

UNIVERSITY FOR DEVELOPMENT STUDIES

THE USE OF SMOKELESS TOBACCO AND ITS HEALTH IMPLICATION  
AMONG RESIDENTS IN THE TAMALE METROPOLIS

BY

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## DECLARATION

Student

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere

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I hereby declare that, the preparation and presentation of the thesis was supervised in accordance with the guidelines laid down by university for development studies

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## DEDICATION

This thesis is dedicated to the entire ALKA family and friends



## ABSTRACT

**INTRODUCTION:** The use of smokeless tobacco is increasing globally, posing a significant threat to the health and socio-economic wellbeing of its users. This study was conducted to describe the pattern of smokeless tobacco use, levels of addictions to smokeless tobacco and the health implications of smokeless tobacco use among residents in the Tamale Metropolis.

**METHODS:** We conducted a cross sectional study in the Tamale Metropolis. We collected data from the respondent using semi structured questionnaire. In all we selected 408 adults' respondents from the metropolis using a multistage random sampling. Data was entered, cleaned and analysed using Statistical Package for Social Scientist (SPSS) version 25.

**RESULTS:** The prevalence of use of smokeless tobacco was 71.1% with the most commonly used being Moringa (47.6%; 139/408). The main reasons for use were to enhance energy (40%), and for sexual enhancement (15.8%). On the Fagerstrom scale, 29.6% of the respondents were highly dependent. Male sex was associated with 50% increase Odds of use; primary level of education had about 4 times higher Odds of use; being divorced had 16% less likelihood and being married had 54% less likelihood of use. Being a Muslim had 3 times higher likelihood of use. Parental use of any tobacco product and friend use of snuff had almost 2 times and 5 times likelihood of use respectively. Tooth decay (26.5%), leukoplakia (23.8%) turbinates (35.2%) and nasal polyps (23.1%) were common oral and nasal deformities present in users. Use was associated with 4, 3 and 9 times increased odds of breathing difficulties, oral and nasal deformities, respectively ( $p < 0.001$  in all cases).

**CONCLUSION:** There was a high rate of use of smokeless tobacco in the Tamale Metropolis and was associated with oral and nasal disorders among users. There is the need for public education about the health implications of the substance in the Metropolis.



## LIST OF ABBREVIATION

AOR	Adjusted Odds Ratios
APA	American Psychological Association
CDC	Centre for Disease Control
CI	Confidence Interval
COR	Crude Odd Ratio
CWSA	Community Water and Sanitation Agency
FCTC	Framework Convention on Tobacco Control
GATS	Global Adults Tobacco Survey
GYTS	Global Youth Tobacco Survey
IARC	International Agency for Research on Cancer
ICMR	Indian Council on Medical Research
NCDs	Non-Communicable Diseases
NCI	National Cancer Institute
OR	Odds Ratio
PHC	Population and Housing Census
SCT	Social Cognitive Theory
SLT	Smokeless Tobacco
SPSS	Statistical Package for Social Sciences
USDA	United States Development Agency



USDHHS  
Services

United States Department of Health and Human

WHO

World Health Organization

$x^2$

Chi Square



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background

Tobacco consumption presents a serious danger to human health of man. This has prompted the World Health Organization (WHO, 2011) to categorize tobacco use as a worldwide public health concern. This is especially in the light of the fact that many individuals died from tobacco than any avoidable reason (WHO 2011).

Proven health challenges associated with tobacco use are chronic illness including malignant growth, cardiovascular and respiratory tract diseases (USDHHS, 2010; WHO; 2011).

Tobacco comes in different forms, with non-smoked form and smoked tobacco, for instance cigarette and cigars, being the most common types. Smokeless tobacco (Snuff) use has been practiced by a large number of responsible adults and young persons without any sign of decline in use by these groups, who are at risk of becoming addicts of these products (Bahl, *et al.*, 2014). Tobacco can be consumed variedly, some people chew it, and others dip it. None- smoked tobacco is the type of tobacco that is consumed without smoke, or burnt in the process of consumption, that is taken orally or through nasally. Majority of snuff (smokeless tobacco) users usually dip the substance in their mouth, and when the tobacco juice builds up, they spit out the juice (Cattaruzza & West, 2013).

Rozi & Akhtar (2007), have described smokeless tobacco or snuff that has been carefully prepared in powdered form and presented in multiple scents and flavours.







These tobacco products are either packaged moist or dried; majority of snuffs that are produced in America is packaged in loose bags, dissolvable lozenges in small pouches just as in tea bags. Of the method of administration, Amota (2008) and National cancer Institute (2010), described that users of smokeless tobacco usually put a pinch of moist snuff orally between their cheeks and gums, or behind the upper or lower lip while others employ their nasal cavities.

Brown and Rineli (2010) studied smokeless tobacco and indicated that smokeless tobacco composes of at least 28 chemicals. It is during the growing, curing and fermenting of tobacco that these harmful chemicals are formed (John 2005). Nitrosamines are available in tobacco and have proven scientifically to be potent lung carcinogens in all species of animals tested, regardless of the route of administration; oral or nasal (Wilson et al. 2016).

The consumption of smokeless tobacco poses a significant threat to the health of its user's .The American Cancer Society has reported that smokeless tobacco can cause serious negative health effects including great measures of gray-white patch in the mucous of the mouth (leukoplakia) in the oral users of smokeless tobacco, which eventually becomes cancerous. This gray, white-patch usually would last permanently in the users mouth and would later turns to painless sores, leukoplakia development also depends on how long smokeless tobacco is used orally. (American Cancer Society 2015).

The users of smokeless tobacco may have health challenges as rotten teeth, tooth cavities, retreating gums and root of tooth. Protracted utilization of smokeless

tobacco can intensify the tooth deformities due to the contraction of the gums causing the outside of the root of the tooth lay opened, (American Cancer Society, 2015).

Smokeless tobacco may cause death in kids because of nicotine poisoning when mistakenly taken for candy (Nichter *et al.*, 2015). Smokeless tobacco can influence nicotine addiction and causes the utilization of other tobacco substance. The use of nicotine-containing substances like snuff and smoked tobacco, are becoming more widespread, especially in young adults. This has the potential to cause future health problems, with oral and respiratory tract cancers as some of the associated health concerns that require global intervention (Weber, 2011).

Snuff normally does not give lung cancers, compared to cigarette; snuff would rather cause nasal cancers and oral diseases (Mini and Thankappan 2016). These authors also reported that, snuff also has the ability to increase one's chances of getting heart diseases and other health problems (Mini and Thankappan 2016). For the past two decades, moist snuff sales have doubled in the U.S., while other tobacco products like cigarette are becoming unpopular (Mini *et al.*, 2016).

Smokeless tobacco is used by wider populations including athletes, most adult men, and few women (Berkeley Wellness, 2015). Smokeless tobacco can lead to addiction just like any other addictive substance like cocaine, due to its effective dissolving nature, both in the nose and in the mouth through to the intestines, releasing the nicotine that can easily be absorbed into the blood stream. This is contrary to combated tobacco, which is absorbed by the lungs, and hence providing a higher rate



of addiction. Some marketers and anti-smoking experts have the notion that, use of snuff can help end smoking cigarette (Berkeley Wellness, 2015).

## **1.2 Study Location**

The study was conducted in the Tamale Metropolis in the Northern Region of Ghana. The Northern Region has Tamale as its Regional capital and occupies an area of about 70,383 square kilometres. Northern Region occupies the largest land area in Ghana. The Region has its boundaries with the Upper East and the Upper West Regions to the North, the Brong Ahafo and the Volta Regions to the South, and two neighbouring countries, the Republic of Togo to the east, and La Cote d'Ivoire to the West. (Community Water & Sanitation Agency 2009). The land is mostly low lying except in the North-Eastern corner where we have the Gamboge escarpment and also along the Western corridor. The Region is drained by the Black and White Volta and their tributaries, Rivers Nasia, Dakar, etc. (CWSA 2009)

### **Populace size, structure**

The population of Tamale Metropolis, according to the 2010 Population and Housing Census, is 233,252 representing 9.4 percent of the region's population. Males constitute 49.7 percent and females represent 50.3 percent. The proportion of the population living in urban localities (80.8%) is higher than that living in rural localities (19.1%) of the metropolis. The metropolis has a sex ratio of 99.1. The population of the metropolis is youthful (almost 36.4% of the population is below 15 years) depicting a broad base population pyramid which tapers off with a small



number of elderly persons (60 years and older) representing 5.1 percent. The total age dependency ratio for the district is 69.4, the age dependency ratio for rural localities is higher (86.5) than that of urban localities (65.7) (Population and Housing Census, 2010).

The Total Fertility Rate for the Metropolis (2.8) is slightly lower, compared to the Regional fertility rate of 3.5. The General Fertility Rate is 79.9 births per 1000 women aged 15-49 years. The Crude Birth Rate (CBR) is 21.2 per 1000 population. The crude death rate for the Metropolis is 5.6 deaths per 1000.

Accident/violence/homicide/suicide account for 9.6 percent of all deaths while other causes contribute to 90.5 percent of deaths. Majority of migrants (54.9 percent) living in the Metropolis were born elsewhere in the region while 45.1 percent were born elsewhere in another region. For migrants born elsewhere in another region, those born in have the highest proportion (19.6%) followed by those who were born in Upper East (18.7) (CWSA 2009).

The Metropolis has a total of 219,971 households, living in 19,387 houses. The average household size in the Metropolis is 6.3 persons per household. Children constitute the largest proportion of the household structure accounting for 40.4 percent and heads of household make-up 16.1 percent of the household population. Spouses form about 9.4 percent and other relatives constitute 12.9 percent of the population. The proportion of households who live in extended household structure (head, spouse(s), children and head's relatives) constitute the largest proportion (46.1%) than that of any other type of household structure. Nuclear households



(head, spouse(s) and children) constitute only 19.5 percent of households in the Tamale Metropolis (CWSA 2009).

### **Marital Status**

There are more people (48.6%), 12 years and older, who are married than those who have never married (44.2%). Persons who are widowed constitute 4.0 percent of the population of the Metropolis. Population of divorced make-up 1.6 percent while those in consensual relationships constitute only 0.7 percent. The highest percentages (57.5 and 23.3 respectively) of married persons either had no education or attained only basic education. About 31 percent of persons who have never married are employed, compared to 4.8 percent who are unemployed. The largest proportion (63.8%) of them is economically not active (CWSA 2009).

