

CHAPTER ONE: BACKGROUND

Tobacco use is one of the major preventable causes of death in the world and is a growing health challenge in most developing countries. The World Health Organization (WHO) estimates that there are approximately 1 billion smokers in the world of whom 6 million are killed every year by the same (WHO, 2011).

While this scourge reached its peak and is now declining in developed countries, the use of tobacco is growing in popularity in Africa as evidenced by the dramatic increase of smoking in developing countries over the last 25 years (Rudarkira et al., 2007 & Jagoe et al., 2002). In certain cases the rise is estimated to be as high as 46% (Guindon and Boisclair, 2003) and is likely to rise much higher if control measures are not adhered to.

This increase in tobacco consumption among developing nations like Zambia is linked to a number of demographic and socio-economic factors despite the fact that it causes cancer and other diseases (Siziya, 2009). With the swelling levels of urbanization and the rapid rate at which slums are growing in a number of towns, the vice of tobacco use is likely to continue its upward surge.

Tobacco is now a major export crop in Zambia and is locally grown at most by peasant farmers in Western, Eastern, Central and Southern provinces (Alliance Zambia, 2013) and provides for these farmers the much needed foreign exchange. It is also perceived as one way of diversifying the copper oriented economy.

Zambia has an overall population of 14.1 million (CSO 2010). Of these, approximately 80% live below the poverty line and close to 58% are classified as being 'extremely poor', lacking access to bare necessities of life such as adequate food, health care, education, good water and sanitation, clothing or shelter (Habitat for Humanity, 2009). The World Bank reported the nation's public health expenditure as 4.2% of GDP and private health expenditure as 2.4% of GDP in 2012 (World Bank, 2013) comparable to most third world countries.

The country not only faces a high burden of communicable diseases such as HIV/AIDS, Malaria and Tuberculosis but is now meeting an increasing challenge of the non-communicable diseases as well (WHO, 2011). The relatively low prevalence of smoking and high rates of death from

AIDS, starvation and violence that more immediately threaten the health of citizens in Africa (Zuberi, Sibande, Bawah & Noumbissi, 2003) may suggest that the consequences of cigarette use are not serious. Yet this could change quickly.

In view of the fact that two thirds of the worlds smokers reside in low and middle-income countries where the resultant effects of tobacco on health cause huge economic burden on health systems and families of smokers where resources are already limited. A better understanding of these factors that influence the use of tobacco at population level would better equip a nation like ours to prevent the detriment that comes with its prolonged use.

1.1 Global burden of tobacco use

Tobacco use is a leading cause of morbidity and mortality globally. According to Pradhan et al., (2013) 100 million people lost their lives across the globe due to tobacco consumption. There has also been a dramatic increase of smoking in developing countries over the last 25 years (Rudarkira et al., 2007; Jagoe et al., 2002). The World Health Organization (WHO) is reporting an increase of about 4% a year in tobacco consumption in Africa and the long term effects of this is likely to be disastrous (WHO, 2011). In response to these sharp increases, Lopez and others, in 1994, developed a descriptive model of tobacco epidemics based on smoking prevalence rates. Based on this model, developing countries were said to be in the early stages of the epidemic during which there is a sharp rise in smoking rates for men with much lower prevalence rates among women, though increasing rapidly (Greaves et al., 2009).

Tobacco use is also known to be very closely linked to ill health and premature death. It is projected that globally, the total tobacco attributable deaths are set to rise from 5.4 million in 2005 to 6.4 million in 2015 and 8.3 million in 2030 (Matthers, 2006). In its annual country report for Zambia, the WHO highlighted the fact that tobacco use alongside unhealthy diet, physical inactivity and alcohol are identified as major risk factors in the epidemiological transition from infectious to non-infectious diseases that developing countries are undergoing. However, challenges such as inadequate data on the extent of such factors and their influences abound in Zambia. This in part was attributed to lack of sufficient funding for prevention and control from

government, WHO and other partners. While lack of policy framework and a strategic plan adversely affect implementation (WHO, 2011).

Similarly, Matthers and Loncer (2006) projected, by the use of models, the drastic shift in distribution of deaths from younger to older ages and from communicable, maternal and childhood diseases to non-communicable diseases.

Several studies have demonstrated that national smoking prevalence rates in sub-Saharan Africa vary from 20% to 60% among adults. The prevalence among the youth range from 1.4% in Zimbabwe to 34.4% in Cape Town, South Africa (Townsend et al., 2006). However, prevalence rates for Zambia are not well documented as most of tobacco related research has been based on the youth. From one of these studies, a prevalence rate of ever smoked was reported as being 25.7% among boys aged 13-15 years and 20.4% among girls in the same age group (Zambian Global Youth Tobacco Survey, 2007).

1.2 Factors influencing tobacco use

Central to this study are the determinants of tobacco use, among which are; gender, age, socio-economic status, education, residence, marital status and religion. Epidemiologists have stated that tobacco use in the population goes through changes that take a form similar to an epidemic that spreads from relatively small parts of a population to other parts and then recedes (Lopez and Mackenbach, 2011). In the early stages, smoking emerges first among high socio-economic status groups; most open to innovation and possess the resources to adopt them. The middle stages are characterized by diffusion to the rest of the population but begin to decline among high socio-economic status persons who become concerned with health and the harm of smoking. In the later stages of the epidemic, smoking falls among all groups, but disparities widen as the decline occurs faster among high than among low socio-economic status groups.

Gender has been shown to have an impact on the consumption and health related consequences of tobacco. In the United States, tobacco now causes approximately one third of all middle-age deaths among women (Boyle, 1997). Women are also at increased risk of harm due to physiological aspects in which women are more susceptible to lung diseases as they possess smaller airways than men. Currently, research has found a new link between smoking (actively or passively) and breast cancer (Simon, 2013). Prolonged use or exposure to second-hand smoke

can also exacerbate diseases such as tuberculosis. Despite these facts, the rates of tobacco use among women have been shown to be on the rise globally. This is in spite of the fact that rates for men in developed countries are slowly beginning to decline. This is predicted to rise from the current 12% to 20% by 2025 (Greaves et al., 2009). Tobacco companies have in the recent past increased their targeting of women in developing countries. This, coupled with the ease on many cultural prohibitions on women as a result of globalization has made the female gender a high-risk population for increase in smoking prevalence (Jago, 2002). Challenges yet exist in establishing a true picture of this vice among Zambian women as we are still a nation highly influenced by culture and religion. This influence can also provide a source of bias in attempting to establish true consumption rates as smoking may be viewed as unacceptable by most communities.

