children within the country (CSO, 2014). However, for Lusaka province, underweight has increased from 11 percent in 2001 to 15 percent in 2014. In addition, very little is specific relating to the role socio-economic factors play in determining the nature of under- five children nutritional status at household level. The Zambia Demographic Health Survey (2014) just presents a universal picture for Lusaka province and does not give a specific picture for Lusaka suburban areas within Lusaka, which is believed to have the highest rates of poor nutritional status. Therefore, this study cutting across the three selected varying socio-economic catchment areas gained more specific knowledge on socio-economic factors causing poor nutritional status particularly in under- five children.

1.4 OBJECTIVES

1.4.1. General objective

The main objective of this study is to investigate the association between socio-economic factors and nutritional status of children under the age of five in selected residential areas in Lusaka district.

1.4.2. Specific objectives

i. To profile the nature of under-five nutritional status at household level using anthropometric measurements.

ii. To identify the significance of socio-economic factors that correlates with the nutritional status of under-five children at household level.

iii. To outline the relationship that may exist in terms of the nutritional status and socio-economic factors of under-five children and how they correlate across the three catchment areas.

1.4.3. Research Questions

i. What is the nutritional status of under-five children in selected residential areas in Lusaka?

ii. What are the socio-economic factors that correlate with child nutritional status at household level?

iii. What is the relationship between child nutritional status and socio-economic factors and how do they correlate across the three catchment areas?

1.4.4. Hypothesis of the Study

- Null Hypothesis - There is no relationship between the socio-economic factors and child nutritional status at household level.
- Alternative hypothesis - There is a relationship between the socio-economic factors and child nutritional status at household level.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

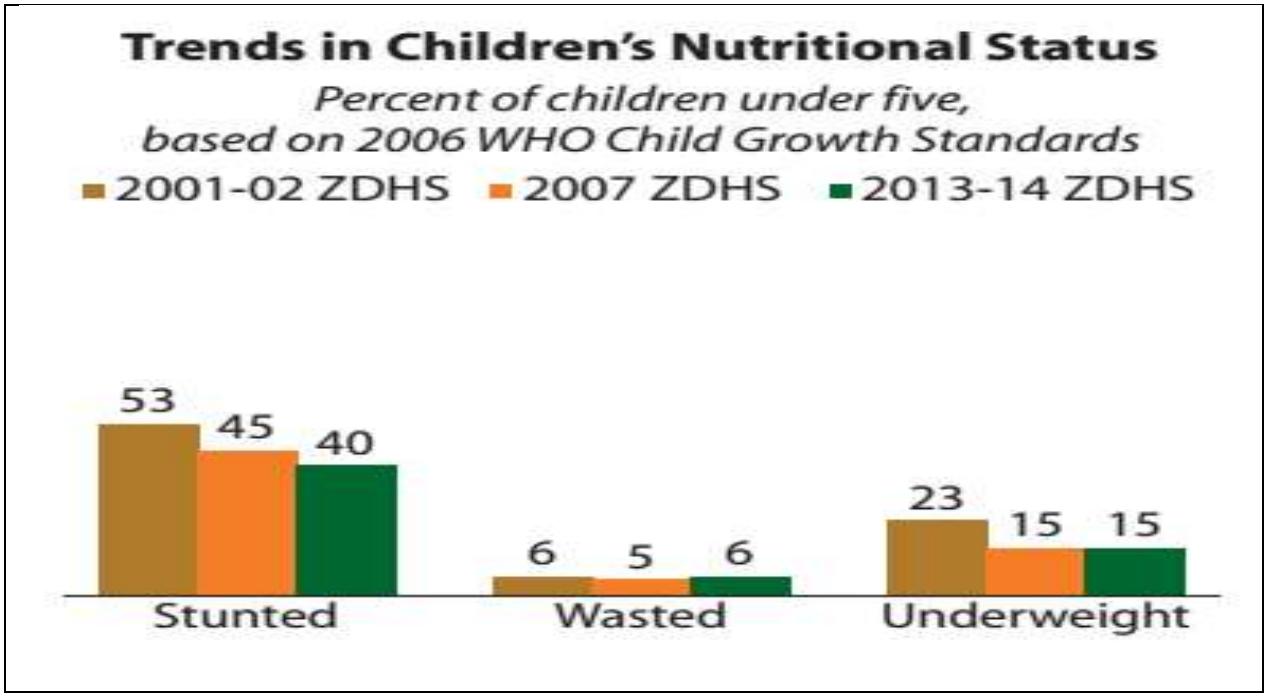
This chapter provides relevant literature related and distinct to the general information of the association between socio-economic factors and the nutritional status of under-five children in the selected residential areas within Lusaka district catchment areas namely: Mtendere, Helen Kaunda and Presidential House Initiative (PHI). A review of the global context of nutritional status of under- five years old children will be highlighted. The study will also narrow down to Zambia's nutritional situation and end with the linkage between socio-economic factors and nutritional status of the under-five years old children.

2.2. Nutritional Status of Children under the Age of Five in Zambia

The nutritional status of children under the age of five is an important proxy measure of the children's health (CSO, 2014). According to World Health Organization (WHO), cited in Nzala et al. (2011) showed that 60 percent of deaths occurring among under- five years old children in developing countries are affected by malnutrition. Further, at global level, about 178 million children under the age of five were too short for their age (stunted), while 115 million were underweight and 19 million were wasted (WHO.2013).

In Zambia, data collected by Zambia Demographic Health Survey (2013-2014) showed that 53 percent of the under-five children were stunted according to the 2001-02 survey and stunting declined to 40 percent in 2013-14. There has been a slight rise in the proportion of children who were wasted over the past six years, from 5 percent in 2007 to 6 percent in 2013-14 (CSO, 2014-2015). Though fairly rated, wasting exceeding 5 percent is alarming and has a parallel increase in mortality rate of under-five children (WHO, 2013). In Zambia, there were no changes in the

proportion of underweight children between 2007 and 2013-14 which remained at 15 percent. At provincial level, wasting was high among children in Luapula province and was at 13 percent and low among children in Muchinga, Northern, and Southern provinces which was at 4 percent each. Luapula province had the highest percentage of underweight children at 21 percent, while Lusaka had the lowest at 11 percent (CSO, 2014).



(Adopted from ZDHS, 2013-2014)

Figure 1: Trends in Nutritional Status of Children under the Age of Five, Zambia 2001-2014

2.3. Measuring Nutritional Status of Children Less than Five Years Old

Anthropometry provides a non-invasive, easy, cheap measurement and valuable information on child nutritional status. Anthropometric measures which are important in children include, weight and height (Corsi and Subramanian, 2014). Anthropometric measurements of height, weight and mid upper arm circumference (MUAC) are important in examining the nutritional status of children under the age of five. Through these same measurements the children's

nutritional status is known. It is known that a well-nourished child is one whose weight and height measurements correlate very well with the standard normal distribution of heights and weights of healthy children with the same age and sex (WHO, 2013).

The study by WHO (2013), observed that anthropometric indicators for acute and chronic malnutrition are weight-for-height, weight for age as well as height for age with standardized Z-scores or deviations below reference. Weight for age (underweight) is an in-between measure of malnutrition that combines wasting and stunting whilst acute malnutrition or weight-for-height (wasting) denotes short-term factors such as diseases or severe food shortages. Underweight is the most frequent type of malnutrition among children below the age of two (WHO, 2013). Anthropometry evaluates both under and over nutrition which is assessed by direct or indirect methods. The direct methods measure objective criterion in individuals, while indirect methods use community health guides that reflect nutritional influences (Pandve and Singu, 2012).

2.4. Weight-for-Height (Wasting)

Wasting refers to thinness and it is measured by weight-for-height at least two standard deviation (SD) below the median. Wasting is caused by a sudden and severe process of losing weight, which is often linked to starvation or severe disease (WHO, 2014). According to WHO (2014), wasting is also as a result of living longer in dirty places where there is very little hygiene. Acute malnutrition or wasting denotes short-term factors such as diseases or severe food shortages. Poor countries can have a prevalence of wasting in under-five children that can be below 5 percent which is still alright as long as the country does not experience severe food shortage. Further, this current study showed higher prevalence of wasting which reflected the state of socio-economic factors of households in the residential areas and district as a whole.

2.5. Weight-for-Age (Underweight)

Underweight is measured as weight-for-age at least two standard deviation (SD) below the median of a reference population. It may indicate wasting or stunting, but does not differentiate between them. Underweight is a common assessment used to determine under nutrition in developing countries (WHO, 2013).

Although weight differences over time shows present, sudden and long term malnutrition, weighing remains the only method used to assess the growth of the under- five children and view changes in malnutrition. However, this study showed that the higher prevalence of underweight reflected the state of economic status of households in the residential areas and district as a whole. According to WHO (2013), most underweight cut off point is -2 Z score standard deviation which is less than the median values of international reference. Weight for age refers to body mass compared to the age of the child. For example, weight for age cannot distinguish between a short child with enough body weight and length with a thin child.

2.6. The Mid Upper Arm Circumference

According to World Health Organization (2013), mid upper arm circumference (MUAC) is the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow. It is used to determine whether a child is malnourished or not. It is an important measurement used to assess children's nutrient deficiency. The tool is easy to use, it is a cheaper method of assessment and it is acceptable by most health institutions worldwide.