### **Economic Activity Status**

About 63.3 percent of the population aged 15 years and older in the Metropolis is economically active and 36.7 percent are economically not active. Of the economically active population, 92.6 percent are employed while 7.4 percent are unemployed. For those who are economically not active, a larger percentage of them are students (56.0%), 20.9 percent perform household duties and 12.4 percent are either too young or old to work. About five out of ten (52.9) of unemployed persons in the metropolis are seeking work for the first time (CWSA 2009).



### **Health Institutions**

There are over ten (10) health institutions present in the catchment area of Tamale Metropolitan assembly. These facilities are owned and controlled by the republic of Ghana, whilst others are owned and controlled by private individuals and organisations. The government owns and controls the Tamale Teaching Hospital (TTH), the Tamale Central Hospital and the Tamale West Hospital. The TTH serves as a referral centre for the other hospitals both publicly and privately owned. The Tamale Central Hospital would be acting as the Northern Regional Hospital whilst the Tamale West Hospital serves as the general hospital.

There are also two health colleges within the Tamale Metropolis. The Nursing and Midwifery Training College and the Community Health Nursing Training College both owned and managed by the government. It is also within the Tamale metropolis that the Northern Regional Health Directorate is located.

Also, there are many privately owned health centres within the Tamale metropolis that exist within the metropolis to aid in the delivering of healthcare services to clients. Some of the facilities include the SDA hospital, Habana clinic and Kabsad scientific hospital.

### **Educational Institutions**

The UNDP human development report (2011), indicated that, there are three hundred and three (303) primary schools; comprising two hundred and forty-five (245) public and fifty eight (58) private, one hundred and four (104) Junior High Schools (JHS) comprising eighty eight (88) public and sixteen (16) private, eighteen



(18) Senior High Schools (SHS); comprising ten (10) public and eight (8) private. Additionally, there are two colleges of education as well as two (2) Technical/Vocational Institutions in the study area

### **Climate and Vegetation**

Northern region has only one rainy season, making it a dry area compared to the southern regions, which usually starts from May and ends in October. The amount of rainfall recorded annually varies between 750 mm and 1050 mm. The dry season starts in November and ends in March.

The regional vegetation is classified as vast areas of grassland, interspersed with guinea savannah woodland, characterised by drought-resistant trees such as acacia, baobab, Shea nut, dawadawa, mango, neem, etc. (CWSA, 2009)

### **1.3 Conceptual Framework**

The conceptual framework illustrates the antecedent, behavior and consequences with respect to the utilization of smokeless tobacco. The Diagram outlines the drivers of the utilization of smokeless Tobacco. Among this are the respondent demographic characteristics, such as age, sex, marital status, educational status, employment status, and religious status. All these demographic characteristics have been proven to have an impact on an individual's behaviour and that include whether a person would use addictive substances like alcohol, cocaine, marijuana and tobacco product. It has been reported in other studies that; demographic characteristics demonstrated a varied ways of influence on the outcome of many



studies. As cited by Rudatsikira, *et al.*, 2010 which suggest that factors which contribute to the inception of tobacco use include: gender, low socioeconomic status, low levels of education and ethnicity.

Friend use of non-smoked tobacco was one of the factors that could influence the use of snuff among all age groups, hence in this conceptual framework would help measure predictors of use. This has been shown in other jurisdictions as an important influential factor with regards to the use of addictive substances. Availability or easy access of snuff was considered in this framework to test whether the ease of access of this substance can be a contributing factor to the utilization of snuff.

This structure additionally perceives the parental utilization of snuff as a factor that can seriously influence the use of snuff. As many parents may be sending their children to buy the this substance, some children would like to explore to see what is in it that the parents uses it always and by this act a child may develop interest in using. Some children who see it in their room and also see the parent using would out of curiosity, try it and continuous test of this substance may lead to a permanent user. Other parents may not see anything wrong it and might be given to the kids as and when they what. This may be very common when these parents seen using it for a medical purpose or when both parents are clients.

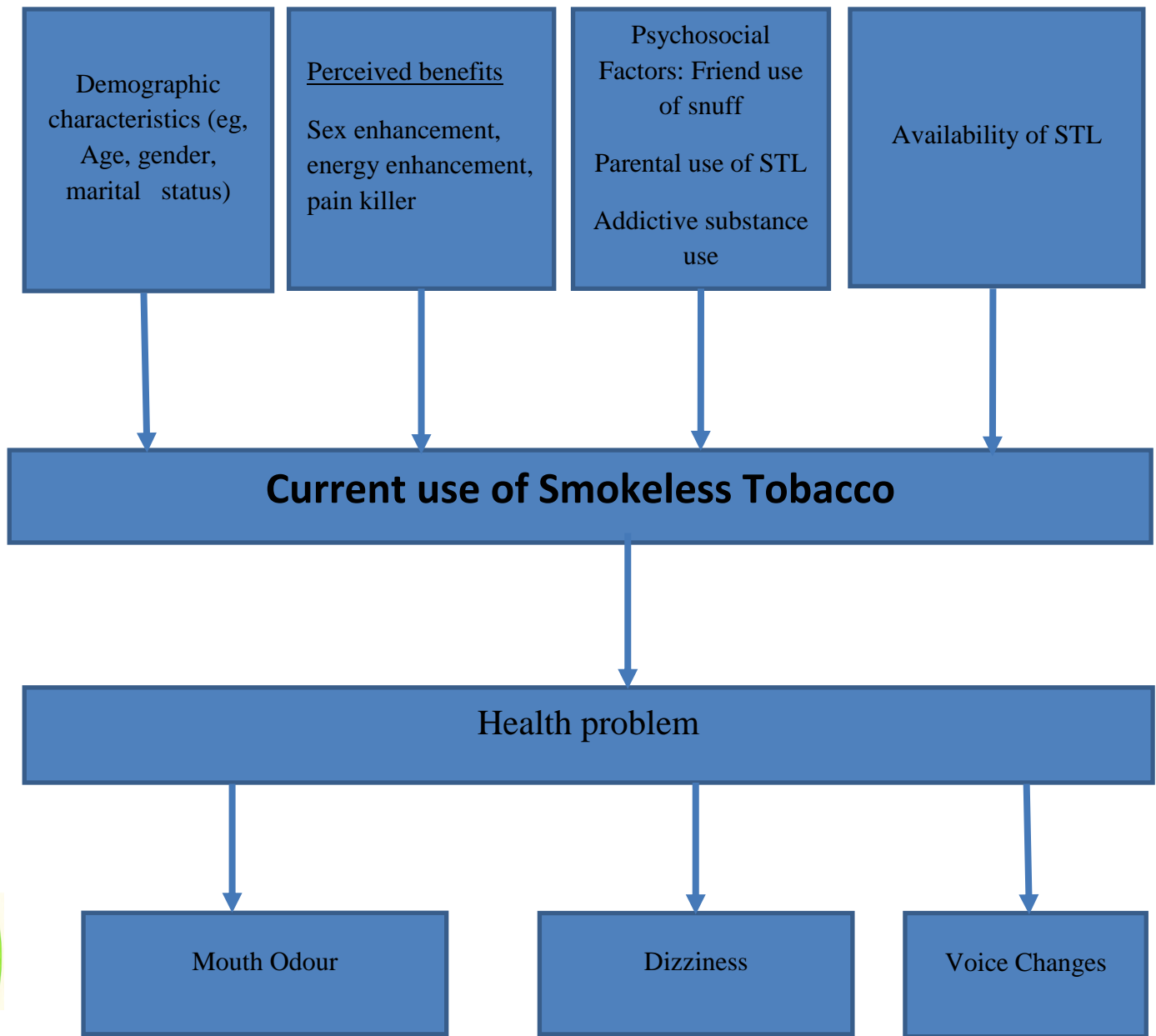
The utilization of smokeless tobacco may be related to some health effects or outcomes. Individuals may use smokeless tobacco for perceived health benefits. However it is also very likely that the use of this substance may be the result of certain health challenges. A portion of the apparent positive effects of the utilization of smokeless tobacco is to attain sexual satisfaction by improving sex drive,





improvement of vitality, relief of torment. Negative effects with respect to utilization of smokeless tobacco are mouth odor, dizziness and voice changes.





**Figure 1: Conceptual framework**

#### 1.4 Problem Statement

Not less than seven million people die each year worldwide from tobacco use (WHO, 2017). Urgent action is needed to save these lives, especially among the adolescence and young adults, because mostly tobacco use starts during adolescence and young adulthood. Nicotine is found in tobacco, which is very addictive and is the reason most occasional users slowly migrate to regular users of tobacco products. Studies conducted reveal that, an estimated number of individuals involved in the utilization of smokeless tobacco, in 70 nations are 302.4 million, which represented 70% of the world population as at 2010 (Global Burden of Disease Collaborators, 2016).

The first- ever report on the world public health impact of smokeless tobacco, stated that: over 300 million individuals in more than 60 nations use this harmful substance (Al-Delainy & Willett, 2008). There is enough prove for one to reason that smokeless tobacco has capacity to cause a decent number of malignant growths, which incorporate; pancreatic disease, oral disease, oesophageal malignant growth in all human (Bhisey, 2012). In excess of 30 cancer-causing agents have been distinguished in smokeless tobacco items. Smokeless tobacco use additionally causes antagonistic oral wellbeing results, including oral mucosal sores, leukoplakia, and periodontal infection. Also, “smokeless tobacco products contain nicotine, and users of these products demonstrate signs of dependence similar to those of cigarette smokers, including tolerance with repeated use and symptoms of withdrawal upon cessation of use” (Subramanian *et al.*, 2015). There have been a few studies on the impacts of smokeless tobacco on clients. Nemeth *et al.*, (2012) in their investigation





of the elements impacting smokeless tobacco use in rural Ohio Appalachia found that interpersonal factors contribute significantly to the inception and consistent use of snuff. Kilkie *et al.*, (2018) studied the initiation, continuation of use and cessation of alternative tobacco products among young adults and found that peer pressure, flavour or taste and easy environmental access to alternative tobacco contributes significantly to the initiation and use of snuff. Smokeless tobacco use has also been linked to 40% increased risk of pancreatic cancers (Whiles *et al.*, 2004).

However, in Ghana, there have been few studies on the utilization of smokeless tobacco among the population. Reports on the utilization of tobacco explicit nitrosamine across the country over population by (Cadmus and Ayo 2018) settled in their studies by saying that, the ramifications of smokeless tobacco use and introduction to tobacco items promotion on smoking plans in the nation and affirm that smokeless tobacco use and presentation to tobacco.