The initiation of tobacco smoking by most adults occurs early in life as adolescents or young adults. Age greatly influences both exposure and access to tobacco. This factor of age is a fairly explored area with a number of studies supporting these findings. Mulaa and Siziya (2007) in a study among adolescents in Lusaka, Zambia demonstrated a prevalence of ever smoked of 43.4% among boys and 35.6% among girls which clearly illustrates that adolescents are at risk to this vice from peers and that educating them early enough on the health risks of tobacco will ensure better results in tobacco control. While Gupta (2009), demonstrated that the prevalence of cardiovascular risk factors such as smoking and others in adolescents were low and resulted in a rapid escalation by age 30 to 39 years, suggesting that adolescents should be targets for prevention. Zulu and others (2008), on the prevalence of smoking among adolescents stated the importance of a holistic approach to prevention of smoking as this is a habit developed in early stages of life. However, these rates have only been demonstrated in selected target groups such as adolescents in Zambia and having a view of its consumption at population level would be of benefit.

The increase in tobacco consumption among developing nations is linked to an increase in the socio-economic status of a population. This is true despite the fact that the prevalence of smoking is highest among those with low socio-economic status, and, who are more likely to have unsuccessful quit attempts Hiscock (2012), Arber (2001), Wolderchek (2005), & Pampel, (2005). Similarly, those with lower education have been shown to have higher rates of tobacco

use and this could be attributed to the fact that low levels of education limit one's knowledge and appreciation of making healthy choices. Khan (2009) stated that education can play an important role in the prevention of tobacco use. Studies illustrating the impact that socio-economic status and education have on the use of tobacco in Zambia are limited.

Results on the association between smoking and urbanization have not been consistent and no significant differences between urban and rural have been illustrated. In Cameroon, the pattern of smoking was influenced by degrees of urbanization (Proctor, 1996) while in Zambia, a study by Siziya (2009) though only conducted on a targeted adolescent population showed the likelihood of smoking was greater among the rural populations.

There is a relationship between marital status and use of tobacco, in the sense that being married has demonstrated a protective effect against tobacco use (Kamal et. al., 2011 & Pampel, 2007)

It has been shown that the presence of religion in an individual's life is strongly related to their use of tobacco in that having a strong religious commitment was associated with less tobacco use. In a meeting held between WHO and religious leaders in Geneva, 1999 saw all major world religions clearly stating that neither group supported the use of tobacco among their followers as it had health impacts on the body generally considered sacred.

However, though this is the case, the strength of association between religion and the use of tobacco varies across religious denominations. Higher rates of tobacco use and alcohol consumption were seen in respondents of no religion or catholic backgrounds due to their liberal approach to personal choices (Mullen, Williams and Hunt 1996). (Most studies done on the relationship between religion and smoking have shown that religion plays a role in deterring the use of tobacco) (Garrusi, 2012 ; McFadden 2011 & Kamal et. al., 2011).

1.3 Health related consequences of tobacco use

Epidemiologic studies have demonstrated several health related consequences of tobacco use. One such effect is the strong relationship between smoking and lung cancer. It is also very closely related to cardiac disease in both men and women. It results in one third of cardiac related morbidity and mortality, and remains one of the largest preventable risk factors of most non-communicable diseases (Jorgensen, et al., 2013).

Other health related complications linked to tobacco use are oral cancers, nasal cancers and cervical cancer. There is new evidence linking prolonged exposure to tobacco smoke with breast cancer (Stacy, 2013). Smoking has also been related to an acceleration of infections such as tuberculosis. Though conventional cigarettes are the main form of tobacco consumed worldwide, other forms that equally affect one's health such as chewing tobacco, pipes and Bidis (Gupta, 2003; Greaves, 2009) are consumed and equally have effect on one's health, resulting in poorer reproductive health outcomes and cancers of the mouth or nose.

Second hand smoke is a much greater problem than many people realize. It has been classified by the United States Environmental Protection Agency (EPA) as a known cause of lung cancer in humans. Its long term exposure has also been shown to cause a 30% increase in the risk of heart disease in non-smokers. Nicotine and other substances in tobacco smoke immediately affect the cardiovascular system of both smokers and those who inhale second hand smoke. Active use of tobacco elevates the heart rate and blood pressure and similar effects are seen in those who smoke passively. The US Centre for Disease Control and Prevention states that the under spread heart health problems created by long-term damage contributed to 126 000 deaths annually as of 2008 (CDC, 2010).

1.4 Tobacco use in Zambia

A number of studies done on tobacco use in Zambia have been targeted at special groups such as adolescents. Findings suggest that tobacco use in Zambia is an increasing problem and various factors influence it. National surveys on the same would provide valuable data that would be of great benefit to its control nationally. The World Health Organization Framework Convention on Tobacco Control (FCTC) is aimed at setting global standards in tobacco control (WHO, 2009). It was adopted in 2003 was the first intervention public health treaty. Since then, 168 countries have bought into this framework. By means of this framework, countries find themselves in a particular stage of the tobacco epidemic on account of historical or cultural contexts. An exception to this staging is Sweden, where women actually have higher smoking rates than men. Under this classification, countries like Zambia and Malawi were placed in the early stages of the epidemic (Pampel, 2006)

Although the experience gained from tobacco control efforts in the developed nations is useful when creating tobacco control programs in developing countries, specific strategies may not be extrapolated due to differences in patterns of tobacco use and socio-demographic conditions. This being said, Zambia has made a number of strides in combating the tobacco epidemic. The Ministry of Health facilitated Zambia's ratification to the FCTC in 2008. The sale of cigarettes to minors less than 16 years was banned in 1992. The Public Health (Tobacco) Regulation of 1992 (Health Regulation-Statutory Instrument No. 163 of 1992), banned the placement of advertisements for tobacco on public media and smoking in public places. All packaging of tobacco products must display the warning 'TOBACCO IS HARMFUL TO HEALTH' which must be printed on both sides in clear label (The Public Health (Tobacco) Regulation, 1992, Regulation 3). These regulations were reinforced in 2008 but due to challenges, as in most developing countries because of weak implementation. Failure of a number of control measures can also be attributed to inadequate understanding of what influences the use of tobacco in a population.