Mwangome et al. (2012) articulated in a retrospective cohort study that the mid-upper arm circumference (MUAC) has a fixed cut off point which cannot be compared with weight-for-height and weight for age. MUAC has a sensitivity of 24.6 percent and a specificity of 94.8 percent which appears to be a better predictor of childhood mortality. According to WHO (2014)

the availability of evidence currently indicates that MUAC is the best in terms of accuracy and sensitivity case detection method for acute severe malnutrition. On the other hand, MUAC measurement is not recommended in children with oedema which is accumulation of fluids under the skin layer because it can give incorrect readings. Our study also revealed essential information on the nutritional status of under-five children as measured by MUAC which complemented the major findings and it was evident that the prevalence of MUAC was 3.4 percent in the three studied areas.

2.7. Socio-economic Determinants of Nutritional status of Under-Five Children

According to WHO (2014), revealed that global determinants of under nutrition differ from one region to the other and most of the regions experience high levels of under nutrition among under- five children.

Wasting and the other types of under nutrition are linked to different factors such as water and sanitation, cultural practices, unavailability of food and other different socio-economic concerns including education level of parents/caregivers.

Abuya et al. (2012) in their study showed that the parent's education level has an impact on the child nutritional status even when the household has low economic status. Their study showed that children coming from households with educated parents had a lower risk of being malnourished. Further the study showed that parents with basic education had knowledge on the importance of resource utilization for improved children nutritional status than those with no education.

2.8. Occupation of Parents/Caregivers

This is the type of work which is done by the one keeping the child in a particular household. This can either be a parent or any other elderly person keeping that child in a household. According to Ganesh et al. (2013), women's employment increases household income, which has an ultimate benefit to household nutrition, including her own nutritional status. In their study it was pointed out that child nutritional status can be determined by women's employment. They further explained that this was due to the power working women have within the household in terms of economic decision making. In addition, Omondi and Kirabira (2016) in their study they pointed out that child nutritional status can also be affected by low earnings and parental lack of education as contributing factors of child stunting, wasting and underweight. Lack of parent education leads to poor understanding and focus on the type of food required for the child in order to achieve good growth of that child at household level. Further, the findings of the current study showed that the high density area had majority respondents that were unemployed and most households that were food insecure which could have been the main cause of malnutrition among under- five children.

2.9. Household Income

This is monetary earnings from charities, receiving regular funds from the family members and productive activities by the parent or any elderly person heading the household. The Bangladesh Demographic and Health Survey (2014) investigated the impact of some demographic, socio-economic environmental, and health related factors affecting child nutritional status. BDHS (2014),found strong significant relationship between uneven household wealth and chronic childhood malnutrition. The study further showed that children from the poorest households are at higher risks of becoming chronically malnourished compared to the children coming from

wealthy households. The study suggested making services like food supplementation more available to children coming from poor households in order to reduce poverty and improving child health and nutritional status (National Institute of Population Research and Training, 2014). The present study focuses on the household income as a socio-economic factor affecting under-five nutritional status. Furthermore, it was also evident that among the studied areas PHI was considered as an area of low density, and as such most households were with literate parents who had household income levels between $100 and $500 per month, and a few with household income above $500 per month. Besides, the majority were in gainful employment which also explains the reason behind its better nutritional status in under-five children. These findings were consistent with a study by Bangladesh Demographic and Health Survey (2014) which indicated that household with high socio-economic factors to be positively linked with improved nutrition, food access and variety of food, which is extremely important to improve the nutritional status of children.

2.10. Place of Residence

This implies living in a particular locality for at least a period of 12 months; this can either mean living in a low, mid or high residential suburb. Each residential suburb has a contributing factor to the children wellbeing or effect on their nutrition. A study by Kingsley et al. (2016) indicated that there were some differences in mortality of children under the age of five by residence. The study showed that 121 children death in urban area were due to malnutrition compared to 191 children in the rural areas. These higher rates of rural malnutrition were also reported by local studies in Ethiopia (Asfaw et al., 2015).

Motbainor et al. (2016) in Ethiopia also revealed the association between residential area and under nutrition. In their study, they studied differences between urban and rural locations and identified that urban parents in high socio-economic areas with low density settings have access to nutrition information that is given through different media on child care and feeding which also makes it easier to manage the children's nutritional status. In our current study, suburban areas were examined, and the outcome could be due to the fact that parents in the high socio-economic areas with low density settings have access to nutrition information that is given through different media on child care and feeding. Such information enables the middle and low density area caregivers to feed their children properly compared to those from high density areas.

2.11. Source of Water and Sanitation

Another determinant of under-nutrition is poor water supply. Some researchers have revealed that piped water is a protective factor against malnutrition (Demissie and Worku, 2013: Oyekale, 2012). Safe water prevents the progression of water borne diseases which together with poor sanitation and hygiene can negatively affect the health and nutritional status and promote chronic malnutrition in under- five children (Schwemlein et al., 2016). For instance, according to the community based cross sectional study by Khan et al. (2016), it was revealed that using unprotected water source supply showed significant association with stunting, wasting and underweight. Contrary to the fact that piped water is a protective factor of malnutrition (Oyekale, 2012). Mtendere still had the highest number of malnourished children despite using piped water; this was because the area also had the highest number of households using unprotected boreholes and wells with untreated water which contributes negatively to children's' nutritional status compared to PHI and Helen Kaunda.

2.12. Availability of Toilet facility and Types of Toilet

Khan et al. (2016 in their study, they pointed out that the non-availability of toilet facilities showed association with risks of stunting, wasting and underweight. This study was consistent with the study done in Ethiopia by Ma'alin et al. (2016) which revealed that toilet availability leads to better sanitation and lowers the risks of infection among the children in the community. In line with other studies, non-availability of toilet facilities showed association with risks of stunting, wasting and underweight. Toilet availability leads to better sanitation that lowers the risks of infection among the children in the community (Khan et al. 2016). However, in their study, the effect of type of toilet on nutritional status was not assessed, and this study found that the effect of type of toilet was not reflective with malnutrition form of wasting but underweight

Studies by Koskei et al. (2013) revealed the type of toilet by households and observed that most of the married respondents used improved toilets like ventilated improved pit (VIP) latrines unlike those who were not married.

Their study revealed that improved and unimproved sanitation facilities included the throwing away of children's stool as a depended on the knowledge of the care taker/ parent on how they were able to throw away the child's stool either in a flushable toilet or pit latrine including attention to hygiene has a direct effect on the children's nutritional status.

2.13. Role of socio- economic status on the nutritional status of under- five children

A study by Masiye et al. (2010) showed that significant differences in nutritional attainment are observed among children of different population groups within countries. In their study they further revealed that these differences are patterned along socio-economic strata however, within the socio-economic domain are underlying and more basic causes that include poverty,

household food insecurity, unsanitary unhealthy environment and social norms. These play a vital role in the nutritional status of children under the age of five.

The report by UNICEF (2013) indicated that food, care and health also depend on socio-economic changes that influence an individual's nutritional status as the three plays a vital role in ensuring adequate nutrition. The report further revealed that malnutrition can be caused by different factors which include poor methods of infant and young child feeding practices, lack of resources to buy or grow adequate nutritious foods and inadequate knowledge of what and how to cook by the caretakers.

A study by Bhutta et al. (2012) observes that prolonged unavailability of food and high food prices increased nutrition demand in Pakistan. In their study they stated that most nutritional status benefits results only when children have access to reasonable prices of food, variety of food nutrients, adequate maternal and child care practices, adequate health services and good hygiene practices. The socio-economic and political factors also affect food, health and care. However, the importance of these factors differs from one country to another (Bhutta et al., 2012). Saaka and Osman (2013), also indicated that households with high socio-economic factors tend to be linked with improved nutrition by having food access and variety of food, which is extremely important to the improvement of children's nutritional status.

2.14. Link between Socio-economic factors and Nutritional status of under- five Children

It was pointed out by Black et al. (2013) that by examining the association between nutritional status and socio-economic determinants in a community one can easily predict the drivers of nutritional status of children in the community were the children lived.

A recent study by Mensah (2015) stated that the influence of socio-economic factors on nutritional status of rural children in Ghana provided valuable information which showed that, socio-economic parameters such as education, occupation, income levels and other socio-economic variables are strongly associated with child nutritional status. He also observed that incidence of malnutrition were only recorded by respondents with low socio-economic factors as compared to those with high or appreciable socio-economic factors within the Nkotompo township.

Another study on the relationship between socio-economic factors and children nutritional status was done by Abuya et al. (2012), revealed a significant relationship between socio-economic factors such as income and literacy of parents with the prevalence of weight-for-height (WH) and weight-for-age (WA). In this cycle socio-economic factors focused on income levels of a household whether high or low while literacy was focused on whether parents could read and write. Low income and maternal literacy was identified as key factors in determining weight for height Z-score and weight for age Z-score (WHO, 2013).

Zambia as well as other developing countries like, Ethiopia, Kenya, and Ghana are found to be at higher risk of poor nutritional status in under-five children aged 6-59 months. In these developing countries most children are affected by stunting, wasting and underweight. Therefore, further the research on socio-economic factors that are likely to influence the nutritional status of under-five children is important.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter gives information of the methods used in collecting data for the research. It describes the study design, study sites and the sample size. It also contains the sampling methods, study variables, data analysis, ethical considerations, and rationale for the research design.

3.2. Study design

The study employed a cross sectional descriptive design which was used to determine whether an association between socio-economic factors and nutritional status of under-five years children existed in the selected residential areas. Cross sectional is a research design where data is gathered once perhaps over a period of days, weeks and months. This study was carried out in June, 2017.The descriptive aspect of the study was used to identify the association between socio-economic factors and nutritional status of children under the age of five.

3.3. Study Site

The study was conducted within Lusaka Urban District in the central region of Zambia covering three selected residential compounds which included Mtendere, Helen Kaunda and Presidential Housing Initiative (PHI). The district was chosen for this study because it had high, mid and low residential areas with different characteristics of socio-economic attributes that had an effect on the nutritional status of the under-five children.