Yawson *et al.*, 2013 additionally contemplated on tobacco item use in Ghana. None of the previous studies gave us data on the utilization of smokeless tobacco (snuff). As such there is a huge gap as far as the pattern of use and health related consequences of smokeless tobacco, otherwise known as snuff is concerned. Therefore, this study was conducted to determine the use of smokeless tobacco and its health implication among residents in the Tamale Metropolis in Ghana. If this is not done, effective public health policies related to tobacco product may not be formulated to improve the entire health of the people in the north and the country as a whole.

## 1.5 Research Questions

1. What is the pattern of use of smokeless tobacco?
2. What is the level of addiction to smokeless tobacco use?
3. What factors drive the use of smokeless tobacco?
4. What are the health implications of the use of smokeless tobacco?

## 1.6 Research Objectives

### 1.6.1 Main objective

The general objective of the study was to determine the usage and health implications of smokeless tobacco in the Tamale Metropolis

### 1.6.2 Specific objectives

In order to achieve the main objective specific the following objectives were set out to:

1. Describe the pattern of use of smokeless tobacco among residents in the Tamale Metropolis
2. Determine the level of addiction to smokeless tobacco among residents in the Tamale Metropolis
3. Assess the determinant of use of smokeless tobacco among residents in the Tamale Metropolis
4. Identify the health implications of the use of smokeless tobacco among residents in the Tamale Metropolis



### **1.7 Justification**

There is a rise in the use and availability of smokeless tobacco in the Tamale Metropolis in the recent years. Studies have been conducted in the country and other parts of the world, however there is none on smokeless tobacco in the Northern Region and specifically in the Tamale Metropolis. Varying reasons account for the use and access of smokeless tobacco. There would also be health implications as a result of use, prevalence and addiction levels of this substance. A study therefore at this time would be necessary to understand and appreciate the phenomena of the use of smokeless tobacco in the Tamale Metropolis. Tobacco with or without smoke has been argued to have more negative health implications than positive implication, if there is any but the rate at which smokeless tobacco is becoming common and used by residents of Tamale Metropolis calls for the need to investigate within the realms of health practices and systems.

### **1.8 Significance of the Study**

The study was conducted to examine the use of smokeless tobacco and its health implication among the residents in the Tamale Metropolis in Ghana. Therefore, the study would contribute significantly in identifying the factors that influence the use of smokeless tobacco among the residents in the Tamale Metropolis. The study would also determine the health implications of the use of the smokeless tobacco among the people in the study area. Additionally, the impact of the study would be seen in the application of its findings in the education of the residents in the Tamale Metropolis on health implications of the use of smokeless tobacco. The study would





also help uncover the degree of addiction to smokeless tobacco (snuff) use so as to inform policy guidelines on the measures to combat it in the Tamale Metropolis. Additionally, the study would contribute to current studies on the use of smokeless tobacco and its effects on the residents. Lastly, the recommendations of the study would guide policy on implementing the education of the use of smokeless tobacco and its health implications in the Tamale Metropolis and beyond.

### **1.9 Scope and Limitations of the Study**

The study was limited to the Tamale Metropolis in the Northern Region of Ghana, and was on the assessment of the use of smokeless tobacco and its health implications on the residents in the Tamale Metropolis. To facilitate a sound grasp of the subject matter within the thought framework of the objectives of the study, the extent of the investigation secured such regions as the general idea of tobacco use, the general impact of utilizing tobacco, why the utilization of smokeless tobacco, and the presence of health effects that might be linked to the utilization of smokeless tobacco.

The main limitation of the proposed study was time. Due to the limited time interval for completing and submitting the study, the researcher was unable to consider a wider range of health implications, especially on the cardiovascular system and the gastrointestinal tract, which have been reported to be affected by consumption of tobacco products. Another constraint to the study was the reluctance with which prospective participants consented to be a piece of the study. Such attitude delayed the data collection unnecessarily and caused fatigue to the researcher. However,

these limitations did not compromise both the internal and external validity of the study.

### **1.10 Organization of the Study**

The study was sorted out as follows: Chapter One contained the Introduction to the examination. It presented among other subheadings as the foundation to the examination, profile of the investigation, a statement of the problem being researched, the ensuing Research Questions, the objective as well as justification for the study. Chapter Two narrated a review of the literature for evidence that formed the basis of the conceptualisation of the study. Chapter Three, the Research Methodology, explained the various methods and procedures and tools used to collect primary data for the study. Chapter Four presented results of the analysis of the data collected. The Discussions of the key findings were presented in Chapter Five., with the last chapter; Chapter Six contains the conclusions and recommendations of the findings of the study.





## CHAPTER TWO

### 2.0 LITERATURE REVIEW

This chapter presents a narrative review of relevant literature for evidence to support the use and health implications of tobacco products, with emphasis on smokeless tobacco. The review is organized into subheadings containing themes such as the evolution of use, forms used, prevalence, and theories of use and behaviour and health implications of tobacco use, among others. Using databases such as PubMed, Medline, Scopus, Elsevier and Science direct, articles published in English till 2018 were searched.

#### 2.1 Tobacco

Tobacco contains nicotine, a substance which leads to strong psychological and chemical dependence (addiction) (Milkie *et al.*, 2018). Tobacco use is one of the major risk factors for many health problems, including cancer, emphysema, and many other cardiovascular diseases (US Department of Health and Human Services, 2004).

Tobacco has many compositions depending on the manufacturer or its purpose. Composition of tobacco can come from one source, mostly from tobacco extract. Tobacco may also come from two or more sources, in which case they would be a carrier to allow insertion for the various types to attach (combination of powder tobacco lamnae and a spray dried tobacco extract) (Reynolds & Company, 1995).

The known tobacco include: Burley, Maryland, flue-cured, and Oriental tobaccos.



They are rare forms of tobacco, which is usual use by the U.S. in form of batch numbers. Examples of such type include; Type 35, type 36 and type 37. This number are been designated by the U.S.D.A. with their respective names as fellows; One Sucker, Green River and Virginia Sun Cured respectively.(Reynolds & Company, 1995).

## **2.2 Evolution of Tobacco Use**

Tobacco utilization began around 500 years ago among indigenous Americans for formal and therapeutic purposes. As indicated by Lopex and Mathers 2006, in the year 1492 after European investigations to the Americas, Christopher Columbus at that point acquainted the item with Europe. From that point, the item spread to the remainder of the world. With development and the development of the primary cigarette assembling machine in 1870, cigarette smoking developed. In any case, during the 1900s, tobacco use was essentially constrained to biting, snuffing and pipe smoking among men (Goodman 1995). Tobacco utilization started to ascend in Western nations from 1910 because of the industrialization of tobacco just as showcasing and publicizing of its items. Smoking prevalence among men in the United States reached 50% by the year 1960 (Mistry and Dasika, 2019). Essentially, by 1948, 82% of British men were smoking cigarettes (Hang, *et al*, 2017). In Finland, smoking predominance among the grown-up populace during the 1950s was 70% (Thankappan and Mini, 2008). From the 1960s onwards, smoking prevalence has been declining in most Western countries over the decades. Similar to the start of the epidemic of smoking, the decline started first among adult men. By



2008 the prevalence of smoking in the US declined to about 20% (Centre for Disease Control and Prevention 2008) and in the same year in Britain, smoking prevalence fell to about 22% (Mishra, *et al.*, 2015). Likewise, in many Northern, Southern and Western European countries the prevalence of smoking, particularly among men has decreased and continues to decrease during the last decades (Mohan & Lando, 2014). As tobacco use declines in many developed countries, the epidemic of smoking is shifting to developing countries. There is currently a rise in “the prevalence of tobacco use in many developing countries owing to the aggressive marketing and promotion of the product in these parts of the world since the 1970s without much restriction till beginning of the millennium” (Mohan & Lando, 2014)

### **2.2.1 Forms of Using Tobacco**

#### **2.2.2 Smoking Tobacco**

Tobacco smoking is the burning of tobacco and inhaling the smoke, and it is the most common form of tobacco use globally. In most Western societies, manufactured and hand-rolled cigarettes constitutes the largest proportion of smoking form of tobacco use, followed by pipes and cigars (Joshi, 2006). In other parts of the world, however, there are other ways of smoking tobacco. In Sudan, for example shisha smoking is popular among the youth (Sinha, *et al.*, 2015).

A common form of tobacco is the cigarette, which is a roll of pieces of tobacco wrapped in a paper tube of about 8mm in diameter and 70–120mm long which is fitted with a filter at one end. Another is the cigar, usually a roll of pieces of tobacco in a leaf of tobacco. Cigar can be little cigar, small, regular or premium. Regular



cigars are about 17mm in diameter and 150mm long, premium cigars are about 12 to 23mm in diameter and about 125mm long, while little and small cigars are smaller and shorter, measuring about the same length and size as a cigarette (Sinha, et al., 2015).

Apart from cigarettes and cigars, other commonly used smoking tobaccos are: *Bidis*, *Chutta* and *Kretek* mostly used in India, Southeast Asia and the US (Yadav and Dhaka 2000 and Fisher 2000). Other kinds of smoking tobacco include *chillum*, *dhumti*, *hooka* and *hooks* which are commonly used in northern India (Fisher 2000).

### **2.3 Smokeless Tobacco**

Smokeless tobacco (SLT) refers to tobacco that is consumed orally or nasally without burning (ref). A review of the health effects of SLT shows that they all contain varying levels of nicotine and the carcinogenic tobacco-specific nitrosamines (Muttappallymyalil & Divakorani, 2010). All forms of SLT were found to cause confined oral injuries and increases the hazard for advancement of oral disease. Moreover, it has been demonstrated that SLT expanded the danger of deadly myocardial localized necrosis among clients, yet the proof for oral malignant growth in clients of the evidence for oral cancer in users of a particular type of STL referred to as Swedish moist snuff, was less unambiguous (Buffetta & Straif, 2009). In India, some smokeless tobacco come in the form of leaf mixed with ingredients such as Areca nut and lime (Critchley and Capewell 2003). In Europe, the most well-known SLT is the Swedish snuff, snus, which is a fine ground damp tobacco that is bitten. In the United States, both the local biting tobacco as hacked tobacco leaves and the



Swedish snus are generally utilized. Different types of smokeless tobacco use incorporate the Sudanese *toombak* which is a fermented powdered tobacco mixed with an aqueous solution of sodium bicarbonate (Hang et al., 2017), and the Ghanaian *tawa* which is either in the form of fine-grain tobacco powder that often comes in teabag-like pouches that users “pinch” or “dip” between their lower lip and gum, allow it to sit there and spit out the juice and or sniff into their nostrils. The other is *chewing-tobacco* in the form of shredded or twisted tobacco leaves that users put between their cheek and gum, chew it and spit out the juice (Cattaruzza & West, 2013). Tens of other forms of SLT exist on all the continents, several still are unknown to the scientific community and more are being discovered every now and then (Codmus & Ayo-Yusuf, 2018). The use of SLT is high and has increased in recent years, particularly among adolescents (Boffetta & Straif, 20019, Misra, Joseph & Gupta, 2015 and Mistry & Dasika, 2017).