A search of literature illustrates that a number of studies have been conducted on tobacco use, its determinants and harmful effects in industrialized nations. However, data from developing countries on patterns and determinants of tobacco use is scarce (Woldecheko, 2005) posing a challenge to the formulation of specific and effective control measures for Zambia. A focus on the determinants of its use in Zambia is of great value in controlling this epidemic.

CHAPTER TWO: RESEARCH FOCUS

2.1 PROBLEM STATEMENT

Zambia like many other developing nations is facing an increasing burden of public health concerns such as tobacco use. According to Pampel, (2007), Zambia was in the early stages of the tobacco epidemic and if this is left to chance it will only see a greater rise in tobacco related morbidity and mortality as a result of an increase in lifestyle diseases such as stroke and hypertension (to mention a few). Despite the growing challenge of tobacco use, one of the main challenges remains the paucity of data on the determinants influencing its use in third world countries like Zambia. A number of studies have been conducted on more developed settings but it is not easy to tell whether those determinants will be similar in Zambia. A weak knowledge base limits the effectiveness of strategies targeted at combating the potential growth of the vice and its harmful effect on future mortality. Therefore this study intends to investigate which factors influence its use in Zambia,

2.2 SIGNIFICANCE OF THE STUDY

The cost involved in treatment and rehabilitation of non-communicable diseases, a number of which can be linked to the increasing use of tobacco is exorbitant. This can cause a large burden in cost on a country that must prioritise its expenditure. Tobacco use, hypertension and stroke form a vicious cycle. Having argued the afore, it then remains a fact that at a time when Zambia is experiencing a rising burden of lifestyle diseases, a study of this nature would prove of great relevance to public health practitioners by strengthening the knowledge base of what influences its use in the population and to policy makers in order to formulate effective strategies that are both target oriented and cost effective.

2.3 RESEARCH QUESTION

What are the determinants of tobacco use in Zambia?

2.4 OBJECTIVES:

2.4.1 General:

To establish the determinants of tobacco use in Zambia.

2.4.2 Specific:

1. To determine the prevalence of tobacco use among men aged 15-59 and women aged 15-49 years in Zambia.
2. To determine how demographic factors influence tobacco use.
3. To determine how socioeconomic status influences tobacco use

2.5 CONCEPTUAL FRAMEWORK

To provide a frame for the study, a conceptual framework adopted from the proximate determinate model used by Bongart et al., (1984) on fertility was constructed.

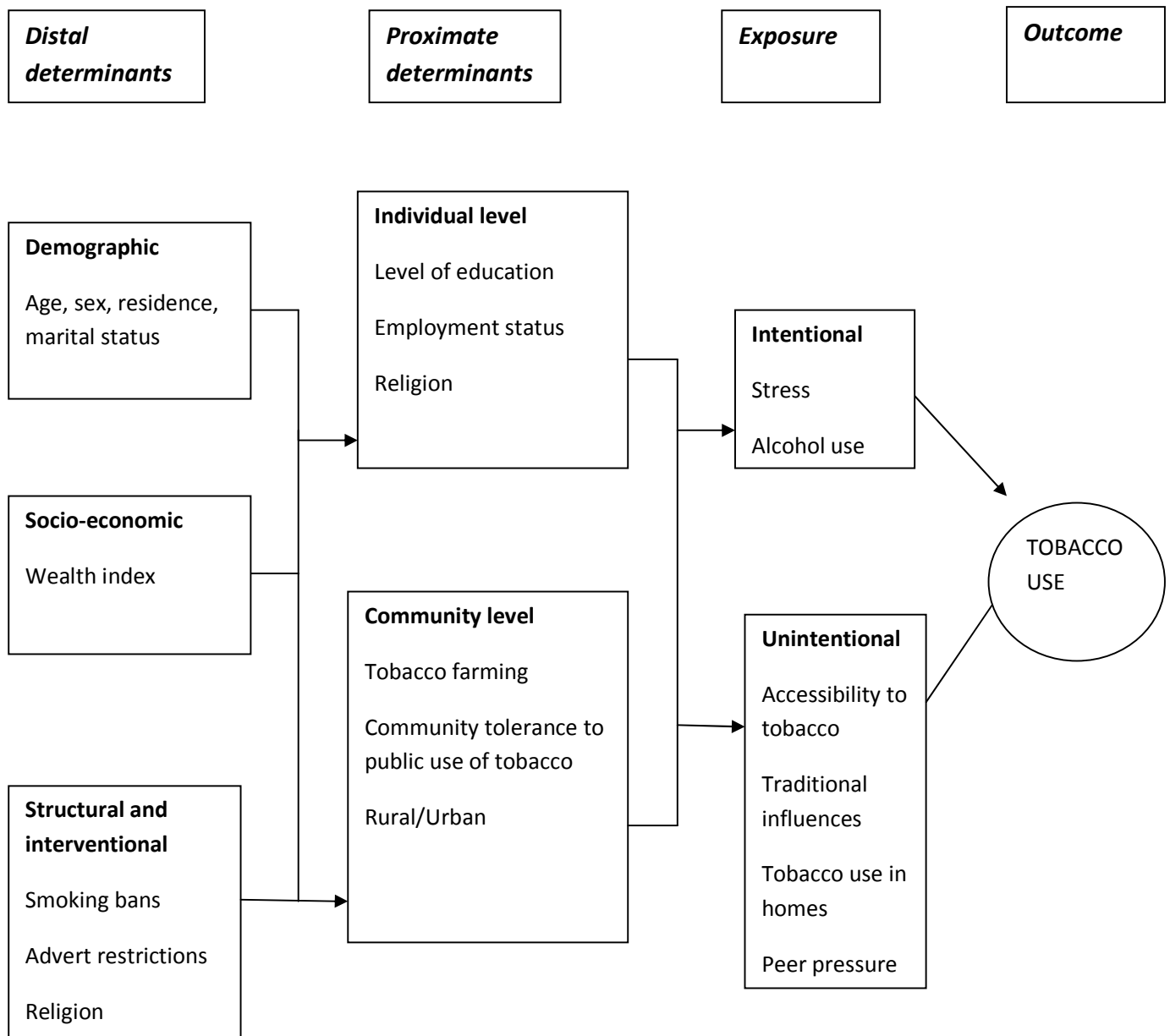


Figure 1. Conceptual framework illustrating factors that influence tobacco use.