The people living in these residential areas had representative groups required for the study that visited the same clinics, churches, and shops. The representative groups also ate the same type of food which was bought from the same market. Furthermore, these groups qualified for this study because they had different socio-economic factors which had an effect on the nutritional status of the under- five children despite living in the same catchment area.

3.4. Study Population

The survey subjects were children under the age of five (6-59 months of age) years who were found in the sampled households within the site of study. The respondents were the child's mother or an adult caretaker who were answering the questions during the interview. The rationale behind the selected study population subjects was because children in this age group were at high risk of developing malnutrition. Children in this age group are prone to disease due to poor feeding, sanitation and hygiene which can further affect their nutritional status. In addition, the socio-economic factors had a huge influence on the nutritional status of the children under the age of five. Therefore, there was need to study further and identify other socio-economic factors which influenced the under-five nutritional status at district level.

For this study, the populations were children under the age of five years who met the inclusion criteria, and were coming from Mtendere, Helen Kaunda and Presidential Housing Initiative study areas as stated earlier.

1. Inclusion Criteria

All children who were between the ages of six months and fifty -nine months (6-59) old and were living in the selected areas and systematically selected households where, one house was picked every after the fifth household during data collection were included in the study. Consent was sought from the parents or guardian of the children before the study was conducted.

2. Exclusion Criteria

Children who were exclusively breast feeding or treated for any diseases during the time of data collection were excluded from the study. Besides, to ensure quality data, children who were treated or had a disease in the last two (2) weeks before data collection were not considered for the study. Lastly, children who did not stay in the area for more than six months were also excluded from the study.

3.5. Sampling Methods

Due to high levels of malnutrition in Lusaka district, this study sampled three compounds namely Presidential Housing Initiative (PHI), Mtendere and Helen Kaunda. The three compounds are geographically located in the same catchment area. This study used a proportionate sampling method were each compound had a different population size. The study used Yemane table to establish the sample size for each compound. According to Yamane (1967), for +/-10% precision level, Mtendere with a total population of 118,727 had 160 respondents, PHI with a total population of 45,933 had 125 respondents and Helen Kaunda with a population of 35,139 had 121 respondents. All the three compounds had a total sample size of 406.

In this study the households were systematically sampled. The households which were systematically sampled had a parent of the under-five child who was either male or female. In the case of where a sampled household had no child or children fitting the criteria for inclusion, another household either on the opposite direction or within the same line was systematically picked in the same neighbourhood to replace it on condition that there was an under five.

Based on the size of the sampling frame, the sampling was determined for each household using the formula (N/n). Where N was the study population and n was the sample size. $n = Z^2 \frac{P(1-P)}{d^2}$= 385.

3.6. Sample size Determination

The sample size for this study was calculated using this formula: $n=Z^2\ [P(1-P)/d^2]$ where n was the sample size, Z^2 was the abscissa of the normal curve that cuts off an area at the tails (1– equals the desired confidence level, 95%), d was the desired level of precision for this study which was +- 5%, p was the estimated proportion of an attribute that was present in the population in this case it was 50% of Zambian children (approximated) and after the calculation the sample size was estimated to be 385 (David, et al.,2011).

$n = Z^2 \ \frac{Pq}{d^2}$ Or $n = Z^2 \frac{P(1-P)}{d^2}$

q = 1-p

d^2 = Degree of Precision = 0.05^2

Z= Level of significant = 1.96^2 when using a 95 percent Confidence Interval.

P= Prevalence of indicators of the malnutrition in the population being studied (50 percent).

n = Sample required

d^2=Degree of Precision or Margin of Error = 0.05^2, this refers to the accuracy range (+/- 5 percent)

Therefore $n = 1.96^2 \frac{0.5(1-0.5)}{0.05^2}$

The minimum sample size was 385.An addition of 5% attrition was done in order to compensate for other respondents who refused to be interviewed and this brought the total sample size to 406.

3.7. Data Collection Tools

This study collected data by assessing the growth of the under-five children through anthropometry measurement. The measurement of weight for age, weight for age and MUAC measurement methods were used to confirm the nutritional status of the children by using a Seca battery scale, height board and MUAC (Pollach et al, 2011). Data was collected by a pretested questionnaire from 20 households which are based in Kalingalinga Vera area which is outside the study areas. The pilot study systematically sampled the households were a pretested questionnaire was administered in order to test the questionnaires strength and weakness. Thereafter, the researcher rearranged the questions in the questionnaire for an improved flow of questions. A semi-structured questionnaire was used to collect data on socio- economic factors and child nutritional status.

3.8. Mid Upper Arm Circumference Measurement

The Mid Upper Arm Circumference (MUAC) was used to determine the nutritional status of children. The interpretation of the readings was as follows;

The coloured tape was used with Red: measurements of 11.5cm or less which mean that the child is severely malnourished and is at extremely high mortality risk. Yellow: A measurement of below 12.5cm means that the child has acute malnutrition and Green: measurements from 12.5 cm and above mean that the child is not malnourished (Pollach et al., 2011).

3.9. Weight for Age (WA) (Underweight)

In order to measure the children's weight, a scale was used by calibrating the scale before weighting. Children less than two years were weighed on a Seca scale whilst wearing minimal clothes and carried by their mother/parent. Children above two years were also weighted using a Seca scale. The children above two years of age those of who were able to stand, were weighted whilst standing straight on the scale without shoes and wore minimal clothes (Mamulwar et al., 2014).

3.10. Weight for Height (WH) (Wasting)

The children height was measured by the use of standardized equipment. Children's lengths up to the years of two were measured on a horizontal measuring scale or a height board. The height of a child was measured whilst standing for children who were able to stand and in lying position for children who could not stand and were younger than two years of age. Height was then measured against the weight of the child in order to know the weight for height (WHO, 2013).This study did not labour to do anthropometric measurements for stunting which is height-for age and chronic malnutrition. This study only focused on acute malnutrition in children such as weight for height (wasting) and weight for age (underweight).

3.11. Questionnaire Administration

A semi-structured questionnaire with both open and closed ended questions was used and was administered to parent or caregivers from each household in order to collect data that assisted in answering the research questions. The data that was collected included the demographic characteristic of the households, sources of income for sustenance and economic activities at the household, income, occupation of the head of the house or caregiver, education of head of the house or caregiver and other factors contributing to the nutritional status of under-five years children at household level.

The semi-structured questionnaire was prepared in English and translated in a local language (Nyanja) during interviews. A pre-tested questionnaire was administered to 20 mothers or caregivers of the children from households in Kalingalinga Vera area a location that was not part of the study in order to assess the questionnaires strength and weakness.

3.12. Data Analysis

The main outcome variables were the nutritional status measured as Weight for Age z-score (WH) and Weight for Height z-score (WA) of under-five year's children. Data entry was done using SPSS computer packages and micro-soft excel. Initial analysis was done using WHO Anthroplus ver.3.2.2 to compute Z-scores, and later data was exported to SPSS and computed indices namely Weight for Age Z-score (WH) and Weight for Height Z-score (WA). Final quantitative data analysis was done using Statistical Package for Social Sciences (SPSS) computer software ver.20.Quantitative data was generated for each of the variables under study. The under- five children were categorized in ages. The two by two tables were generated to show the relationship between nutritional status of the under-five years old and the independent variables.

Further, Pearson Chi square was used to prove the relationship between socio-economic factors and child nutritional status. Any results with a p value less than 0.05 was considered significant.

3.13. Study Limitations and Justification

There was need to analyse and quantify information on the relationship between socio-economic factors and nutritional status of the under-five children even though language was a barrier considering the fact that respondents were of different ethnical background and the questionnaire was only translated in one local language which was Nyanja. Furthermore, household selection was also an issue in case the house selected did not have children who were under-five years. Hence, households with children aged 6-59 months of age were not representative of all households. The excluded households without eligible children were not the target group. The study being a household survey, effectively excluded residents who did not live within the context of the households. It was also not representative of migrant groups and people who had resided in the study areas for less than six months prior to the start of the study. The researcher ha several call backs in few households during the study. In addition, this study did not collect measurements for stunting because the researcher had no tools to use for the measurement.

A good understanding of the association between socio-economic factors and nutritional status of under -five years children will be beneficial to the people within the compounds of Lusaka urban and the rest of the country in terms of the nutritional support such as cooking demonstrations from the health centres through Lusaka district health office. Therefore, it is hoped that by conducting the study, the researcher will contribute to the existing body of knowledge on child nutrition and address the role socio-economic factors play in determining the nature of child nutritional status at household level in under-five children to further reduce malnutrition in the selected catchment areas. The results from this study are important because they will enable the

District health office to introduce helpful interventions and strategies on how to reduce malnutrition in Zambia.

Therefore, comprehensive national socio-economic developmental strategies should be considered in order to solve these problems in all areas affected by malnutrition in Zambia.

3.14. Ethical Considerations

Ethical clearance was obtained from the Research Ethics Committee ERES CONVERGE approval number 2017-march-011 and permission from the Ministry of Health, Lusaka Provincial Health Office and District Health Offices were sought before collecting data. The consent was sought from each participant (under- five years caretaker or parent) prior to data collection. Confidentiality was considered before, during and after the study. even when taking measurements of a child. Either the caretaker or the parent of the child was used as an assistant to hold the child during measurements in order to keep the child comfortable and familiar with the whole process.

3.15. Rational of Selecting Research Design

Cross-sectional studies, also known as one-shot or status studies are the most commonly used design in the social sciences surveys.

This design is best suited for studies aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population. They are useful in obtaining an overall ‘picture’ as it stands at the current time of the study. They are designed to study some phenomenon by taking a cross-section of it at one point in time. Such studies are cross sectional with regard to both the study population and the time of investigation.