### 2.3.1 Moringa ‘as a component of snuff’

Moringa, scientifically referred to as *Moringa oleifera* Lam is an herbaceous plant with therapeutic effects that has been recognised by Indians, and as such it has turn out to be commonly used in tropical and subtropical countries throughout the world. Other names given to the plant are: Horseradish tree, Mulangay, Mlonge, Benzolive, Drumstick tree, Sajna, Kelor, Saijihan and Marango. Biologically *Moringa oleifera* belongs to the Kingdom Plantae, Division: Magnoliphyta, Class: Magnoliopsida, Order: Brassicales, Family: Moringaceae, Genus: Moringa, Species: M. oleifera (Fahey, 2005).



Moringaceae has only one genus with 13 species known to man to date (Khawaja *et al.*, 2010). Being a small native tree of the sub-Himalayan regions of North West India, Moringa is currently indigenous to many regions in Islands and South America. Among the peoples of these regions, the plant is used daily as a vegetable. Moringa was claimed to be ‘the most nutrient-rich plant yet discovered’ (Khawaja *et al.*, 2010). However its wide use for its health benefits among commoners, has earned its name as ‘the miracle tree’. This is made strong by the amazing healing abilities it has for various ailments and even some chronic diseases. Several investigations have been carried out to isolate the bioactive compounds from various parts of the plant, just to be able to support the various applications it has (Guevara *et al.*, 1999). The use of plants in the treatment of diseases, otherwise known as phytomedicine provide an alternative source of medical treatment that has been widely embraced, apparently due to its affordability (Abalaka *et al.*, 2009).

For centuries and in many cultures around the world, the medicinal usage of Moringa has been found in treatment of conditions like: skin infections, anaemia, anxiety, asthma, blackheads, blood impurities, bronchitis, catarrh, chest congestion, cholera and many other illnesses (Khawaja *et al.*, 2010; Hamza, 2010; Singh *et al.*, 2012).

*Moringa oleifera* also has properties that include: anti- inflammatory, anti-spasmodic and anti-hypertensive effects (Paliwal *et al.*, 2011). These authors have also suggested anti-tumour, anti-oxidant, anti-ulcers, anti-pyretic, and anti-epileptic activities for the various chemical constituents of the plant. The antihypertensive properties may be linked to the diuretic and cholesterol lowering ability that has

been reported of Moringa (Sharma et al., 2012). Anti-diabetic, possibly due to the sugar lowering effect of Moringa has previously been reported (Paliwal et al., 2011). Other properties of Moringa have been suggested to include hepatoprotective activities (Lai *et al.*, 2010; Huang *et al.*, 2012). It has also long been identified for its great cosmetic value, such that in recent years, components of the plant have commonly been found in various health care products. Examples of such products are body and hair moisturisers and conditioners. Egyptians have very early on discovered that Moringa oil had a great value as smoothners in skin ointments ever since the Egyptian times (Huang *et al.*, 2012).

Through research, Moringa was found to contain numerous basic supplements, for example, nutrients, amino acids, minerals, antioxidants, omega 3, 6 unsaturated fats, (Kasolo *et al.*, 2010).

#### **2.4 Prevalence of SLT**

Tobacco forces a goliath weight of infection and poses a great danger to wellbeing, social, monetary, and ecological impacts. Estimates demonstrate that over 1.1 billion individuals smoke worldwide and around 4,000,000 people die yearly because of smoking (Prabhakar, *et al.*, 2012). The danger is that smoking has been identified as the single biggest cause of inequality in morbidity and mortality between rich and poor people in many countries (Krishna, *et al.*, 2012).

In spite of deliberate endeavours to control tobacco use around the globe, there still remain various nations where current levels and patterns of use are in ascending



direction which raises concern. Indonesia, for instance, a nation with extremely elevated levels of tobacco smoking among men especially, has not yet sanctioned the FCTC (Lunze K, *et al.*, 2013). As a result, based on the indicators for the strategies to eliminate tobacco usage in and around Europe, Indonesia has scored very low. Likewise, in Russia, pervasiveness of tobacco use among ladies has been expanding, and as of not long ago, there were not many laws identified with tobacco control (Lunze K, *et al.*, 2013). Russia passed a complete tobacco control arrangement in 2014 and can possibly accomplish advance control on tobacco as indicated by Lunze K, *et al.*, (2013).

It has been reported that 19.0% of men, 0.8% of ladies and 10.2% of all grown-ups presently smokes tobacco. (*Madhya Pradesh, GATS,2016-2017*). These report also indicated that 38.7% of men, 16.8% of ladies and 28.1% of all grown-ups presently utilize smokeless tobacco, and

50.2% of men, 17.3% of ladies a 34.25 of all grown-ups either smoke tobacco or potentially utilize smokeless tobacco, as presented in Figure 2.





November 2016.

Prevalence of current tobacco use,  
GATS Madhya Pradesh, 2009-10 and 2016-17  
(Figures in Percentages)

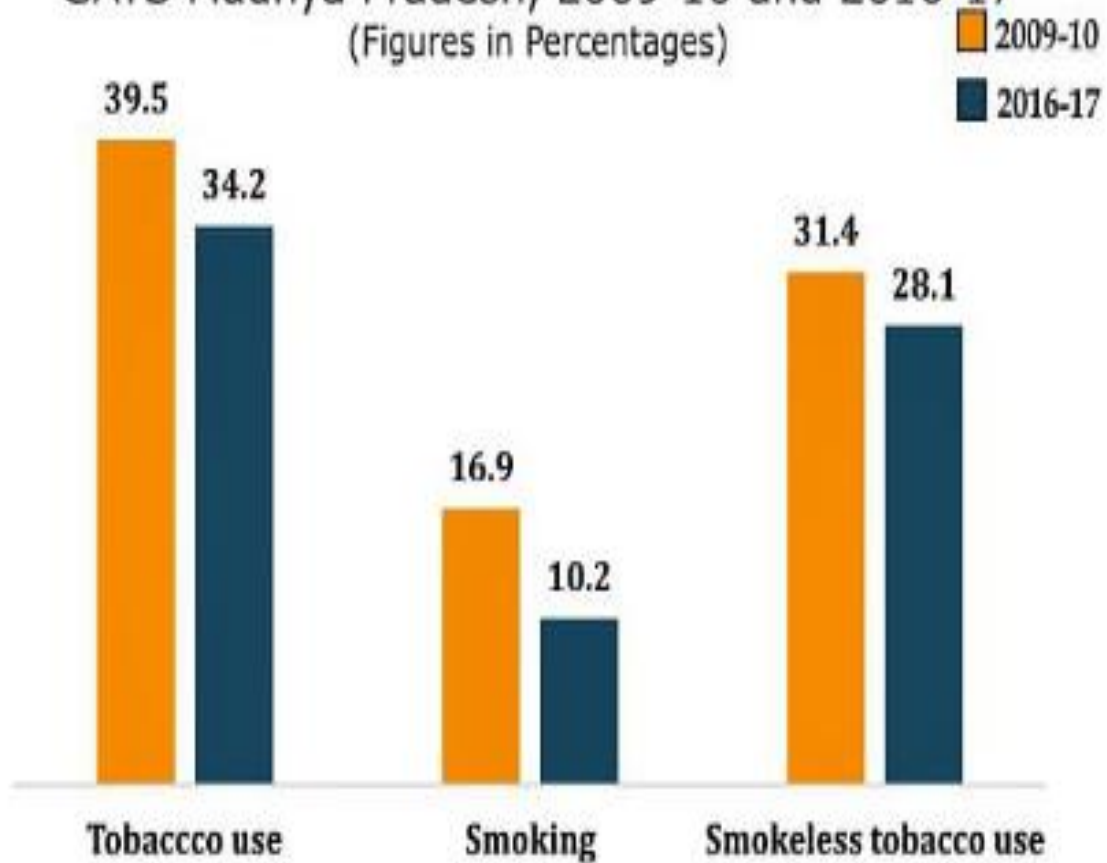


Figure 2: Prevalences of tobacco use (Source: *Madhya Pradesh, GATS, 2016-2017*)





Tobacco use includes cigarette smoking and the use of smokeless tobacco, which may be sucked, chewed or snuffed and is usually initiated and established early in adolescence (U.S. Dept. of Health and Human Services, 2012). In recent times, due to restrictive measures on cigarettes and smoking, smokeless tobacco has been marketed more intensively, and the prevalence of its use has increased globally (Morrison, *et al*, 2008).

As a district, Eastern Europe has seen a measurably huge increment in smoking pervasiveness among ladies since 1990. Increments among ladies, alongside a supported high commonness of male smokers, can be connected to tobacco industry focusing during the 1990s (Doku D, 2010).

The most well-known SLT is the Swedish snuff, (snus), which is a fine ground damp tobacco that is used. In the United States, both the local used tobacco as well hacked tobacco leaves and the Swedish snus are generally utilized. The use of non-smoked tobacco is rampant in South East Asia, where according to the World Health Organization (WHO), 90% of SLT consumers live in South East Asia (WHO, 2013). In South Asia, including Bangladesh traditional values do not permit smoking by women, however, the usages of SLT is socially acceptable. Tobacco with betel leaf, known as Paan in the subcontinent, is commonly used after having food, snacks, tea in small and large social gatherings. This is a cultural practice of Bangladeshi people which extends back to the early times of history (Choudhury, *et al.*, 2007). The prevalence of SLT among Bangladeshi people is estimated at 27% (26 million grown adult individuals) (WHO, 2009).