CHAPTER THREE: METHODOLOGY

This study utilized data derived from the Zambia Demographic Health Survey (ZDHS) 2007. The extracted data was then utilized to conduct the tobacco survey in order to establish the relationship between tobacco use and various demographic and socio-economic factors.

3.1 ZDHS

The ZDHS is a cross-sectional survey that provides nationally representative, multi-dimensional estimates of various demographic and health indicators among the Zambian population. Data on the various indicators was collected using face to face interviews with participants providing informed consent before starting the interview. The survey was implemented by the Central Statistical Office (CSO) in partnership with the Ministry of Health, the Tropical Diseases Research Centre (TDRC) and the Demography division of the University of Zambia from April-Oct 2007.

3.1.1 STUDY POPULATION

The study population comprised men aged 15-59 years and women aged 15-49 years in randomly selected households across Zambia.

3.1.2 SAMPLING CONSIDERATIONS

A nationally representative sample of 8,000 households was drawn for the survey. This sample was a stratified sample selected in two stages from the Census of Population and Housing of the Republic of Zambia (CPH) 2000 frame. Stratification was achieved by separating every province into urban and rural areas (ZDHS, 2007).

3.1.3 SAMPLE SIZE

In consideration of the above sampling, the original survey interviewed 6 494 men and 7 142 women.

3.1.4 DATA COLLECTION

CSO recruited and trained 122 people for the field work to serve as supervisors, field editors, male and female interviewers and research interviewers. Interviews were conducted at the visited households making use of three questionnaires, namely, household, male and female questionnaires. The use of universal questions gave uniformity to the results and response rates stood at 91% for males and 97% for females. Quality assurance was assured by double entry.

3.1.5 ETHICAL ISSUES

Clearance for the study was sought and granted by the University of Zambia Biomedical Research Ethics Committee (UNZABREC) upon satisfaction that issues of confidentiality, safety and benevolence to the patients were guaranteed.

3.2. TOBACCO SURVEY

The tobacco survey was cross-sectional in nature and utilized data collected during the ZDHS of 2007. As data collection in the original study was done using pre-formed questionnaires designated male or female, the survey was conducted by means of two data sets. In order to analyze the relationship between tobacco use and the various indicators, only data collected from individuals who responded to the question “Do you currently smoke cigarettes?” were analyzed.

3.2.1 STUDY POPULATION

For this survey the study population was defined by those who responded to the question on residence.

3.2.2 SAMPLING CONSIDERATIONS

Eligibility to this survey was based on response to the questions on current tobacco use (cigarette, pipe, chewing or snuff). In addition to meeting the aforesaid eligibility, the participants were subjected to the following criteria of inclusion and exclusion.

Inclusion Criteria

Male survey;

- Men aged between 15 and 59 years.
- Those who responded to questions on smoking.

Female survey;

- Women aged between 15 and 49 years
- Those who responded to questions on smoking.

Exclusion criteria (for both male and female survey)

- Data collected for individuals below the age of 15 years.
- Those who did not respond to questions on smoking.

3.2.3 SAMPLE SIZE

Based on the above considerations, a sample size of 6494 men and 7142 women was reached for this study.

3.2.4 DATA COLLECTION

Authority to utilize the ZDHS data set was sought from the Central Statistical Office (CSO). A tool to extract data from the data set was formulated for the purposes of this study upon which frame new data sets were created with focus on tobacco use.

3.2.5 DATA MANAGEMENT AND ANALYSIS

The extracted data was then renamed ‘tobacco use’ and two new data sets were created. One for males and another for females. This is because respondents to this survey were based on the individual questionnaire which were pre-labelled male or female. An attempt to merge data from both questionnaires so as to analyse gender as a determinant resulted in numerous loss of data elements hence the decision to analyse them individually. As the initial (DHS) data set was already subjected to quality control procedures, the researcher ensured that accuracy and consistency was maintained by double checking. Response to questions on residence and current smoking were used to ascertain completeness.

The dependent variable “tobacco use” was derived from the variable “smokes cigarettes”. The numbers of users of other forms of tobacco were for the purposes of this research considered negligible but used only to ascertain prevalence of their use which was in line with a research conducted by Pampel (2008). Combining all forms of tobacco use resulted in significant overlap

and consequent loss of data. The selected variable was coded 0,1 with those who do not use tobacco being the reference group. Independent variables such as age were re-coded so as to form fewer age groups and ensure easier analysis.

STATA version 13 was the statistical software used in the analysis of the data while openepi was used to compute an overall prevalence for both men and women. Cross tabulations using Chi-Square and univariate regression from which crude odds ratios were obtained were conducted. As the dependent variable 'tobacco use' was dichotomous in nature, multivariate logistic regression in which priori independent variables were placed into the model was conducted to assess the association between tobacco use and its identified risk factors (independent variables). Adjusted odds ratios (OR) and their 95% confidence interval were calculated as a measure of association between tobacco use and its determinants.

3.2.6 ETHICAL ISSUES

As this study took the form of a desk review, authority from the Central Statistical Office (CSO), the custodians of the data set was sought and granted. No personal identifiers were encountered during the use of the data set and hence utmost confidentiality was maintained.

Having ensured the above, ethical clearance was sought and granted by the Excellence in Research Ethics and Science Institute (ERES) in compliance with good scientific research.

CHAPTER FOUR: RESULTS

4.1 SAMPLE PROFILE:

Findings of the tobacco survey revealed that a number of demographic and socio-economic determinants influence the use of tobacco, more so in men than women. Table 1 below shows the background characteristics of the participants stratified by sex. Significantly more men (23.7%) than women (0.8%) were users of tobacco. Little differences appeared in mean age and residence for both sexes, with slightly more participants residing in rural parts of the country as compared to urban. The majority of participants were currently married with 56.5% of the male participants and 60.4% of the female participants being married. Among the men, a larger proportion than that of women was currently employed. There was little difference in classification of wealth index between the two sexes.