The research design makes it possible to determine the association between socio-economic factors and nutritional status of under -five years as the nature of this study involved only one contact with the study population.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1. Introduction

This chapter is a presentation of the findings on the association between socio-economic factors and nutritional status of under-five children in the three selected catchment areas. Tables, frequencies and percentages have been used to present these findings.

4.2. Demographic and Socio-Economic Characteristics

The background characteristics of respondents in this section include sex, age, residence education levels, household income, sources of water, toilet availability, types of toilet, employment status and education level of the parent or caregiver.

A total of 406 study subjects were included in the study, out of which 279 (68.7%) were representing 69% females and 127 (31.3%) representing 31% males. The mean age for the study subject was 28.97 months for both sexes, and there were basically more female children compared to males as illustrated in table 1 below.

Table 1: Distribution of under- five Children by Age and Sex

Age (months)	Male(percent) N (%)	Female (percent) N (%)	Total (percent) N (%)
6-11 months	29 (7.1)	69 (17.0)	98 (24.1)
12-23 months	17 (4.2)	44 (10.8)	61 (15.0)
24-35 months	24 (5.9)	57 (14.0)	81 (20.0)
36-59 months	57 (14.0)	109 (26.8)	166 (40.9)
Total	**127 (31.3)**	**279 (68.7)**	**406 (100.0)**

* The median age calculated for both sexes is 24**.** This implies that half of the sample was below 24 months, while the other half was above the age of 24months.

The overall socio-economic characteristics and relationship across the three studied areas indicated that a total of 406 parents and caregivers coming from the selected households responded to the questionnaire.

Out of the 406, 160 (39.4%) of the children coming from the selected households were Mtendere residents, 125 (30.8%) children were coming from PHI and 121 (29.8%) children were from Helen Kaunda. The majority of children who were 206 (50.7%) were born from parents with household income between $100 and $500 per month. The children who were 175 (43.1%) were born from parents with household income below $100 and few of the children who were 25 (6.2%) were born from parents and household income above $500.Table 2 also showed that 346 (85.2%) and also representing the majority of households had taps or piped water as the source of water. A reasonable number of 29 (7.1%) were from households that had borehole water as source of water and 31(7.6%) respondents were from households that had water from the well as source of water. The majority of the respondents who were 357(87.9%) had toilets and only a few who were 48 (11.8%) respondents had no toilets.

More than half of the respondents, who were 288 (70.9%), were not in any employment and 118 (29.1%) were in employment. Literate parents were 262 (64.5%) comprised parents who underwent secondary education and above, while 105 (25.9%) respondents and 39 (9.6%) respondents represented primary and no education respectively. The majority of respondents who were 227 (55.9%) possessed flushable toilets while a reasonable number of the respondents who were 159 (39.2%) were using pit latrines and a few who were 20 (4.9%) had open pit toilets as illustrated in Table 2 below.

Table 2: Distribution of Socio-economic Characteristics

	Frequency	Overall Percent	Place of Residence		
			PHI Low Density	Helen Kaunda Mid Density	Mtendere High Density
Total	**(n=406)**	**100 percent**	**125 (30.8%)**	**121 (29.8%)**	**160(39.4%)**
Household Income/Month					
Below $100	175	(43.1)	12 (9.6)	43 (35.5)	120 (75.0)
$100- $500	206	(50.7)	90 (23)	76 (62.8)	40 (25.0)
Above $500	25	(6.2)	23 (18.4)	2 (1.7)	0 (0.0)
Sources of water					
Borehole	29	(7.1)	3 (2.4)	11 (9.1)	15 (9.4)
Well	31	(7.6)	1 (0.8)	9 (7.4)	21 (13.1)
Taps/Piped water	346	(85.2)	121 (96.8)	101 (83.5)	124 (77.5)
Toilet Availability					
Yes	357	(87.9)	124 (99.2)	108 (89.3)	125 (78.6)
No	48	(11.8)	1 (0.8)	13 (10.7)	34 (21.4)
Employment Status					
Not Employed	288	(70.9)	24 (19.2)	68 (56.2)	114 (71.3)
Employed	118	(29.1)	101 (80.8)	53 (43.8)	46 (28.8)
Education Level of caregiver/Parent.					
No education	39	(9.6)	5 (4.0)	11 (9.1)	23 (14.4)
Primary	105	(25.9)	7 (5.6)	28 (23.1)	70 (43.8)
Secondary and Above	262	(64.5)	113 (90.4)	82 (67.8)	67 (41.9)
Types of Toilet					
Flushable Toilet	227	(55.9)	110 (88.0)	74 (61.2)	43 (26.9)
Pit Latrine	159	(39.2)	15 (12.0)	42 (34.7)	102 (63.8)
Open pit toilet	20	(4.9)	0 (0.0)	5 (4.1)	15 (9.4)

4.3. Nature of under-five Child Nutritional Status at Household Level

The nutritional status among the under-five children in terms of underweight and wasted in the study areas shows that of the 406 children 80.3% of the children were not underweight (low weight for age) and 12.3% were underweight. In terms of wasting 80.3% of the 406 children were not wasted (low weight for height) and 7.4% were wasted as illustrated in figure 2 below.

The figure also reveals that out of the children who were underweight, majority 9.6% were from Mtendere, 1.7% from PHI and 1.0% from Helen Kaunda. In terms of wasting, 5.9 % were from Mtendere, 1.2% were from PHI and 0.2 % were coming from Helen Kaunda.

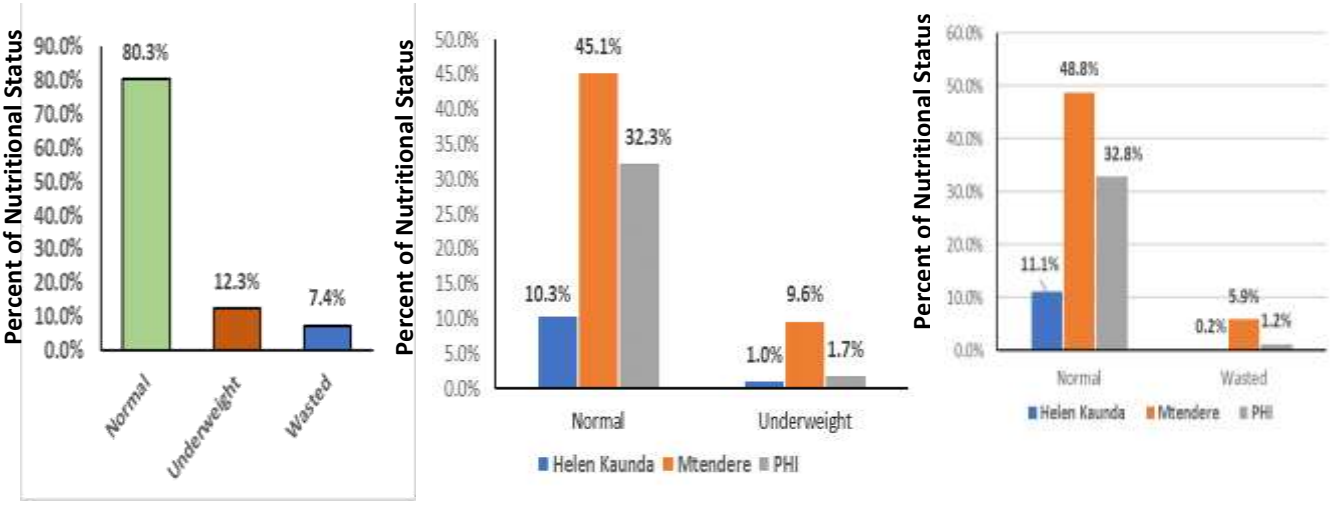


Figure 2: Nutritional status of the studied under-five children*

*Wasting refers to WHZ <-2 SD; normal Z-score of between negative (-) 2 to positive (+) 2 SD

The findings on MUAC measurements taken from the under- five children from the three residential areas indicated that the majority of the children representing 78.3% were above 13.5cm, were well nourished, 18.2% fell in the range between 12.5cm-13.5cm were at risk of acute malnutrition. The rest comprising of 3.4% were below 12.5cm had acute malnutrition as illustrated in Figure 3 below.

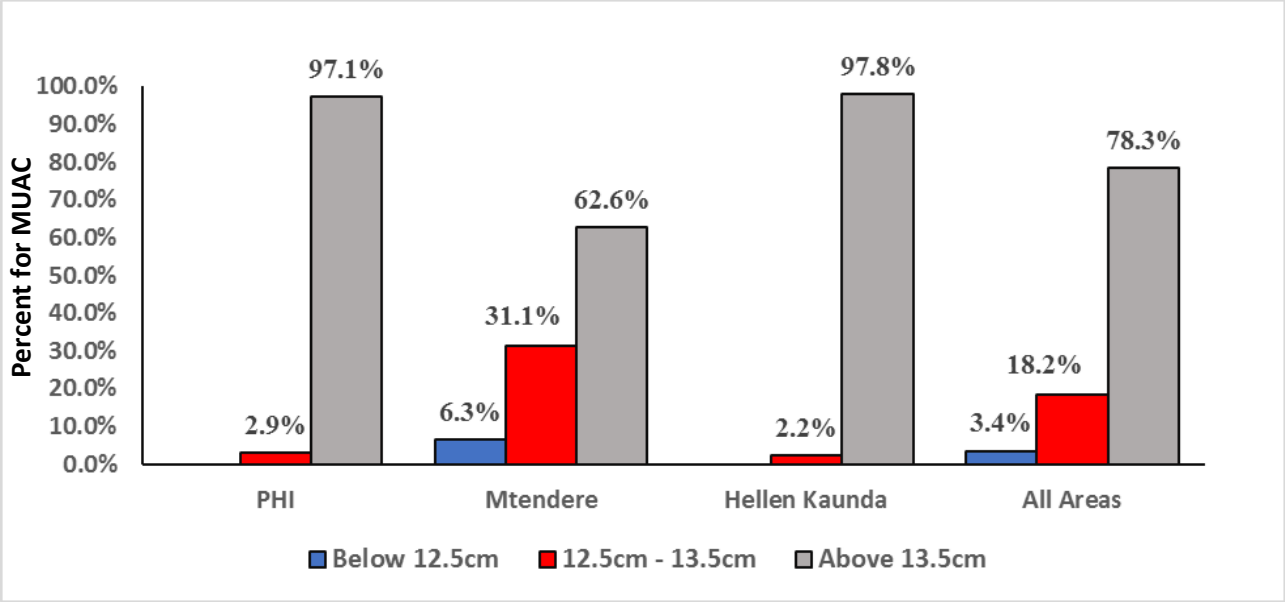


Figure 3: Under-Five Children Nutritional Status as Measured by Mid Upper Arm Circumference (MUAC)