The habit of tobacco use has become not only a major contributor to the morbidity in many countries but, has also been the biggest burden to the economies of countries (Maman, *et al.*, 2007).

A study conducted by Pednekar *et al.*, (2015) concluded that, there is high prevalence of tobacco use among production workers in India, underscoring the need for targeted cessation efforts, especially for production workers. Production workers are less educated, are mostly from lowest economic group and are more likely to use tobacco and report their health status as poor. Creating a work environment supportive of tobacco control, including through well-enforced tobacco control policies for all forms of tobacco and through involving co-workers is very important. This can be achieved through programs that provide guidance to users on quitting their tobacco use and to non-users to support users to quit tobacco use, which may ultimately reduce tobacco-related morbidity and mortality (Pednekar *et al.*, 2015).

Holman, *et al.*, 2013 also reveals that friends have a significant influence on smokeless tobacco initiation use. The tendency of comply with a friend on smokeless tobacco use has about 3 times likelihood.

The tobacco industry is now turning its focus toward emerging markets in sub-Saharan Africa, seeking to soften the continent's tobacco control regulations and limited resources to combat industry marketing advances (Savell E *et al.*, 2014)

In the GATS Survey in India, the counts of smokeless tobacco use was twice as high in rural areas, and appeared differently in relation to urban ones. It was higher

among the population who were not educated and twice as higher in men (GATS, 2010).

A study conducted in Ghana by Juliet *et al.*, (2009) to examine the smoking patterns in Ghanaian civil servants indicated that the age-standardized prevalence of cigarette smoking among the 1,015 participants was 3.9% (95% CI: 3.0-5.6). The prevalence was higher among men, 6.1% (95% CI: 4.8-8.9) compared to 0.3% (95% CI: 0.006-1.4) among women. Among the participants, 48/615 of men with age-standardized prevalence of 7.3% (95% CI: 5.8-10.2) and 2/400 of women with prevalence of 0.5% (95% CI: 0.06-1.8) were considered to be ex-smokers.

In Malawi, the tobacco crop contributes at least 60% of the foreign exchange earnings. Pampel pervasiveness of both smoking and SLT use was most astounding among single men (35.22% and 7.87%, individually) while smoking commonness was most noteworthy in agriculturists and un-gifted/manual labourers (19.96% and 20.69%, separately) and SLT use was most noteworthy among agriculturists (7.39%) (Sreeramareddy,*et al.*,2014)

Among men, smoking predominance rates were high in Sierra Leone (37.7%), Lesotho (34.1%), and Madagascar (28.5%); low (<10%) in Ethiopia, Benin, Ghana, Nigeria, and Sao Tome and Principe; the pervasiveness of SLT use was <10% in all nations aside Madagascar (24.7%) and Mozambique (10.9%). Among ladies with smoking and SLT use, rates were <5% in many nations aside Burundi (9.9%), Sierra Leone (6%), and Namibia (5.9%) Smoking, and Madagascar (19.6%) and Lesotho (9.1%) SLT use. The extent of females who smoked was lower than SLT users in





many nations. More established age was emphatically connected with both smoking and smokeless tobacco use among these people. Smoking among men and women was feebly related; yet non- smoked tobacco use was firmly related, with training. Additionally, smoking among people was feebly related, however snuff use was unequivocally related, with the riches file. Smoking and un-combated use were likewise connected with conjugal status among the two people, just as with occupation (Rani, *et al.*, 2003) in their study of Tobacco use in India: Prevalence and predictors of smoking and chewing in a national cross sectional household survey presented that, prevalence of both chewing tobacco/pan masala and smoking tobacco is significantly higher in rural and uneducated populations compared to urban and more educated populations, respectively

A Survey of Socio-demographic Characteristics of Tobacco Use among 99598 Individuals in Bombay, India Using Handheld computer' stated that, among women, 57% reported current use of tobacco, 2.2 reported ever use. Majority of their use was smokeless tobacco and only few reported smoking. Among men, 69.3% reported current tobacco use and 4.45 much more often (23%) than women, while smokeless tobacco remain dominants (55.6%).

The predominance of smokeless tobacco utilization was a lot higher among rural contrasted with urban ladies (2.47% versus 0.73%), albeit smoking commonness was about equivalent (1.29% and 1.23%). The predominance of both smoking and smokeless tobacco utilization expanded with age; the most astounding pervasiveness was among matured ladies 40–49 years (2.75% for smoking and 4.78% for SLT use), (Sreeramareddy *et al.*, 2014)

Globally, 90.4% of SLT users live in 11 countries of the world: India (237.4 million, 67.5%), Bangladesh (30.9 million), Myanmar (12.6 million), Pakistan (10.1 million), USA (9.6 million), China (4.1 million), Indonesia (3.2 million), Nepal (2.7 million), Madagascar (2.6 million), Germany and Uzbekistan (2.4 million each). (Sinha, et al., 2015).

## **2.5 Types of Smokeless Products and Patterns of Use**

Smokeless tobacco products including snuff, available in the African South Sahara region include large scale manufactured products as well as those produced by small cottage industries, and custom-made products for personal use or for sale by street vendors. These smokeless tobacco products are sniffed, chewed, sucked, or applied to the teeth and gums, and these products are generally much cheaper than cigarettes (Guindon & Past, 2003). As such, they are more widely used by people who are socioeconomically disadvantaged and by older adults compared to younger adults (Popova & Ling, 2013). Snuff use is considered outmoded by many African people, thus it is not often practiced in public (Mike et al., 2013). However, snuff containing areca nut with or without tobacco, previously popular only in a limited number of countries, is now being marketed heavily to specific target groups, including women, young people, and smokers (Mohan & Lando, 2016b). Smokeless tobacco products are advertised to women, as an alternative to smoking in cultures where smoking by women is not socially acceptable; to young people, for whom flavoured and milder-tasting “starter” items have been created; and to smokers, for use where smoking is disallowed (Pawar, Pednkar and Grupta, et al., 2014). As indicated by Thankappan





and Mini (2008), for the individuals who are as of now tobacco sneedy, snuff items are recommended as the most moderate and available method for getting adequate nicotine. Mistry and Dasika (2017) opined that, double utilization of smokeless tobacco and cigarette smoking has been observed to be basic among South African young people, where about 55% of the individuals who utilize smokeless tobacco were likewise smokers of either cigarette or stogie. Similarly, data on adults from Nigeria suggest that as many as 21.1% of the surveyed STL users also smoked cigarettes (Hang et al., 2017). In Algeria, smokeless tobacco, particularly clammy snuff, has been expended generally by most of men in every single social gathering, Locally, chemma or shammah is the term given to moist snuff, which is put directly on the gums or placed in paper and then placed in the mouth (Nemeth et al., 2012). Dry snuff is called neffa, which is taken in through the nose. Chemma, the most prevalent category of smokeless tobacco utilized, is accessible by means of both legitimate and illegal (Algyacil & Silverman, 2004).

Dry snuff is called neffa, which is taken in through the nose. Chemma, the most prevalent category of smokeless tobacco used, is available via both legal and illicit channels (Algyacil & Silverman, 2004) GATS, (2016).

In a number of West African Nations, including Northern Nigeria, Cameroon, Senegal, Chad and Ghana, a smokeless item privately known as *taba* and is generally devoured orally or by nasal inward breath. It is set up from dry matured tobacco pummelled to fine particles and blended with Natron (a blend of sodium bicarbonate and sodium chloride). For oral utilization, a spot of the item is set between the lower gum and the lip, and the squeeze is left in position for a couple of



minutes to thirty minutes, until some dynamic fixings are ingested. *Taba* is additionally at times set on the tongue and sucked. In a few provincial and urban territories of Nigeria, *taba* is supposedly utilized in view of its implied capacity to “cure” certain medical ailments and because of its traditional place in social gatherings (Cattaruzza & West, 2013).

In Ghana, local snuff is set up by blending the dried tobacco leaf indigenous to the forested territories (*N. tabacum*) with synthetic substances, for example saltpeter (potassium nitrate) and afterward pounded into a fine powder (Mohan and Lando, 2016). In the wake of cooking the tobacco leaves, clients customarily plunge the simmered tobacco into the fly cinder of wood before embedding it between the lower gum and lip (Joshi, 2006). As indicated by Mohan and Lando (2016), to escalate the conveyance of free nicotine, clients include a basic operator (for this situation, fiery remains) as do different makers of tobacco items around the world. Smokeless tobacco is expended for the most part by more seasoned grown-ups in Ghana, yet youth are allegedly winding up increasingly keen on utilizing it. The expanding enthusiasm among youth is reliable with discoveries from the Global Youth Tobacco Survey (GYTS) from Ghana, which demonstrated that 10.4% of adolescents overviewed announced utilizing tobacco items other than cigar (Mini & Thankappan, 2016).

In Tanzania, three types of STL products are used. Kuberi and ugoro (moist oral snuff) are used by indigenous people, and thinso (tobacco with Areca nut, more widely known as gutka), which is used by migrants of Indian descent. Kuberi is the

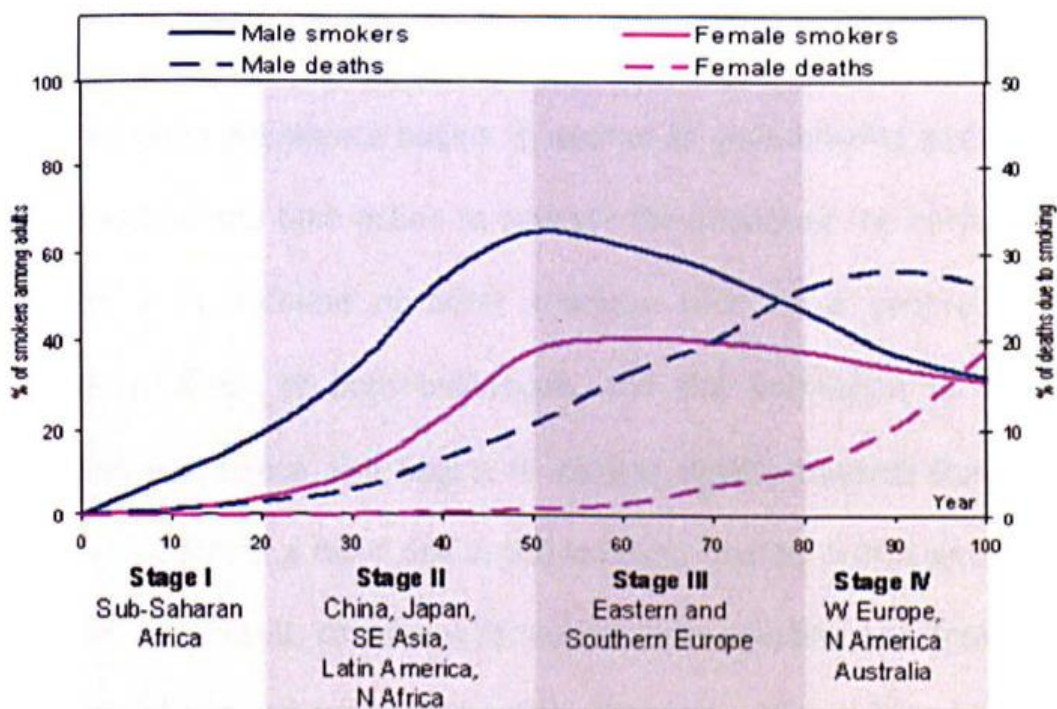


most popular product, followed by ugoro. Ugoro is either placed under the tongue or sniffed. Thinso is either placed in the cheek or chewed (P. Kaduri, *et al.*, 2008).