Educational attainment was fairly similar for both men and women though only approximately 36% of the female population had attained secondary and more education as compared to 49% for the men. The majority of all participants were of protestant faith and as is socially believed, more men than women consumed alcohol.

Table 1. Background characteristics of study participants

Variable	Male (n= 6 494) n (%)	Female (n= 7 142) n (%)
Tobacco use		
User	1540 (23.7)	56 (0.8)
Non-user	4954 (76.3)	7086 (99.2)
Age		
15-24	2477 (38.1)	3003 (42.0)
25-34	1927 (29.7)	2416 (33.8)
35-44	1205 (18.5)	1363 (19.1)
45-54	688 (10.6)	364 (5.1)
55-59	203 (3.1)	---
Mean age	30	27
Residence		
Urban	2827 (43.5)	3176 (44.5)
Rural	3667 (56.5)	3966 (55.5)
Marital Status		
Never married	2546 (39.2)	1941 (27.2)
Currently married	3624 (56.5)	4312 (60.4)
Formerly married	324 (5.0)	889 (12.5)
Employment status		
Currently employed	4834 (74.4)	3456 (48.4)
Currently unemployed	1469 (22.6)	3675 (51.5)
Wealth quintile		
Poorest	1144 (17.6)	1130 (15.8)
Poorer	963 (14.8)	1245 (17.4)
Middle	1314 (20.2)	1409 (19.7)
Richer	1598 (20.2)	1731 (24.2)
Richest	1475 (22.7)	1627 (22.8)
Education		
No education	298 (4.6)	740 (10.4)
Primary	2988 (46.0)	2803 (53.3)
Secondary	2718 (41.9)	2241 (31.4)
> Secondary	490 (7.6)	358 (5.0)
Religion		
Catholic	1346 (20.8)	1368 (19.2)
Protestant	4928 (76.0)	5648 (79.2)
Muslim	26 (0.4)	26 (0.4)
Other	184 (2.8)	90 (1.3)
Alcohol		
Yes	2618 (40.3)	734 (10.3)
No	3876 (59.7)	6393 (89.7)
Province		
Central	600 (9.2)	671 (9.4)
Copperbelt	810 (12.5)	827 (11.6)
Eastern	857 (13.2)	940 (13.2)
Luapula	560 (8.6)	704 (9.9)
Lusaka	960 (14.8)	939 (13.2)
Northern	715 (11.0)	783 (11.0)
N/western	630 (9.7)	685 (9.6)
Southern	773 (11.9)	821 (11.5)
Western	589 (9.1)	772 (10.8)

4.2 Prevalence of tobacco use

Of the 6494 men, 1540 reported being current users of tobacco and 56 of 7142 women giving a prevalence of 23.7% and 0.78% respectively with an overall prevalence of 10.9% for both. The prevalence of use of other forms of tobacco is given in table 2 below. There was an obvious higher percentage of tobacco use in the conventional form of cigarette among men. Consumption rates were much lower among women though there were higher levels of other forms of tobacco. Most commonly was the use of snuff among women in Western and Luapula provinces.

Table 2: Prevalence of use of different forms of tobacco

Form of tobacco	Male		Female		Pooled total	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Cigarettes	1540	23.71 (22.70 ,24.80)	56	0.78 (0.60,1.08)	1596	10.90 (10.41,11.42)
Pipe	85	1.30 (1.10,1.60)	11	0.15 (0.09,0.28)		
Chewing	11	0.20 (0.09,0.30)	25	0.35 (0.24,0.52)		
Snuff	11	0.17 (0.09,0.30)	65	0.91 (0.71,1.16)		

4.3 Determinants of tobacco use

Bi-variate analysis by means of Fischer's Chi Square demonstrated that all independent variables were significantly associated to tobacco use as illustrated in table 3 below.

Table 3: Cross tabulation of tobacco use and background characteristics

Variable	MALE n (%) N=6494			FEMALE n (%) N=7142		
	User	Non-User	p-value	User	Non-user	p-value
Age						
15-24	214 (8.7)	2260 (91.4)	< 0.001	5 (0.2)	2998 (99.8)	<0.001
25-34	582 (30.2)	1345 (69.8)		11 (0.5)	2402 (99.5)	
35-44	441 (36.7)	762 (63.3)		25 (1.8)	1337 (98.2)	
45-54	244 (35.5)	443 (64.5)		15 (4.1)	349 (95.9)	
55-59	59 (29.1)	144 (70.9)				
Residence						
Urban	583 (20.6)	2244 (79.4)	<0.001	8 (0.3)	3168 (99.7)	<0.001
Rural	957 (26.1)	2710 (73.9)		48 (1.2)	3918 (98.8)	
Marital status						
Never married	269 (10.6)	2277 (89.4)	<0.001	2 (0.1)	1939 (99.9)	<0.001
Currently married	1114 (30.7)	2510 (69.3)		37 (0.9)	4275 (99.1)	
Formerly married	157 (48.5)	167 (51.5)		17 (1.9)	872 (98.1)	
Employment status						
Cur unemployed	132 (9.0)	1337 (91.0)	< 0.001	14 (0.4)	3661 (99.6)	<0.001
Cur employed	1384 (28.6)	3448 (71.4)		42 (1.2)	3413 (98.8)	
Wealth quintile						
Poorest	341 (29.8)	803 (70.2)	< 0.001	16 (1.4)	1114 (98.6)	< 0.001
Poorer	289 (30.9)	674 (69.0)		23 (1.8)	1222 (98.2)	
Middle	334 (25.4)	980 (74.6)		10 (0.7)	1399 (99.3)	
Richer	369 (23.1)	1229 (76.9)		5 (0.3)	1726 (99.7)	
Richest	207 (14.0)	1268 (86.0)		2 (0.1)	1625 (99.8)	
Education						
No education	124 (41.6)	174 (58.4)	< 0.001	27 (3.7)	713 (96.3)	< 0.001
Primary	842 (28.2)	2146 (71.8)		25 (0.7)	3778 (99.3)	
Secondary	503 (18.5)	2215 (81.5)		3 (0.1)	2238 (99.9)	
>Secondary	71 (14.5)	419 (85.5)		1 (0.3)	357 (99.7)	
Religion						
Catholic	374 (27.8)	972 (72.2)	< 0.001	10 (0.7)	1358 (99.3)	< 0.001
Protestant	1078 (21.9)	3850 (78.1)		38 (0.7)	5610 (99.3)	
Muslim	7 (26.9)	19 (73.1)		0 (0.0)	26 (100.0)	
Other	79 (42.9)	105 (57.1)		8 (8.9)	82 (91.1)	
Alcohol						
Yes	1229 (46.9)	1389 (53.1)	< 0.001	38 (5.2)	696 (94.8)	<0.001
No	311 (8.0)	3565 (92.0)		18 (0.3)	6375 (99.7)	
Province						
Central	139 (23.2)	461 (76.8)	<0.001	4 (0.6)	667 (99.4)	< 0.001
Copperbelt	205 (25.3)	605 (74.7)		3 (0.4)	824 (99.6)	
Eastern	213 (24.9)	644 (75.2)		3 (0.3)	937 (99.7)	
Luapula	170 (30.4)	390 (69.6)		3 (0.4)	701 (99.6)	
Lusaka	212 (22.1)	748 (77.9)		1 (0.1)	938 (99.9)	
Northern	163 (22.8)	552 (77.2)		5 (0.6)	778 (99.4)	
N/western	146 (23.2)	484 (76.8)		1 (0.1)	684 (99.9)	
Southern	122 (15.8)	651 (84.2)		2 (0.2)	819 (99.8)	
Western	170 (28.9)	419 (71.1)		34(4.4)	738 (95.6)	