4.4. Nutritional Status of under- five Children measured by Weight for Age

The differences in nutritional status by underweight. The differences in nutritional status through underweight across the three residential areas involved in the study showed the proportion of the majority among the underweight representing (17.6%) came from Mtendere, (8.7%) representing children from Helen Kaunda and (5.1%) consists of children from PHI.

Figure 4 also showed the differences in nutritional status by normal or not being underweight. It also showed that among the children found not to be underweight, and had good nutritional status the majority (94.9%) were PHI residents, (91.3%) were Helen Kaunda residents and the rest representing (82.4%) were Mtendere residents as illustrated in Figure 4 below.

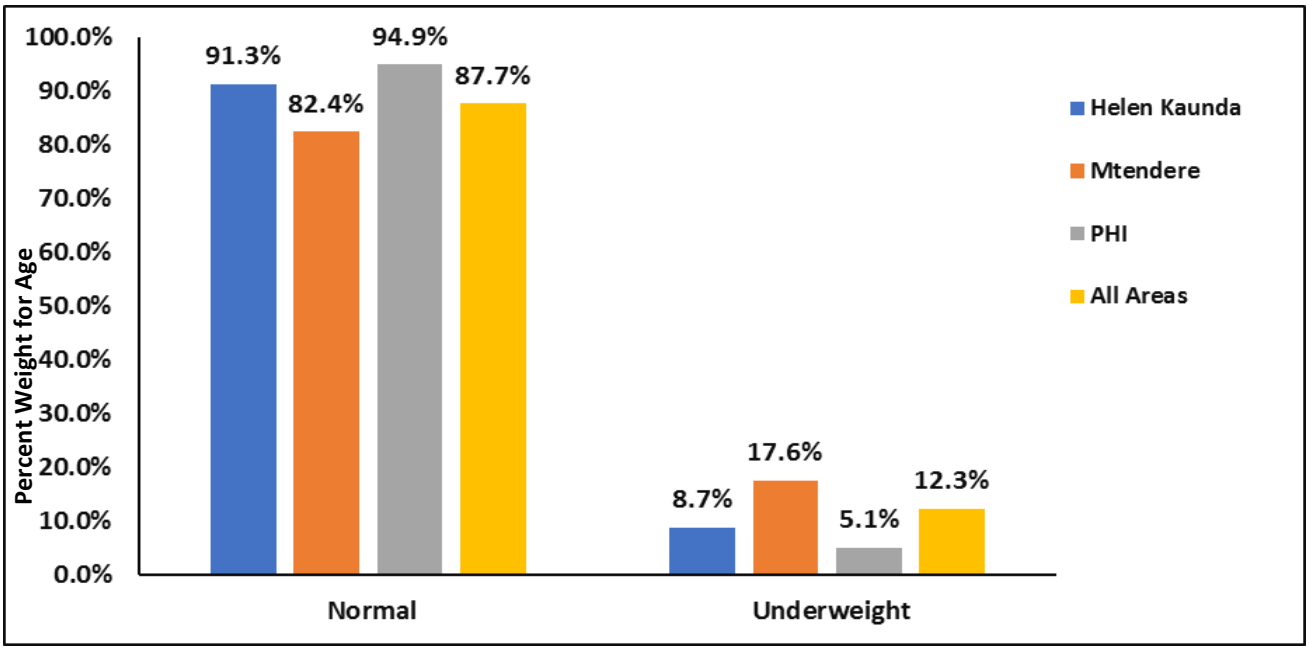


Figure 4: Differentials in Under-Five Children Nutritional Status Measured by Weight for Age.

The differences in the nutritional status by weight for height (wasted) and not wasted or normal children across the three residential areas involved in this study. The results in figure 5 below showed the differences among the children who were wasted, and the majority who represented by (10.8%) were residents of Mtendere, (3.6%) were from PHI and (2.2%) comprised of those from Helen Kaunda. These findings indicate that most of the wasted children were from Mtendere, followed by PHI and Helen Kaunda respectively.

Among the children found not to be wasted and had good nutritional status, the majority represented (97.8%) were Helen Kaunda residents, (96.4%) were from PHI, whereas (89.2%) of the children with normal nutritional status were coming from Mtendere.

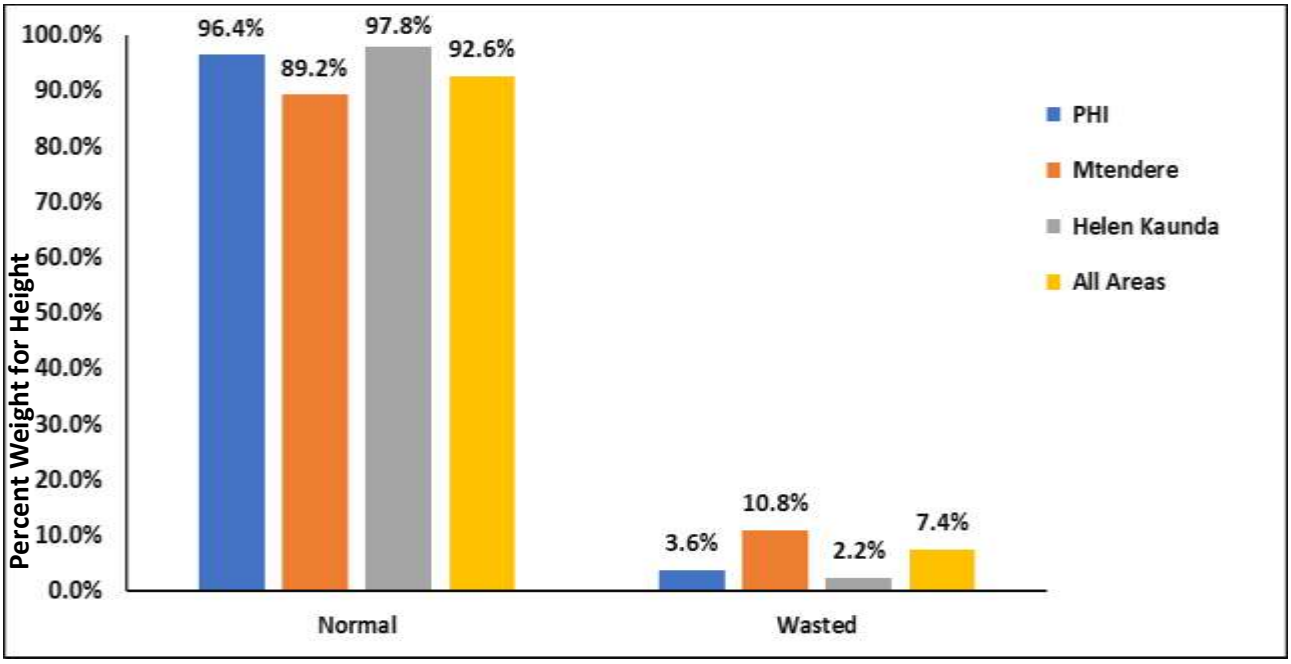


Figure 5: Differentials in Under-Five Children Nutritional Status Measured by Weight for Height.

The differentials in under-five children nutritional status as measured by MUAC among the three research areas. The study showed that (3.4 %) of the children with acute malnutrition were from Mtendere. Figure 6 below further showed that (17.0%) of the children from Mtendere were at risk of suffering from acute malnutrition, followed by Helen Kaunda with (1.0%) and (0.2%) PHI. The study showed that the children above 13.5 cm of MUAC were not at risk of acute malnutrition because they were well nourished, representing (34.2%) were Mtendere residents, followed by (33.0%) from Helen Kaunda and (11.1%) from PHI. This may be that Mtendere has a high density in terms of population and has low socio-economic factors which contributes to children's' nutritional status.