## **2.6 Smoking Epidemic Model**

The typical progression of the smoking epidemic has been described in a model by Lopez & Mathers (2006) in which countries tend to follow a clear pattern as the epidemic uptake of smoking emerges and evolves, and with a three to four decade lag between the peak in smoking prevalence and the subsequent peak in smoking related deaths. The epidemic is thought to move through four distinct stages over the course of around a century as shown in Figure 3.





**Figure 3: Smoking Epidemic Module (Source: Adopted from Lopez & Mathers (2006))**

The stages of the epidemic are explained as follows:

**Stage I** - Male and female smoking prevalence is relatively low and smoking-related deaths are not yet evident (Lopez & Mathers, 2006). This phase is relatively brief, usually lasting about one or two decades. Examples of countries in this stage are said to include those in sub-Saharan Africa such as Ghana, Nigeria and Malawi (Yawson, *et al.*, 2013).

**Stage II** - As smoking becomes socially acceptable and tobacco control strategies remain underdeveloped, the prevalence of smoking among men rises rapidly, reaching a peak of between 50-80% among men (Lopez & Mathers, 2006). Smoking prevalence among women typically lags behind men by one or two decades, but

increases rapidly during this stage. Examples of countries in this stage of the epidemic include Mexico, China and Brazil.

**Stage III** - Male smoking prevalence begins to decline as governments and health authorities acknowledge and take action to address the impact of the epidemic (Yawson, *et al.*, 2013). This is often against a background of other changes such as a general improvement in the education levels of both individuals and the population as a whole. Female smoking prevalence also begins to decline slightly towards the end of stage III. However, there is a rapid rise in the smoking-related deaths among both men and women. As a result, conditions for successfully enacting and implementing tobacco control policies are more favourable. Examples of countries in this stage of the epidemic include Poland, Russia, Spain and Turkey.

**Stage IV** - Smoking prevalence for men and women continues to decline, but slowly. Male smoking-related deaths peak in stage IV, although female deaths continue to rise rapidly as the full health impact of female smoking patterns become evident (Lopez & Mathers, 2006). However, because women's cumulative exposure to tobacco is lower than men's, the peak number of deaths is also lower. Smoke-free personal environments then become the norm. Examples of such countries include UK, Canada and France.

Key policy initiatives depend on the stage of the epidemic of that country. For example, it is recommended that for countries within stage I, key priorities should include education of the general public on the dangers of smoking through wide scale campaigns, and the implementation by governments of the WHO's Framework Convention on Tobacco Control (FCTC) (Mistry & Dasika, 2017).



For those within stage II priorities should include an implementation of countrywide tobacco control policies such as restrictions on smoking in public places, tougher legislation on the promotion of cigarettes and increase in tobacco tax. There should also be wider access and choice of smoking cessation therapies to help with quitting (Mistry & Dasika, 2017). Policies within stage III typically include enforcing smoking restrictions and education on quitting and providing access to broad range of smoking cessation options so that smokers are offered tailored support for quitting.

Within stage IV, priority policies include sustained taxation of smoking products, creating novel public health campaigns and innovation in policies to constrain further consumption, focusing on addicts to help them quit (Mohan & Lando, 2016). It has to be said that whilst the model has been used for years to describe the epidemic in developed countries, the validity of the model to the evolution of the epidemic in the developing world has not been widely tested.

### **2.6.1 Theoretical Models on Youth Tobacco Use**

Several behavioural models have been used to explain smoking initiation, continuous use and cessation among adolescents (Bhisey, 2012). The social cognitive theory by Bandura (1977) and the problem behaviour theory developed by Jessor and Jessor (1977) are the most commonly used models to describe substance use behaviours including smoking among adolescents. These are reviewed below.

### 2.6.2 Social Cognitive Theory

Social cognitive theory (SCT) was developed by Albert Bandura based on the social learning theory (Bandura, 1977). According to Nichter et al., (2015) it is seen as the most extensively theoretical models used to explain how smoking behaviour as well as other substance uses are acquired and maintained, particularly among adolescents. SCT is a component of behaviourism, and attempts to explain why people and animals do what they do (Brown & Rineh, 2010). It postulates that “there is a subtle but complex interaction between an individual and his or her environment, mediated through cognitive processes, which influence behaviour” (Al-Delaimy & Willet, 2008). One concept of SCT is that of reciprocal determinism, in which perspective behaviour is explained in terms of a triadic, dynamic, reciprocal and continuous interaction of the environment, personality traits and behaviour (Mini & Thankappan, 2016). The direction of a behaviour, whether conformity or deviant depends on the balance of the influence exerted on the behaviour in question. In the context of smoking, for example in a school where most are non-smokers and are intolerant to the behaviour, people would be less likely to smoke even in the absence of smoking regulations. Thus the smokers may need to modify their behaviour. According to Bandura (1986), three cognitive factors namely vicarious capability (observational learning), self-efficacy and perceived outcome of the behaviour (reward and punishment) are important predictors of behaviour. People learn by observing behaviour and its consequences from others. This is sometimes referred to as observational learning, social learning or role modelling. With regards to tobacco use, it has been reported that many young people acquire and maintain tobacco use



behaviour through the modelling by peers and parents who smoke (Amota, 2008; Mishra *et al.*, 2015; Bahl *et al.*, 2014).

Self-efficacy, which is the ability to believe in one's own ability to undertake or change a particular behaviour (Pawar, *et al.*, 2014), for non-smokers is displayed in the ability to successfully refuse the temptation of smoking while for smokers, it is displayed in the ability to quit. Adolescents who have low self-efficacy have low chances of quitting smoking (Codmus & Ayo-Yusuf, 2018). Regarding perceived outcome of a behaviour among adolescents, studies have shown that perception of the harmful effect of smoking is related to its initiation, continuous use and quitting.

### **2.6.3 The Problem Behaviour Theory**

Apart from the social cognitive theory, problem behaviour theory (PBT) has been extensively employed to explain behaviour in adolescence including smoking and other drug addictions (Rozi & Akhtar, 2007). The problem behaviour theory, according to Brown & Rineli (2010), postulates that all behaviour results from the interrelationship between the environment system (e.g. legislation, peer influence and parental support), personality system (e.g. Beliefs, attitudes, values and orientation towards self and society), the perceived and the behaviour system (e.g. School performance and delinquent behaviours) (Jessor and Jessor 1977).

According to Jessor and Jessor (1977) as cited by Mohan & Lando, (2014) “problem behaviour is behaviour that is largely accepted by society as a problem, as a source of concern, behaviour that breaks societal norms, an illegal act which attracts sanctions from others or society”. In this perspective, health compromising





behaviours can be regarded as a problem behaviour because they constitute a deviation from conventional behaviour. Smoking has not only been documented to be harmful to health several decades ago, but the behaviour also is largely rejected by society and it constitutes a deviation from conventional norm as well as a rejection of social model of good demeanour (Mohan & Lando, 2014).

In line with this theory, adolescent problem behaviours, e.g., tobacco use and alcohol use, are inter-related and form a premature way of uptake of an adult's behaviour and assertion of adulthood (Joshi, 2006). Adolescent smoking in particular has been associated with well-known problem behaviours such as illicit drug use, membership of a gang, shoplifting and having problems with the police (Rozi & Akhtr, 2007). Furthermore, adolescent smoking has been found to be a way of testing and breaking the boundaries of parental control in a quest for independence. Adolescent smoking behaviour is therefore clear problem behaviour as confirmed by empirical studies that specifically tested this theory. However, the association between other problem behaviours and smoking can be in both directions and reciprocal in that the use of other substance leads to smoking and smoking can also be a cause of other substance use (Hang et al., 2017).

### **2.7 Factors that drive the use of smokeless tobacco**

Factors which contribute toward initiation of tobacco use include: male gender, low socio-economic status, low levels of education and ethnicity (Rudatsikira, *et al*, 2010; U.S. Department of Health and Human Services, 2012). Studies have also shown that tobacco use initiation, may start as early as the age of 10 years and more



than 80% of adult smokers were reported to have started smoking before the age of 18 years. Research has also shown that a younger age at tobacco use initiation is a strong predictor of prolonged use (Eniola *et al.*, 2018).

In addition, having a parent, sibling or close friend who uses some form of tobacco may reinforce the habit (Rudatsikira *et al.*, 2010). Furthermore, the availability of different types of tobacco products, the tobacco control policies and strategies in place, as well as advertisements and promotional activities by the tobacco industry play a huge role in propagating the epidemic of tobacco use (WHO, 2003).

However, increased prevalence of smokeless tobacco has been linked to the erroneous perception that its use is associated with fewer negative health consequences than smoked tobacco (Rudatsikira *et al.*, 2010). In addition, smokeless tobacco is usually cheaper than cigarettes. This price advantage has been suggested to have contributed to the increased use of smokeless tobacco products among adolescents in many low- and middle-income countries (Rantao & Ayo-Yusuf, 2012). Furthermore, advertising helps to “normalize” tobacco use by creating appealing images and suggesting that the product being used is prevalent, desirable and safe (American Psychological Association [APA], 2012; Morrison *et al.*, 2008).

According to Azam, *et al.*, (2016), easy accessibility and affordability, along with misunderstandings concerning its useful health effects are main contributing elements for augmented smokeless tobacco consumption. While many people are aware that tobacco is hazardous, the majority of users are not aware about the lethal association between SLT and fatal diseases.