Multivariable logistic regression provided the researchers with adjusted odds ratios for the various independent variables. Among the male participants, age significantly influenced one's use of tobacco with the highest odds being for the age group 35-44 years (AOR= 3.08, 95% CI=2.35-4.04) when controlled for residence, education, wealth index, marital status, religion, alcohol and region.

Men in rural areas showed reduced odds of 0.68 (95% CI= 0.55-0.85) of using tobacco as compared to the urban population. Those who were formerly married were 71% (AOR =1.71, 95% CI=1.22-2.39) more likely to smoke than those who were never married and the employed also generally had higher chances of smoking (AOR =1.71, 95% CI=1.35-2.16) than their unemployed counterparts. This factor was adjusted for age and other factors. However, those classified as being richer or richest displayed significantly lower odds of tobacco use as compared to the poorest AOR richest=0.39 (95% CI, 0.27-0.55) adjusting for all other predictors.

Higher levels of education, for instance those who had an education level of secondary and above showed less likelihood to using tobacco AOR= 0.26 (95% CI= 0.17-0.40) than their counterparts with no education keeping factors such as age, wealth and residence constant. Similarly, if a man did not consume alcohol, he was less likely to smoke as well AOR=0.13 (95% CI=0.11-0.15).

Residing in Eastern, Luapula or Western provinces increased a man's likelihood of using tobacco as compared to those in Central province.

The overall usage of tobacco among women was generally low but it was established that tobacco consumption occurred more in the older age groups. The odds of tobacco use were significantly higher in those aged above 45 years, AOR= 6.42 (95% CI= 1.93-21.32) controlling for all other predictors.

Education was protective in that its use reduced with the more education attained. However, consuming alcohol increased ones odds of tobacco use by as high as 10 fold.

A very strong association (p value= 0.003) existed between tobacco use and residing in the western province.

Table 4: Analysis of tobacco use against determinants in men

Characteristic		n= 6 494 % of Users	Crude OR	Adjusted OR
Age				
	15-24	8.7	1	1
	25-34	30.2	4.57 (3.85,5.42)	2.45 (1.93, 3.12)
	35-44	36.7	6.11 (5.09,7.34)	3.08 (2.35, 4.04)
	45-54	35.5	5.81 (4.72,7.18)	2.92 (2.17,3.94)
	55-59	29.1	4.33 (3.10,6.04)	2.29 (1.50,3.49)
Residence				
	Urban	20.6	1	1
	Rural	26.1	1.36 (1.21,1.52)	0.68 (0.55, 0.85)
Marital status				
	Never married	10.6	1	1
	Currently married	30.7	3.76 (3.25,4.34)	0.87 (0.69,1.10)
	Formerly married	48.5	7.96 (6.19,10.24)	1.71 (1.22,2.39)
Employment status				
	Cur unemployed	9.0	1	1
	Cur employed	28.6	4.07, (3.36,4.91)	1.71 (1.35,2.16)
Wealth quintile				
	Poorest	29.8	1	1
	Poorer	30.0	1.01 (0.84,1.22)	0.98 (0.78,1.23)
	Middle	25.4	0.80 (0.67,0.96)	0.89 (0.70,1.12)
	Richer	23.1	0.71 (0.60,0.84)	0.59 (0.44,0.78)
	Richest	14.0	0.38 (0.32,0.47)	0.39 (0.27,0.55)
Education				
	No education	41.6	1	1
	Primary	28.2	0.55 (0.43,0.70)	0.70 (0.52,0.94)
	Secondary	18.5	0.32 (0.25, 0.41)	0.49 (0.36,0.66)
	> Secondary	14.5	0.24 (0.70,0.35)	0.26 (0.17,0.40)
Religion				
	Catholic	27.8	1	1
	Protestant	21.9	0.73 (0.63,0.83)	0.87 (0.73,1.02)
	Muslim	26.9	0.96 (0.40,2.30)	1.38 (0.45,4.20)
	Others	42.9	1.96 (1.43,2.68)	0.12 (0.88,1.88)
Alcohol				
	Yes	46.9	1	1
	No	8.0	0.09 (0.09,0.11)	0.13 (0.11,0.15)
Province	Central	23.2	1	1
	Copperbelt	25.3	1.12 (0.88,1.44)	1.31 (0.97,1.77)
	Eastern	24.9	1.09 (0.86,1.40)	1.40 (1.03,1.88)
	Luapula	30.4	1.44 (1.11,1.87)	1.59 (1.16,2.18)
	Lusaka	22.1	0.94 (0.73,1.20)	1.23 (0.91,1.66)
	Northern	22.8	0.98 (0.76,1.27)	0.94 (0.68,1.28)
	N/western	23.2	1.00 (0.77,1.30)	1.31 (0.96,1.80)
	Southern	15.8	0.62 (0.47,0.81)	0.85 (0.62,1.17)
Western	28.9	1.35 (1.04,1.75)	1.79 (1.30,2.47)	