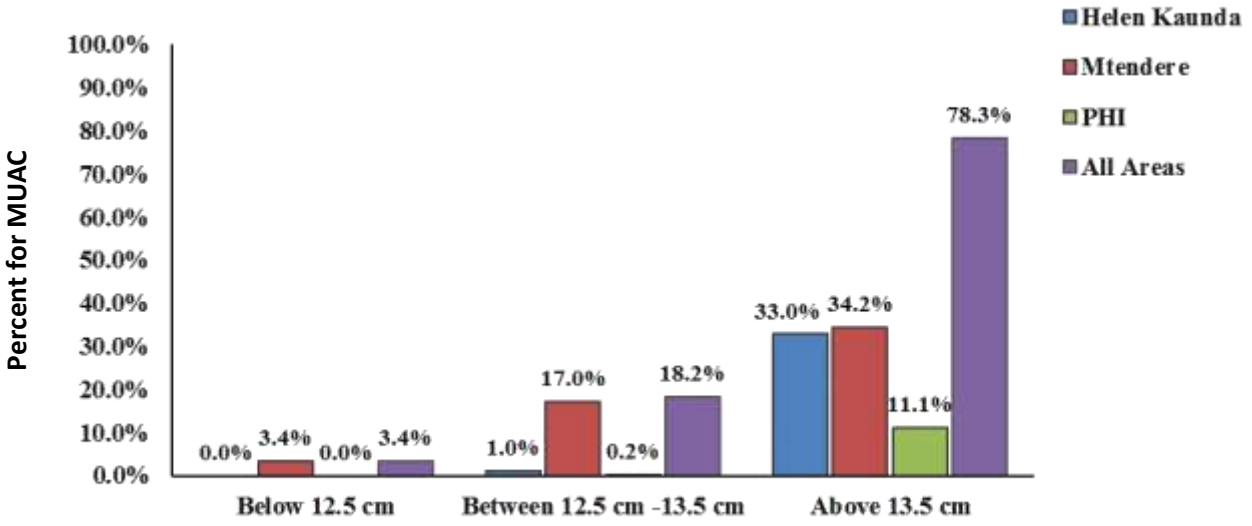


Figure 6: Differentials in under-five Children Nutritional Status Measured by MUAC

4.5. Socio-economic Factors Associated with under- five Child Nutritional Status

The association between nutritional status which is underweight of under- five children and different socio-economic variables which were place of residence, education of parents, types of toilet, toilet availability, sources of water, and education level of the parent/ caregiver, employment status and household income. Statistically, underweight was significant related with the variables like: place of residence with (P= 0.002), types of toilet with (P=0.001), toilet availability with (P=0.018), sources of water with (P=0.001) and education level of the parent/ caregiver with (P=0.001), employment status with (P=0.001) and household income with (P=0.002) as illustrated in Table 3 below.

Table 3: Factors Associated with Nutritional Status Measured by Weight for Age (N=406) among under- five Children

Variable	Underweight (n=50)	Not Underweight (n=356)	Chi square; p-value
Residence			
PHI- Low density	7 (14.0%)	118 (33.1%)	**P = (0.002)**
Helen Kaunda- Medium Density	10 (20.0%)	111 (31.2%)	df =2
Mtendere-High Density	33 (66.0%)	127 (35.7%)	X^2 =12.933[a]
Employment Status			
Not Employed	39 (78.0%)	167 (46.9%)	**P = (0.001)**
Employed	11 (22.0%)	189 (53.1%)	df =1
			X^2 =16.955[a]
Toilet availability			
Yes	38 (76.0%)	319 (89.9%)	**P = (0.018)**
No	12 (24.0%)	37 (10.1%)	df =1
			X^2 =5.623[a]
Household income			
Below $100	30(60.0%)	145(40.7%)	**P = (0.002)**
Between $100-$500	19(38.0%)	187(52.5%)	df =2
Above $500	1 (2.0%)	24 (6.7%)	X^2 =12.483[a]
Education Level			
No education	22(44.0%)	17 (4.8%)	**P = (0.001)**

Primary	18(36.0%)	87(24.4%)	df =2
Secondary and Above	10(20.0%)	252(70.8%)	X^2 =90.012[a]
Source of water			
Borehole	7 (14.0%)	22(6.2%)	**P = (0.001)**
Well	12(24.0%)	19(5.3%)	df =2
Taps/Piped water	31(62.0%)	315(88.5%)	X^2 =27.361[a]
Type of toilet			
Flushable Toilet	20(40.0%)	207(58.1%)	**P = (0.001)**
Pit Latrine	22(44.0%)	137(38.5%)	df =2
Open pit toilet	8 (16.0%)	12(3.4%)	X^2 =15.991a

*** P value, value for which <0.05 is significantly associated**.

***** Exchange rate at the time was 1 United States dollar = 10 Zambian Kwacha.

The association between nutritional status which is wasting of the under- five children and socio-economic variables like; place of residence, education level of the parents/caregiver, employment status, sources of water, toilet availability and type of toilet and household income. Statistically, wasting was significant related with the variables like: place of residence with (P=0.014), education level of the parents/caregiver with (P=0.001), employment status (P=0.001), sources of water with (P=0.045), toilet availability with (P=0.001).Table 4, also shows that there was no statistically significant relationship between household income and wasting (P=0.464), type of toilet and wasting (P=0.215) as illustrated in Table 4 on the next page.

Table 4: Factors Associated with Nutritional Status Measured by Weight for Height (N=406) among under- five Children

Variable	Wasted (n=30)	Not Wasted (n=376)	Chi square; p-value
Residence			
PHI- Low density	4(13.3%)	121(32.2%)	**P =(0.014)**
Helen Kaunda- Medium Density	8(26.7%)	113(30.1%)	df =2
Mtendere-High Density	18 (60.0%)	142 (37.8%)	X^2 =8.486[a]
Employment Status			
Not Employed	24 (80.0%)	182(48.4%)	**P = (0.001)**
Employed	6 (20.0%)	194 (51.6%)	df =1
			X^2 =11.097[a]
Toilet availability			
Yes	18 (60.0%)	339 (90.0%)	**P = (0.001)**
No	12 (40.0%)	37 (9.6%)	df =1
			X^2 =24.572[a]
Household income			
Below $100	16(53.3%)	159(42.3%)	**P = (0.464)**
Between $100-$500	12(40.0%)	194(51.6%)	df =2
Above $500	2 (6.7%)	23 (6.1%)	X^2 =1.536[a]
Education Level			
No education	14(46.7%)	25 (6.6%)	**P = (0.001)**
Primary	4 (13.3%)	101(26.9%)	df =2
Secondary and Above	12(40.0%)	250(66.5%)	X^2 =51.305[a]
Source of water			
Borehole	4 (13.3%)	25(6.6%)	**P = (0.045)**
Well	10(33.3%)	21(5.6%)	df =2
Taps/Piped water	16(53.3%)	330(87.8%)	X^2 =6.220a
Type of toilet			
Flushable Toilet	13(43.3%)	214(56.9%)	**P = (0.215)**
Pit Latrine	14(46.7%)	145(38.6%)	df =2
Open pit toilet	3(10.0%)	17(4.5%)	X^2 =3.075[a]

*** P value, value for which <0.05 is significantly associated**.

CHAPTER FIVE

DISCUSSION

5.1. Introduction

This chapter discusses the research findings as per study objectives, conclusions based on those findings and recommendations which are based on both the study findings and other relevant literature considered necessary and vital to be used in future to improve the study situation.

5.2. Discussion of findings

This study revealed interesting findings relating to the nutritional status of under-five children. It generally revealed that most children were well nourished which can be due to quality care and health which is reinforced by other socio-economic factors that influenced adequate nutrition among most households in the three residential areas. Similarly, UNICEF (2013) indicated that food, care and health are dependent on socio-economic changes and can influence an individual's nutritional status as they all play a big role to adequate nutrition.

However, among the malnourished, the study clearly revealed the prevalence of underweight as 12.3 percent among under-five children. This was slightly higher than the prevalence for Lusaka province and slightly lower than the national prevalence which is at 11 percent and 15 percent, respectively. On the other hand, the prevalence of wasting was 7.4 percent across the three selected areas which were higher than that reported by the Zambia Demographic Health Survey (ZDHS) for the national prevalence as 6 percent. These results were also slightly higher than the findings from the Global Hunger Index Report (2016), which is at 6.3 percent. This implies that malnutrition status in the studied areas is bad compared to the national average in Zambia and globally.

With nutritional status being an important measure of children's health in the studied areas, nutritional status therefore demands serious intervention because wasting exceeding 5 percent is alarming and increases mortality (WHO, 2012: CSO 2014: Global Hunger Index Report, 2016).

The study also revealed essential information on the nutritional status of under-five children as measured by MUAC which complemented the major findings as the measurements of wasting and underweight did not provide the extent of severity of malnutrition across the studied areas. Nonetheless, it was evident that the prevalence of MUAC was 3.4 percent in the three studied areas.

This community based survey also revealed that among the malnourished, Mtendere had the highest number of under- five children who were wasted and underweight compared to PHI and Helen Kaunda. Mtendere is a high density area coupled with low socio-economic factors which affects children's nutritional status. Similarly, this finding is supported by a study done by Motbainor et al. (2016) in Ethiopia that showed a significant association between residential area and under nutrition. In their study, they did not examine nutritional status within suburban setting; instead they only differentiated between urban and rural settings. In the current study, suburban areas were examined, and the outcome could be due to the fact that parents in the high socio-economic areas with low density settings have access to nutrition information that is given through different media on child care and feeding. Such information enables the middle and low density area caregivers to feed their children properly compared to those from high density areas. In addition, like other studies, high levels of education could have played a critical role in favour of respondents from middle and low density areas in directing their resources to right diet for their children resulting into low malnutrition levels (Masiye, 2010:Abuya.et.al., 2012).

Further, the study showed that the higher prevalence of wasting and underweight reflected the state of economic status of households in the residential areas and district as a whole. Therefore, underweight with a slightly lower prevalence than the national rate accounts for the reason that parents or caregivers of these under-five children had improved socio-economic factors than the average areas at national level. In the same way, the study found by Bhutta et al. (2012) revealed that quality nutritional status or low malnutrition levels results only when children have access to reasonable prices, variety of food nutrients, adequate maternal and child care practices, adequate health services, food and good hygiene practices.