Education is by all accounts a solid indicator of tobacco use. Many studies worldwide and in India demonstrate a more noteworthy predominance of tobacco use among the less instructed and ignorant. In a cross-sectional example overview (Sentinel Survey) of the ICMR and WHO on 35,288 people matured 10 or more in Karnataka and 29,931 in Uttar Pradesh, a contrary relationship among training and tobacco utilize was watched generally speaking and in the vast majority of the age gathering (PC *et al.*, 2007).

Among men, the chances of a wide range of tobacco use were observed to be huge in those jobless. Chances proportion was additionally higher for men who were homemakers, particularly in the individuals who were uneducated. Moreover, the chances of utilizing cigarette were high in male government representatives. In females, the chances of smoking bidi and different structures (barring cigarettes) were the most noteworthy among those jobless. It was discovered that ladies who were homemakers and resigned men demonstrated lower chances of utilizing tobacco when contrasted and those independently employed (Prabhakar B, *et al.*, 2012).

In Pakistan, the uneducated people are more likely to use tobacco compared to the educated people and chances of tobacco use among males is about 13 folds higher than the likelihood of its use among the female population (Alam *et al.*, 2008).

Exposure of children and adolescents to tobacco advertisements may lead to the development of positive attitudes, beliefs and expectations about both the marketing and use of the products (National Cancer Institute, 2008). These authors also revealed that the prevalence of tobacco use is generally higher among urban, less

educated and low economic groups and people with less knowledge about effects of smoking (Krishna *et al.*, 2012).

(Holman, Bricker, & Comstock, 2013) also revealed that friends have a significant influence on smokeless tobacco initiation use. The tendency to comply with a friend on smokeless tobacco use has about 3 times likelihood.

Gritz *et al.*, (2003) reported that parental and household influences (parental education, marital status, household smoking) were important predictors of ever smoking, but not of susceptibility to smoking, among African Americans. Hispanic adolescents were significantly influenced by environmental influences, namely smoking by other household members (ever smoking) and by peers (susceptibility and ever smoking), although peer pro-tobacco influences (friends who smoke or friends' approval of smoking) were important predictors of susceptibility to smoking or ever smoking for all three ethnic groups.

Smokeless tobacco use has been shown to be a gateway drug not only leading to cigarette smoking, but the use of other drugs such as alcohol, marijuana, cocaine and inhalants (Campaigning for Tobacco free kids)

## **2.8 Addictive levels**

As defined by the World Health Organization (WHO), Tobacco is a psychoactive substance causing mental and behavioural disorders and also brings about many physical disease risks as well as high healthcare cost (Uysal *et al.*, 2004). Tobacco addiction or dependence may have been attributed to the presence of the key





addictive substance, nicotine. Nicotine dependence or tobacco dependence is an addiction to tobacco products caused by the drug nicotine. Nicotine dependence means you can't stop using the substance, even though it's causing you harm (Uysal *et al.*, 2004).

The idea of enslavement is much of the time bantered as either an individual "direction for living" or a "natural defencelessness." Current proof demonstrates that most medications of abuse exert their effects by actuating prize circuits in the cerebrum. And that, while introductory medication experimentation is generally an intentional conduct, continuous medication use hinders mind work. Without a doubt, people with hereditary vulnerabilities or experiencing comorbid mental conditions, just as the individuals who manhandled drugs during early youthfulness, are at more serious danger of abuse and consequent addition (Volkow and Morales, 2015)

Nicotine produces physical and mood-altering effects in the brain that are temporarily pleasing. These effects make the individual want to use tobacco and lead to dependence. At the same time, stopping tobacco use causes withdrawal symptoms, including irritability and anxiety (Uysal *et al.*, 2004). The toxic effects of tobacco result from nicotine and other substances in tobacco product. Smokers have much higher rates of heart disease, stroke and cancer than non-smokers do (Mayo Clinic, 2012).

According to Lammel *et al.*, (2014) recent pseudorabies virus-based procedures for monosynaptic functions tracing have proven that neurons from parts of the brain synapse on distinct VTA DA neuron subpopulations, and neurons from the dorsal



raphe (DR) give more of mono- synaptic inputs. Although these phenomenon have been suggested studies on the influence of these projections on DA neurons have been just around a few brain structures (Paladini and Roeper, 2014). Example, the control of tonic firing of VTA DA neurons involves the stria terminals and the ventral pallidum (Georges and Aston-Jones, 2001; Mahler et al., 2014), whereas the control of phasic firing of VTA DA neurons involves the pedunculo pontine tegmentum (PPT), the subthalamic nucleus (STN), and the laterodorsal tegmentum (Floresco et al., 2003; Lodge and Grace, 2006). VTA DA neurons receive GABAergic innervation from local GABAergic neurons, the NAc, globus pallidus, and rostromedial tegmental nucleus, among others. These GABAergic projections are implicated in the control of burst timing (Paladini and Roeper, 2014). It is likely that phasic and tonic changes in DA neuronal firing triggered by repeated drug administration reflect neuroplastic changes in these regions and on inputs that relay to them. For example, the lateral habenula (LHb) indirectly inhibits VTA DA neurons via its inputs to GABA neurons in rostromedial tegmental nucleus (Ji and Shepard, 2007), eliciting aversion (Lammel *et al.*, 2012), and these inputs are modified by repeated cocaine administration (Meye *et al.*, 2015). Thus, future studies will be able to assess their contribution to the dysphoria and enhanced stress reactivity in addiction. We recently showed abundant glutamatergic projections from the DR to VTA DA neurons that innervate the NAc, whose activation induced DA release in NAc and evoked reward (Qi *et al.*, 2014). The DR is best known as a serotonergic structure that regulates emotional behaviours. However, findings on the role of DR serotonergic neurons in reward have been inconsistent (Cohen *et al.*,



2015; Fonseca *et al.*, 2015; Liu *et al.*, 2014; McDevitt *et al.*, 2014; Miyazaki *et al.*, 2014), which is likely to reflect, in part, the functional diversity of these neurons. In this regard, cellular recordings from DR serotonergic neurons in behaving mice have revealed that they convey reward information through tonic as well as phasic firing and that they signal reward and punishment on multiple timescales (Cohen *et al.*, 2015). The DR also has glutamatergic and GABAergic neurons, some of which co-release serotonin, and thus future studies are necessary to tease apart the specific targets of the diverse serotonergic neurons and of their neighboring GABAergic and glutamatergic neurons (Liu *et al.*, 2014; McDevitt *et al.*, 2014; Qi *et al.*, 2014). In this regard, it's within the VTA, DR neurons expressing the vesicular glutamate transport (VGluT3) preferentially establish synapses on DA neurons (Qi *et al.*, 2014). These DR-VGluT3 neurons provide a major glutamatergic input to VTA DA neurons, including those that innervate the NAc. Selective activation of these DR-VGluT3 fibres results in VTA glutamate release, NAc DA release, and reward (Qi *et al.*, 2014). Notably, these DR VGluT3-glutamatergic neurons (some of which may co-release serotonin) are highly interactive with the serotonergic system (Commons, 2009). Thus, a better understanding of the function and connections of the diverse DR neurons will help us determine whether they serve as a link between reward and mood regulation and whether they contribute to the high co-morbidity between drug use and depression. (Volkow & Morales, 2015)

The endogenous opioid system also contributes to the effects of stress on drug consumption. Specifically, dynorphin, through its activation of kappa receptors (KOR), is implicated in the stress-induced potentiation of drug reward (reviewed in



Ehrich *et al.*, 2014). Activation of KOR on DA terminals inhibits DA release in the NAc, which is implicated in the dysphoria that follows drug withdrawal (Tejeda, *et al.*, 2012). These findings have generated interest in KOR antagonists or partial agonists as medications to prevent relapse in addiction (Al-Hasani *et al.*, 2013; Butelman *et al.*, 2012; Grosshans *et al.*, 2015; Schlosburg *et al.*, 2013; Smith *et al.*, 2013a). The effects of drugs on the opioid system in the human brain have been investigated with positron emission tomography (PET) using [11C] carfentanil to assess MOR and their occupancy by enkephalins. These studies have shown that acute alcohol, but not intravenous amphetamine, increases enkephalins (Guterstam *et al.*, 2013; Mitchell *et al.*, 2012). Increases in enkephalins after cigarette smoking have been inconsistent, which is likely to reflect, in part, the influence of MOR gene variants in these responses. More specifically, increases were observed only in smokers with the AA variant of the MOR A118G polymorphism (Domino *et al.*, 2015). Brain-imaging studies of MOR in alcoholics and cocaine abusers have reported increased [11C]carfentanil binding, which has been interpreted to reflect reduced levels of endogenous enkephalins (hence, decreased competition for ligand binding) though they could also reflect MOR upregulation (Weerts *et al.*, 2011; Zubieta *et al.*, 1996). In cocaine abusers, the increases in [11C]carfentanil binding have been associated with worse clinical outcomes (reviewed in Volkow, 2010). In contrast, studies in smokers have shown no changes in [11C]carfentanil binding (Kuwabara *et al.*, 2014). Brain-imaging studies of delta opioid receptors in alcoholics (measured with PET and [11C]methylaltrindole) showed no differences when compared to controls (Weerts *et al.*, 2011). To our knowledge, no PET studies

have been done in substance abusers using kappa receptor ligands (Volkow & Morales, 2015).