Table 5: Analysis of tobacco use against determinants in women

Characteristic	n= 7 142 Users (%)	Crude OR (CI)	Adjusted OR (CI)
Age			
15-24	0.2	1	1
25-34	0.5	2.75 (0.95,7.91)	1.13 (0.35,3.62)
35-44	1.8	10.13 (3.81,26.92)	3.64 (1.20,10.98)
45-49	4.1	25.71 (9.55,69.22)	6.42 (1.93,21.32)
Residence			
Urban	0.3	1	1
Rural	1.2	4.85 (2.29,10.27)	1.30 (0.37,4.56)
Marital status			
Never married	0.1	1	1
Currently married	0.9	8.39 (2.02,34.85)	2.43 (0.48,12.30)
Formerly married	1.9	18.90 (4.36,81.99)	3.11 (0.57,17.03)
Employment status			
Currently unemployed	0.4	1	1
Currently employed	1.2	3.21 (1.75,5.90)	0.98 (0.47,2.05)
Wealth quintile			
Poorest	1.4	1	1
Poorer	1.8	1.31 (0.69,2.49)	1.62 (0.75,3.49)
Middle	0.7	0.49 (0.22,1.10)	1.48 (0.55,3.98)
Richer	0.3	0.20 (0.13,0.55)	0.95 (0.20,4.60)
Richest	0.1	0.09 (0.09,0.37)	0.42 (0.04,4.71)
Education			
No education	3.7	1	1
Primary	0.7	0.17 (0.10,0.30)	0.51 (0.26,0.99)
Secondary	0.1	0.04 (0.01,0.12)	0.25 (0.06,0.98)
> Secondary	0.3	0.07 (0.01,0.55)	0.67 (0.46,9.75)
Religion			
Catholic	0.7	1	1
Protestant	0.7	0.92 (0.46, 1.85)	1.03 (0.46,2.28)
Muslim	0.0	***	***
Others	8.9	13.25 (5.09,34.46)	1.98 (0.55,7.09)
Alcohol			
No	0.3	1	1
Yes	5.2	10.28 (5.39,19.58)	10.28 (5.39,19.58)
Province			
Central	0.6	1	1
Copperbelt	0.4	0.61 (0.14,2.72)	0.99 (0.21,4.78)
Eastern	0.3	0.53 (0.12,2.39)	0.64 (0.13,3.08)
Luapula	0.4	0.71 (0.16,2.20)	0.96 (0.20,4.54)
Lusaka	0.1	0.18 (0.02,1.59)	0.34 (0.04,3.32)
Northern	0.6	1.07 (0.29,4.01)	0.56 (0.14,2.22)
N/western	0.1	0.24 (0.03,2.19)	0.26 (0.03,2.42)
Southern	0.2	0.41 (0.07,2.23)	0.64 (0.11,3.69)
Western	4.4	7.68 (2.71, 21.76)	5.79 (1.82,18.45)

*** This variable predicted perfect failure

CHAPTER FIVE: DISCUSSION OF RESULTS

The main findings of this research illustrated that tobacco use is a problem in Zambia, more in men than in women in view of the proportions of 23.7% which is considerably higher than 1%. Among women the use was negligible (0.8%). Urban, employed men of lower socio-economic status, formerly married and of humble education were most likely to use tobacco. Province of residence and alcohol use also influenced its use. This could most likely be explained by the fact that there were more male users than there were female and the higher rates of social acceptability of its use among the men folk. Cigarettes were the main form of tobacco used among men, a finding also supported by Gilani & Leon, (2013). Among women the rate of consumption was fairly negligible and yet of note was that women who smoked preferred to use other forms of tobacco such as snuff.

The response rates for the tobacco survey were 99% in both the male and female surveys. The exclusion of men >54 years and women >49 years is likely to exempt a vital population that may be users hence negatively biasing the findings if rates among the exempted population are higher. It was also observed by us and others that people are better able to recall as to whether they smoke or not. However, issues of social desirability are likely to affect groups such as women and parents of young children in whom it is socially undesirable to smoke and thus may be reluctant to admit to the fact (Florescu et al., 2009). Another study also reported that self reported data is likely to underestimate smoking status by 0.64% (Tennekoon & Rosenman, 2013). The above possible sources of bias, though present were minimal and the results of which determinants influence tobacco use do reflect the accuracy of this association.

5.1 Prevalence of Tobacco use

The prevalence of tobacco use in the population surveyed was shown to be higher in males than females similar to what is reported in other studies (Pampel & Denney, 2010). Rates for men were shown to be 23.7% while those for women were 0.8%. The main determinants of tobacco use among men were noted to be age, residence, marital status, employment status, wealth quintile, education, alcohol and region while among women it was noted that alcohol consumption and region strongly influenced its use with education and age weakly associated to

the vice. These findings were generally corroborated by studies of (Blakely et al., 2005; Bobak et al., 2000; Mackay & Mensah, 2004; Pampel, 2005).

Findings from this study suggest that the prevalence rates show a 39% increment (from 17%) in tobacco use among men in 2002 while those of women still remain pretty much in the same range (from 1%). This corroborates earlier studies such as conducted by Pampel (2005) in which he stated that the early stages of an epidemic are characterized by an increase in tobacco use first among males. The persistence of smoked tobacco use among males over the last decade is a serious cause for concern.

5.2 Influence of Demographic and Socio-economic factors on tobacco use

Some of the factors that can attribute to this increment could be an improvement in socio-economic status (Woldecherkos,2005), influence of advertising and urbanization and its accompanying stress. This increase in prevalence of smoking is indicative of how rapidly this epidemic is rising (Pampel, 2008). It should also enable us reassess the effectiveness of our control measures as a country. However, the prevalence among women remained essentially the same and could be suggestive of a slower progression among women. This interpretation must be taken cautiously due to the fact that this survey determined current tobacco use by means of self reporting. It is therefore possible that smoking habits are under reported due to the influence of cultural, social or religious perspectives of tobacco use among women.