This study also revealed the differences in the nutritional status and socio-economic factors among the three selected areas. It was revealed that Mtendere had the highest number of children who were among the underweight and wasted, (17.6%) percent and (10.8%) percent respectively. While among the well-nourished, the majority come from the three residential areas but Helen and PHI were highly ranked compared to Mtendere. However, these variations did not seem to be greater compared to what was observed among the malnourished. The accountings of such differences are due to variations in samples across the three residential areas as well as having different socio-economic factors that would contribute to the nutritional status of the under-five children in the these residential areas. As such, these results can be attributed to the fact that the differences in nutritional status are patterned along socio-economic strata occurring across the three selected areas. These findings are in line with studies in Ghana which revealed how incidences of malnutrition affected respondents with low socio-economic factors as compared with those coming from a high or appreciable socio-economic factor within the township (Mensah, 2015).

In addition, this study showed a very small proportion of the children that had wasting and most of these children actually came from a high density area which is Mtendere, whereas PHI and Helen Kaunda had less than 9 percent of under- five children with acute malnutrition. In other words, children drawn from Mtendere were more likely to be wasted or underweight compared to other two study areas as they are at high risk of suffering from acute malnutrition due to low socio-economic status. Similarly, BDHS (2014) found that children from the poorest household are at higher risks of becoming chronically malnourished compared to the children coming from the wealthy households.

This study found out that the difference in the socio-economic factors existed across the three selected areas. It was observed that there was a variation in the educational level of respondents among the selected areas of which Mtendere had the most illiterate care givers and the highest proportion of parents who lived below $100 per month compared to PHI and Helen Kaunda. Thus, the poor educational background of parents in Mtendere could have contributed to their poor knowledge of the nutritional requirements of their children, while their low economic status makes it difficult for them to contribute meaningfully to the family income, with the consequent inability to purchase some of the basic food needed by their children. Similarly, a study by Omondi (2016) recognized low earnings and illiteracy as being the determinant of stunting, wasting and underweight.

Furthermore, it was also evident that among the studied areas PHI was considered as an area of low density, and as such most households were with literate parents who had household income level between $100 and $500 per month, and a few with household income above $500 per month. Besides, the majority were in gainful employment which also explains the reason behind its better nutritional status in under-five children.

These findings were consistent with a study by Saaka and Osman (2013), indicated household with high socio-economic factors to be positively linked with improved nutritional food access and variety of food, which is extremely important to improve the nutritional status of children.

Further the findings showed that the high density area had majority respondents that were unemployed which could have been the main cause of malnutrition among under- five children.

In addition, the study also showed that high unemployment levels among the parents of the under -five children were found in Mtendere, and this affected household food choices leading to poor nutrition in children from this high density area.

It was evident that toilet availability was one of the important factors in the assessment of child nutritional status. In this study, it was very noticeable that parents from high density area or Mtendere had more respondents with access to toilets compared with PHI and Helen Kaunda.

However, this could not translate to the quality of the nutritional status among the under-five children in Mtendere compared to Helen Kaunda and PHI as Mtendere was also found with the largest number of households without toilets. Despite Helen Kaunda and PHI having more households with flushable toilets which is perceived to be linked to low malnutrition levels.

Contrary to the statement that piped water is a protective factor of malnutrition (Oyekale, 2012). Mtendere still had the highest number of malnourished children despite using piped water; this was because the area also had the highest number of households using unprotected boreholes and wells with untreated water which contributes negatively to children's' nutritional status compared to PHI and Helen Kaunda. In addition, piped water is usually treated and this has a positive relationship with nutritional status and improves under- five children's' health unlike untreated water from the wells and boreholes which is prone to contamination.

We can further argue that even with piped water, Mtendere still has poor sanitation and hygiene that is negatively affecting nutritional status and promoting chronic malnutrition in under- five children because of being a highly density area.

In line with other studies, non-availability of toilet facilities showed association with risks of stunting, wasting and underweight. Toilet availability leads to better sanitation that lowers the risks of infection among the children in the community (Khan et al. 2016). However, in their study, the effect of type of toilet on nutritional status was not assessed, and this present study found that the effect of type of toilet was not reflective with malnutrition form of wasting but underweight.

The study revealed the associations that were either significant or not significant among some socio-economic factors with wasting and underweight of children under the age of five, and these factors included place of residence, education, sources of water, toilet availability, employment status and household income.

It was evident that the relationships that were significant were in agreement with the study by Mensah (2015) on the influence of socio-economic factors on nutritional status of rural children in Ghana. His study brought out information that establish, socio-economic parameters such as education, occupation, income levels and other socio-economic variables that are strongly associated with child nutritional status.

Contrary to other studies by Abuya et al. (2012), the current study did not find significant association between nutritional status with household income and type of toilet. Thus, malnutrition in form of wasting in these areas might have been caused by other factors other than just having a high household income or a certain type of toilet.

However, these finding are in agreement with the study by Koskei et al. (2013), who revealed improved and unimproved sanitation facilities which included throwing away of stool for children also depended on the knowledge of the caretaker on hygiene and disposal of stool either in a flushable toilet or pit latrine toilet has a direct effect on the children' nutrition status. As such, can further argue that the type of toilet alone may have no effect on wasting in the studied areas as what matters is the level of hygiene and knowledge of good health practices that suppress malnutrition.

This study revealed parents place of residence to have been statistically significant to the children's underweight and wasting, whereby both underweight and wasting prevalence's were more observed in children whose parents were residents of Mtendere by it being a high density area compared to parent's place of residence from Helen Kaunda (medium density) and PHI (low density) compounds. These findings were in line with the study by Asfaw et al. (2015) who found higher rates of rural malnutrition in Ethiopia. In their study they also studied urban variances and found that within urban settlement there are low, median and high density catchment areas. In this study under-five nutritional status varies in the three catchment areas which are Mtendere, Helen Kaunda, PHI and it was revealed that it increases from high and reduces as it approaches low density areas.

The nutritional status of children with parent's different education levels and nutritional status was statistically significantly different from each other. Parent's level of education was statistically significant to children's underweight and wasting, whereby underweight and wasting prevalence was observed more in children whose caregivers had no schooling compared with the parents who acquired primary, secondary and tertiary education.

These findings are also in line with the study by researchers who found that the parent's education level has an impact on the child nutritional status even when the household have higher economic status.

Their study also showed that children coming from households with educated parents were at lower risk of being malnourished. Furthermore, the study showed that parent's with basic education had knowledge on the importance of proper resource utilization which improved children nutritional status than those with no education (Abuya et al., 2012).

Our study showed that sources of water and availability of toilets were important selected factors linked to the two indicators of nutritional status of under-five children across the studied areas. It was revealed that the nutritional status of children whose sources of water was from a borehole or well were more likely to be underweight as compared to those that had taps/piped water sources. Underweight increases in children coming from households which use borehole water sources, and reduces when taps/piped sources are used. This showed that sources of water had an impact on the children's' nutritional status. This relationship was evident for both sources of water and availability of toilets at 5 percent significant level in relation to wasting. Similarly, a study done in Ethiopia by Ma'alin et al. (2016) found that toilet availability makes better communities with good sanitation that reduces the risks of infections among the children.

From this study, it is evident that the households did not exercise very good hygiene and this could have affected children's' nutritional status.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

The study revealed that wasting and underweight are still a major problem among under-five children in the selected study areas especially in Mtendere residential area which is a high density area with low socio-economic factors compared to Helen Kaunda and PHI who have high or appreciable socio-economic status. The results also showed that the study areas that had poor water supply and sanitation problems and high illiteracy levels among parents which corresponded with high levels of wasting and underweight among under-five children. Further, the study revealed variations of the nutritional status among the under- five children and illustrated that there was a significant relationship between socio-economic variables with wasting and underweight. Only types of toilet and parent's household income had no significant relationship with wasting.

Based on the findings of this study, the following measures are recommended for further research and policy implementation on malnutrition among under-five children in Mtendere, Helen Kaunda, PHI and Zambia at large.

1. There should be more community-based interventions by the health centres within the suburban areas through the Lusaka district office. This will support the children with poor nutritional status through outreach assessments that would bring about rapid economic growth at both household and national level. To this effect, it is important to develop giving priority to very vulnerable households with low socio-economic factors as those in Mtendere.

2. The fight against malnutrition even in suburban areas of the country should be encouraged and supported and public information campaign in nutrition education on wasting and underweight among the under-five years children should be encouraged.

3. Further research should be conducted to evaluate the kind of malnutrition among children especially in most affected areas. This is necessary because acute malnutrition is by far the most fatal form of malnutrition and children are its most visible victims.

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APPENDICES

APPENDIX A: Informed Form

Research Topic

Title: Association between Socio-Economic Factors and Nutritional Status of Under-Five Years Children in Lusaka, Zambia.

Introduction

You are invited to participate in the study. Before you decide to be part of it, you need to understand the risks and benefits involved.

This consent provides information about this study. The researcher will be ready to attend to your questions and concerns and to provide further explanations. If you agree to take part in this study, you will be asked to sign this consent form after understanding its content. This process is known as Informed Consent. Be informed that your decision to take part in this study is voluntary. You are free to either accept or refuse to be part of it.

Purpose of the Study

The purpose of this study is to determination if there is an association between socio-economic factors and the nutritional status in three residential areas.

Study Procedure

In this study a structured questionnaire will be administered. It involves 406under- five children from house hold of Mtendere, Hellen Kaunda and PHI residential areas. Participants will be randomly selected. The study is estimated to last up to 2017. The researcher gives you a copy of questionnaire regarding the study. Twenty (18) questions are on a questionnaire and you will only be required to tick the correct answer. The other 4 questions will require explanations and explain in brief were needed. The length of the questionnaire will depend on how fast you answer the questions.

Benefits of Participation

This study is for academic purposes. There is no monetary gain for either researcher or participant. Your participation however will give you an opportunity to learn more on child health through assessments; it will also help in proposing ways that can be included in health nutrition education in the Ministry of Health.

Confidentiality of Records

You do not need to indicate your name on the questionnaire. Be assured that the information you provide will be kept confidential and shall not be used against you.

Voluntariness of Participation and Right to Withdraw

Your participation in this study is entirely voluntary. You have the right to refuse participation. You also have the right to withdraw from the study at any time and for your own reasons.

Privacy, Anonymity and Confidentiality

The questionnaire will be used and answered whilst I am present. Your privacy shall be respected and protected. All your information shall be kept in strict confidence.

APPENDIX B: Consent Form

I declare that I have explained the determination benefits, risks and discomforts of the study to the signatory's individual below.

Other important issues pertaining to this study have been cleared to the participant. Other questions have been discussed and answered to the participant's satisfaction.

Participant	Signature Date		
---	---	---	---
Researcher (print name)	Signature	Date	
---	---	---	Finger print for

Participant

Who to Contact:

1 Beatrice Kankhuni (Researcher)	2 The Secretary, ERES Converge
Contact details	Contact details
University of Zambia P.O Box 32379 Lusaka	33 Joseph Mwila Road, Rhodes Park, Lusaka. Mobile #: 260 977742129

APPENDIX C: Translated Consent Form

Chivomekezo

Ofufuza azafotokoza lingo yawo ndipo muzayankha mafunso ao onse, chonde ndinu omatsuka kutengako mbali muzocitika izi. Nizindikila kuti mayankho anu azakhala achisinsi ndipo mulinawo ufulu woleka kuyankha mafunso pakati pakulankhuzana komwe kuzatenga teka la ola.Ndinu omasuka kutenga mbali muzochitika izi zoona pavuto yamene imabweretsa bvuto yamatenda yanjala ku ana achichepele azaka (6-59mounths) chifukwa cha kuona ngati bvuto ya zomwe zibweretsa matenda yanjala mu ana achichepele zipasa matenda mumakomboni atatu omwe alimu muzinda wa Lusaka. Zokambilana izi zizathandiza boma lathu la Zambia kupyolela mu chigao cha umoyo kupeleka thandizo ku ana achichepele munjila zosiana-siana.

Zina la onfunsidwa	Zina la mboniZinayaofufuza		
Sign----------	Sign……..	Sign……	Finger print
Date……	.Date…….	Date……	yaofunsidwa

1. Ofufuza, Beatrice Kankhuni
   Contact details
   University of Zambia
   P.O Box 32379 ,
   Lusaka.
   Mobile #: 260 955 155 633

2. The Secretary, ERES Converge
   Contact details
   33 Joseph Mwila Road,
   Rhodes Park,
   Lusaka.
   Mobile #: 260 977742129

APPENDIX D: Guided Questionnaire for the Parent

Data Collection Tools

GUIDED QUESTIONAIRE FOR THE PARENT

Respondent number: …… Position of respondents: ……

Date: ……..

DEAR RESPONDENT

I am a student at the University of Zambia carrying out a research on the topic; a study to determine if there is an association between socio-economic factors and the nutritional status of the under-five old children at household in Lusaka district in the Lusaka province of Zambia. In Mtendere, Hellen Kaunda and Presidential Housing Initiative (PHI) Compounds.You have been selected randomly as a respondent to answer this questionnaire.

Your responses to the questions will be purely for academic purposes and will be treated with confidentiality.

INSTRUCTIONS

- Please answer by putting a tick in the appropriate brackets and fill in the provided spaces where brief explanation is necessary.
- Explain in brief were you are required to give reasons for your answer or write brief point answers in bullet form

YOUR CO-OPERATION WILL BE HIGHLY APPRECIATED.

Section A.Socio-Economic Questionnaire

Questions	**Response**
1. House number	……..
2. Locality	PHI……1 Mtendere……...2 Hellen Kaunda……..3
3. Sex of the child	Male……..…….1 Female……...2
4. What was your age as at last birthday of the under- five child?	……...
5. Indicate your Marital status	Single…….…….1 Married……...……2 Divorced…….…….....3 Widowed…….....4 Separated……5
6. Relationship of the respondent with the under-five child	Father……..1 Mother…….……2 Dependent……...3 Other specify……4
7. Age of the under-five child	……

8. Education level of the caregiver or parent

None……..……..1
Primary……....2
Secondary…….....3
University/college…….....4

9. What is your employment status?

Not Employed…..…….1
Employed…….2

10. What economic or income generating activities do you have as a household? .....

11. What is your income as a household (yours plus your husband's)? K/month…….

12. What are your sources of water?

Borehole……..1
Well…….……....2
Taps/Piped-water…….…3

13. Do you treat water before using it?

Yes…….……..…….1
No....…….…...2

14. Do you have a toilet for your house?

Yes……1
No……2

15. If yes to Q14. What types of the toilet to you have?

Flushable toilet…….1
Pit-Latrine……2
Open pit……3

SECTION B: Anthropometrical Measurements

16. The MUAC tape reading for the under-five year's child?

Child 1	Child 2	Child 3
Red 0-11.5 cm	Red 0-11.5 cm	Red 0-11.5 cm
Yellow 11.5-12.5cm	Yellow 11.5-12.5cm	Yellow 11.5-12.5cm
Green 12.5 and above	Green 12.5 and above	Green 12.5 and above

17. Weight of the child? ……..

18. Height of the child? ……...

Thank You For Your

Participation

May God Bless You!

APENDIX E: ETHICAL CLEARANCE DOCUMENTS

ERES CONVERGE

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I.R.B. No. 00005948
F.W.A. No. 00011697

24th May, 2017

Ref. No. 2017-Jan-002

The Principal Investigator
Ms. Beatrice Kankhuni
C/o Mr. Mabvuto Daka
G4S Secure Solutions
LUSAKA.

Dear Ms. Kankhuni,

RE: ASSOCIATION BETWEEN SOCIAL-ECONOMIC FACTORS AND NUTRITIONAL STATUS OF UNDER-FIVE YEARS CHILDREN IN MTENDERE, HELLEN KAUNDA AND PRESIDENTIAL HOUSING INITIIATIVE (PHI) IN LUSAKA, ZAMBIA.

Reference is made to your resubmission. The IRB resolved to approve this study and your participation as Principal Investigator for a period of one year.

Review Type	**Ordinary**	Approval No. **2017-Mar-011**
Approval and Expiry Date	Approval Date: 24th May, 2017	Expiry Date: 23rd May, 2018
Protocol Version and Date	Version-Nil	23rd May, 2018
Information Sheet, Consent Forms and Dates	• English.	23rd May, 2018
Consent form ID and Date	Version – Nil.	23rd May, 2018
Recruitment Materials	Nil	23rd May, 2018
Other Study Documents	Nil	23rd May, 2018
Number of participants approved for study	400	23rd May, 2018

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

Prof. E. Munalula-Nkandu
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD
CHAIRPERSON

THE NATIONAL HEALTH RESEARCH AUTHORITY
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LUSAKA

MH/101/23/10/1

07 June, 2017

Beatrice Kankhuni
University of Zambia
Department of Foods Science and Nutrition

LUSAKA

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"Association Between Social-Economic Factors and Nutritional Status of Under-Five Years Children in Mtendere, Hellen Kaunda and President Housing Initiative (PHI) in Lusaka"**.

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been approved to carry out the above mentioned exercise on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, and all key respondents.

Yours sincerely,

Sandra Chilengi-Sakala
For/Director
National Health Research Authority

All correspondence should be addressed to the
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Telex: +260 211 256815

PMOLSK/101/8/1

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

PROVINCIAL MEDICAL OFFICE
P. O. BOX 31574
LUSAKA

16th June 2017

Beatrice Kankhuni
C/O UNZA Dept of Food Sciences and Nutrition
Lusaka

Notice to conduct Research entitled "Association between socio-economic and Nutrition Status of Under five children in Mtendere, Helen Kaunda and PHI Residential Areas of Lusaka"

Your letter dated 4th June 2017 with the above subject matter refers.

Lusaka Provincial Health Office is happy to support your study entitled "Association between socio-economic and Nutrition Status of Under five children in Mtendere, Helen Kaunda and PHI Residential Areas of Lusaka District" in fulfilment of your Masters in Human Nutrition .

Kindly ensure that Lusaka District (DHO) and the Provincial Health Office are frequently updated on the progress of this study and by copy of this letter Lusaka DHO is duly informed to provide the support needed for this study's success.

We look forward to learning from your study results.

Dr M Kakungu Simpungwe
LUSAKA PROVINCIAL DIRECTOR OF HEALTH

Cc Lusaka District Director of Health

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REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH
LUSAKA DISTRICT HEALTH OFFICE

15th June 2017

Beatrice Kankhuni (Ms)
University of Zambia
Department of Food Sciences and Nutrition
P. O. Box 32379
LUSAKA

Dear Ms. Kankhuni

RE: AUTHORITY TO CONDUCT RESEARCH IN LUSAKA DISTRICT

Authority is hereby granted to conduct research on **"Association between Social-Economic Factors and Nutritional Status of under-five children aged 6-59 months in Mtendere, Hellen Kaunda and President Housing Initiative (PHI) in Lusaka".**

Kindly ensure that your findings are shared with the health facility and District Health Office and that the normal operations of the facility are not disturbed.

By copy of this letter, the Health Facility In-Charge for Mtendere is herewith informed.

Yours sincerely,

Dr. C. Mbwili-Muleya
PRINCIPAL CLINICAL CARE OFFICER
For/DISTRICT HEALTH DIRECTOR

C.C: The In-Charge: Mtendere Health Centre