Chances of one using tobacco increased with age as a man aged 35-44years was 3 times more likely to do so than one aged 15-24. Other studies relating to tobacco use among Zambian youth also alluded to the fact that one's chances and interest in tobacco use only increases with age (GYTS, 2007; Muula & Siziya, 2007; Siziya, 2009). The influence of age among women was weaker despite the fact that the odds of a woman using tobacco were as high as six times more among the group aged 45-49years compared to their counterparts aged 15-24years. This finding provides insight to the fact that snuff was the preferred form of tobacco consumed among Zambian women. An Indian study by Rani et al.,(2003) illustrated the fact that tobacco in its other forms was essentially consumed by older women. Consumption was shown to be higher among rural populations where the crop is mostly grown. However, adjusting for the demographic and socio-economic factors showed that males in rural areas were less likely to

smoke than those in urban areas. This could be due to the various exposures and stress one faces in an urban setting and the weakening influences of culture and religion as a result of westernization. Pampel (2007), found a similar trend in a study conducted in Malawi and Zambia and Khan et al., (2009) described that men of lower socio-economic status, lower education and residing in urban slums were more likely to smoke.

However, in contrast to the above, Siziya (2009) while studying smoking among adolescents in Zambia, found that rural adolescents were more likely to consume tobacco than their urban counterparts.

The chances of a man using tobacco were significantly higher for one residing in Eastern province, Luapula province and Western province in comparison to their counterparts in Central province. Among the women, one residing in Western province was almost 6 times more likely to use tobacco as opposed to one in Central province. The reasons for significantly high consumption in western province, especially among women are still unclear to the researcher. Besides the fact that the province is among those that grow the plant, there is no other suggestion to this finding. This would thus be proposed as an area for further study so as to enable policy makers formulate strategies that could combat the vice before the burden of disease is increased. Moreover, studies that could validate self reporting of tobacco use with biological markers would prove valuable in obtaining credible data.

Men who were formerly married had a higher chance of smoking than those never married. This corroborated findings by Pampel (2008) which suggested that being currently married has a protective effect on tobacco use. The likelihood of using tobacco also increases with one's employment status. This study showed that those currently in employment also had a higher chance of using tobacco. This could be because of the accessibility to disposable cash that employment offers [Barbeau et al., (2004); Bobak et al., Kalucka(2012)]. Despite this finding, it was also shown that the richer one was among the males, the lower the chances of them using tobacco. The lowest odds were seen among those participants classified as richest of engaging in the vice. This in no way distorts our earlier findings on employment as it is most likely that those in the category of richer and richest have higher paying jobs and are better educated to understand the harmful effects of tobacco and thus restrain from its use. This is in line with the findings of Werch & Anzalone (1995).

5.3 Influence of Education on Tobacco use

Education has a strong inverse relationship with tobacco use in which the likelihood of its use significantly reduced, the higher one went with their education (Proctor et al 1996). This goes to show the role that education plays on one's decisions regarding their health. Among the women folk, a slightly weaker inverse relationship was seen. This, in the view of the researcher could be due to the fact that the numbers of users among women were too low to produce sufficient evidence for the association and also compounded by the fact that fewer proportions of women access education in comparison to men (Townsend et al (2006), Woldecherkos (2005)).

5.4 Influence of Religion on Tobacco use

It came as a wonder to the researchers that there was insufficient evidence to support the influence that religion has on tobacco use. This contrasts the findings of Pampel (2007) in which he illustrated that being Christian or Muslim was protective against tobacco use. It was hoped that it may help explain why unlike other tobacco growing provinces, Southern province has significantly lower proportions of users in comparison to Central province. The failure to find sufficient evidence to support the influence of religion may suggest that the influence of religion may have waned since the previous survey.

A good number of respondents who use tobacco also reported taking alcohol. Among the women, these chances rose to as high as 10 times. This clearly illustrates that the consumption of alcohol stands as a strong risk factor for using tobacco (Engs & Mullen, 1999).

Value of the Study

This study attempts to add an improved understanding of what influences tobacco use in the population and the groups at most risk of the vice. In addition provides information necessary for focusing control and preventive strategies to policy makers.

Limitations of the study

The researcher however acknowledges that this study is not without limitations. As this took the form of a desk review of data collected in a cross sectional survey, data elements on likely determinants were restricted only to those collected during the interviews. Self reporting of

tobacco use is likely to bias results especially among women. In addition, the findings here will show association but cannot illustrate causality.

However, it is hoped that this study will in a way increase the value of the information collected during national health surveys. Alongside providing a reference point to where we are as a nation in terms of the tobacco impact so as to facilitate surveillance of the same as recommended by WHO (WHO, 2011).

CHAPTER SIX: CONCLUSION

Tobacco use is still a public health problem in Zambia, more in men than in women. The persistent use among those of low socioeconomic status of who are the majority in Zambia is of concern. This illustrates the fact that if well focused health promotion is not intensified, we are likely to encounter an unmanageable burden of the morbidity and mortality that is attributed to tobacco. This is therefore an evolving epidemic to which we must all react.

CHAPTER SEVEN: RECOMMENDATIONS

These findings give weight to the need for strengthening our local tobacco control program. In view of the increase in prevalence of tobacco among men and the limited resources available for its control, the following suggestions are made:

1. Deterrent measures such as provision of information education and information (IEC) must be targeted at groups in which use is highest e.g.
 - Male population
 - Urban areas
 - Should incorporate other forms of tobacco such as snuff which is more commonly used among women.
 - Western, Luapula and Central provinces
2. Government must ensure improved access to education to equip the population with the ability to make better health choices.
3. Information, education and communication on the harmful effects of tobacco should be tailored to the youth so as to prevent initiation of tobacco use.
4. A multisectorial approach involving social sectors, health programs and the church to ensure social support for cessation and prevention of initiation among possibly stressed groups such as formerly married and urban residents.

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APPENDICES

1. Tobacco survey data Collection Tool

(adapted from the individual questionnaires of the ZDHS)

Socio-Demographic information

1. Questionnaire Male Female

2. Age at last birthday ?.....

3. Residence (Province)

4. Religion? Catholic
Protestant
Muslim
Other

5. Marital status Never married
Married or living together
Divorced/Separated/Widowed

Tobacco use

6. Currently smoking cigarettes Yes
No

7. Number of cigarettes smoked in previous 24 hours

8. Currently smoke or use any other type of tobacco Yes
No

9. Other type of tobacco used Pipe
Chewing tobacco
Snuff
Other

10. Currently taking alcohol Yes
No

11. Number of times alcohol was taken in previous week.....