Bowers et al., (2010); Lüscher and Malenka, (2011) reported that several drugs of misuse, including cocaine, but also morphine, nicotine, and ethanol, etc., can evoke synaptic plasticity in VTA DA neurons. Because VTA DA neurons are heterogeneous in their synaptic connectivity, molecular composition, and electrophysiological and signalling properties (Lammel *et al.*, 2014), it is conceivable that drugs differentially affect their subpopulations. For instance, VTA DA neurons that lack DAT or D2R (Li *et al.*, 2013) innervate the medial PFC, but not the NAc (Bannon and Roth, 1983; Lammel *et al.*, 2012; Sesack and Grace, 2010). Moreover, some of the VTA DA neurons innervating the NAc have axons with micro-domains for either DA or glutamate signalling, further emphasizing their diversity (Zhang *et al.*, 2015). DA regulates excitatory synaptic plasticity both by increasing and decreasing synaptic strength through LTP and LTD. Synaptic strength is controlled by the insertion or removal of AMPAR or NMDAR and by changes in the subunit composition of AMPA receptors. Specifically, the insertion of high-calcium permeable AMPAR (GluR2 subunit) contributes to the drug-induced increases in AMPAR-to-NMDAR ratios associated with LTP in models of addiction (Boudreau *et al.*, 2007; Conrad *et al.*, 2008; Kourrich *et al.*, 2007). These AMPAR have higher single-channel conductance than GluA2-containing receptors (Guire *et al.*, 2008; Liu and Cull-Candy, 2000), and their upregulation increases the responsiveness of MSNs in the NAc to glutamate released by cortical and limbic terminals when exposed to drugs or drug cues (Wolf and Ferrario, 2010). Drug-



induced neuroplastic changes have been uncovered in glutamatergic inputs to the NAc from PFC, basolateral amygdala, and ventral hippocampus (Di Forti *et al.*, 2014; Lee and Dong, 2011; MacAskill *et al.*, 2014; Pascoli *et al.*, 2014b). Recently, the use of genetic cellular tagging has enabled researchers to identify the clusters of neurons within the PFC that trigger excitatory signals into NAc with exposure to cocaine cues (Cruz *et al.*, 2014). Though not as extensively investigated as the NAc, the dorsal striatum also undergoes neuroplastic changes with repeated cocaine exposure; these are implicated in habit learning and in the automatic cocaine consumption triggered by repeated cocaine exposures (Volkow & Morales, 2015).

A study in India by (Manimunda *et al.*, 2012) shows that about 3% of the study participants exhibited nicotine dependency.

Pedro, *et al.*, (2017) also shows that tobacco use and nicotine dependency is considerable higher in men (10%) relative to women (2.6%).

Suliankatchi *et al.*, (2019) further advanced the argument that smokeless tobacco use is associated with males than females.





2.9.1 Fagerstrom test for nicotine dependence measurement scale. Figure 4:

QUESTIONS	Answers	Score <i>(please circle)</i>
1. How soon after waking up do you smoke your first cigarette?	Within 5 minutes	3
	6-30 minutes	2
	31-60 minutes	1
2. Do you find it difficult to abstain from smoking in places where it is forbidden?	Yes	1
	No	0
3. Which cigarette would you hate to give up?	The first one in the morning	1
	Any other	0
4. How many cigarettes a day do you smoke?	10 or less	0
	11 - 20	1
	21 - 30	2
	31 or more	3
5. Do you smoke more frequently in the morning than in the rest of the day?	Yes	1
	No	0
6. Do you smoke even though you are sick in bed for most of the day?	Yes	1
	No	0
<b>Total</b>		

Source: Heatherton TF, Kozlowski LT, Frecher RC & Fagerstrom KO (1991) *The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire*, *British Journal of Addiction*, 86 pp 1119-1127.

Score	1-2	=	very low dependence	6-7	=	high dependence
	3-4	=	low dependence	8+	=	very high dependence
	5	=	medium dependence			

Fagerstrom test for nicotine dependence (Source: Heatherton *et al.*, {1991})

The Fagerstrom Test for Nicotine Dependence is a standard instrument for surveying the power of physical dependence on nicotine. The test was intended to give an



ordinal proportion of nicotine reliance identified with cigarette smoking. It contains six things that assess the amount of cigarette utilization, the impulse to utilize, and reliance (Heartherton *et al.*, 1991).

In scoring the Fagerstrom Test for Nicotine Dependence, yes or no responses to tobacco addiction tailored questions are scored from 0 to 1 and various decision items are scored from 0 to 3. The scores on the items are summed up to yield a maximum score of 10. The higher the complete Fagerstrom score, the more serious is the patient's physical reliance on nicotine. The Fagerstrom test might be utilized by the doctor to record signs for recommending medicine for nicotine withdrawal (Heartherton *et al.*, 1991).

### **2.8.1 Symptoms of tobacco dependency**

Tobacco dependency can vary from individual, in that, some people, using any amount of tobacco can easily get to nicotine dependence. Signs that you may be addicted include:

-You cannot stop smoking: Individual who has made one or more attempts to stop attempts to stop serious, but unsuccessful.

-You experience withdrawal symptoms when you try to stop. Your attempts at stopping have caused physical and mood-related symptoms, such as strong cravings, anxiety, irritability, restlessness, difficulty concentrating, depressed mood, frustration, anger, increased hunger, insomnia, constipation or diarrhoea.



-You keep smoking, despite health problems: Even though the user have developed health problems with your lungs or your heart, you would not be able to stop.

-You give up social or recreational activities in order to smoke: People may stop going to smoke-free restaurants or stop socializing with certain family members or friends because they would not be able to smoke in these locations or situations, (mayo clinic 2012).

The biological basis of cigarette abuse is explained by dependence of nicotine by the molecular mechanisms of the reward system in the brain. Nicotine is highly addictive similar to that of cocaine and other hard drugs when delivered by inhaling tobacco smoke into the lungs. This smoke quickly releases nicotine into the blood, allowing it to get into the brain in no time of taking a puff. Brain chemicals called neurotransmitters are released with the presence nicotine, which can regulate mood and behaviour. Dopamine, one of these neurotransmitters, is released in the "reward centre" of the brain and causes improved mood and feelings of pleasure. Experiencing these effects from nicotine is what makes tobacco so addictive.

Nicotine dependence involves behavioural (routines, habits, feelings) as well as physical factors. These behavioural associations with smoking may act as trigger situations or feelings that activate a craving for tobacco, even if the affected individual has not smoked for some time. (Mayo Clinic 2018).



## 2.9 Health implications of smokeless tobacco

Non-communicable diseases (NCDs) kill 41 million people each year, equivalent to 71% of all deaths globally, (WHO, 2018)

Smoking alone is estimated to cause about 21% of the cancers worldwide (Ezzarati et al., 2005). Additionally, tobacco smoking has been identified as a risk factor for several chronic diseases such as is heart disease, hypertension, chronic obstructive airways diseases, stroke, and lung and other cancers (Muula, 2007).

Dhirendra et al., (2018) detailed in their Global weight of all-cause and cause-explicit mortality because of smokeless tobacco use: methodical audit and meta-examination that, SLT is in charge of countless deaths worldwide with the South-East Asian locale bearing a considerable portion of the weight.

There is evidence that long-term smokeless tobacco product use may be associated with a greater risk of fatal myocardial infarction (MI) and fatal stroke, suggesting that smokeless tobacco product use may complicate the chance for survival after a MI or stroke. In addition to potential cardiovascular disease risk, smokeless tobacco products use has been associated with an increased risk of certain cancers and oral disease, (Mariann et al., 2010)

Tobacco use, physical latency, the unsafe utilization of liquor and unfortunate weight control plans all increase the danger of passing on from a NCD, (WHO, 2018). According to Danaei (2005), tobacco smoking is among the leading risk factors for death worldwide including low and middle income countries. Total tobacco attributable deaths are projected to increase from approximately 5 million



per year today to over 8 million per year by 2030 (Charles *et al.*, 2009). It is projected that by the year 2030, the number of annual deaths resulting from tobacco use will be around 10 million, most of which will occur in developing countries (WHO), Eniola and Ayo-Yusuf, (2018).

Currently about a billion adults use tobacco every day, with smoking causing half of all male deaths among tuberculosis patients in India (Krishna *et al.*, 2012). Smoking by pregnant women is well established as a causative factor for low birth weight, stillbirth and other adverse reproductive outcomes. Recent evidence suggests that a non-cigarette form of tobacco use also causes adverse reproductive outcomes, especially with smokeless tobacco use in India. In addition, there is a strong indication that exposure to second-hand smoke increases the risk of stillbirth. Tobacco use accounts for one in six of all deaths resulting from Non-communicable Diseases (NCDs) (Krishna *et al.*, 2012).

Smoking alone is estimated to have caused 21% of deaths from cancer worldwide (ref Krishna *et al.*, 2012). This same report claimed that, more than 1 in every 10 cardiovascular deaths in the world in the year 2000 was attributable to smoking, demonstrating that it is an important preventable cause of cardiovascular mortality. Similarly, smokeless tobacco users have an increased risk of heart attacks and strokes compared to never users, and former smokers who have switched to smokeless tobacco have a higher risk compared to those who have quit entirely, according to a study conducted by Rostron *et al.*, (2018)

Further information from the WHO STEPS overviews describing the smokeless tobacco issue among grown-ups in specific provincial and urban zones of various



pieces of SEAR: Men, 5.4% to 39.6% in urban zones; 6.5% to 67.6% in rustic zones; ladies, 0.9% to 17.6% in urban territories; 1.6% to 41.6% in country regions.

Smokeless tobacco use is associated with spitting, with a high rate of smokeless tobacco use prompting a pervasive spitting, presenting an anaesthetic and unhygienic condition, which may prompt the spread of infections, including tuberculosis. Notwithstanding, a restriction on spitting could, without a total wellbeing message, lead to a gulping of the juices, which results in higher paces of upper aero digestive malignancy. In Nepal, around 95% of chewers of betel quid with tobacco commonly swallow the juices. In Singapore, where spitting is carefully banned, small sacks are offered to betel quid chewers for spitting into (Gupta *et al.*, 2011)

Hatsukami & Severson (1999) established in their studies that smokeless tobacco use is associated with leukoplakia, a disease of the mouth characterized by white patches and oral lesions on the cheeks, gums, and or tongue. Leukoplakia can sometimes lead to oral cancer. Studies have found that more than half of daily users of smokeless tobacco had lesions or sores in the mouth, and that these sores are commonly found in the part of the mouth where users place their chew or dip.

In expansion, regardless of the developing information of unfavourable conceptive impacts of smoking, it isn't sure whether nicotine has comparable impacts and system of activity as cigarette smoking. There is additionally worried about the effect of tobacco presentation, especially smokeless tobacco, on conceptive action in the youthful or adolescent male, with the expanding pace of smokeless tobacco utilization in the youthful (Aprioku and Ugwu, 2015).





A report called *Smokeless Tobacco and Public Health: A Global Perspective* was discharged by the CDC and the National Cancer Institute in December 2014. As indicated by this report, in excess of 300 million individuals in at any rate 70 nations utilize unsafe smokeless tobacco items. Stogie smokers and smokeless tobacco (bite or spit tobacco) clients have comparable wellbeing dangers as cigarette smokers, including oral malignant growth, oesophageal disease, and pancreatic disease, just as oral medical issues like mucosal injuries, leukoplakia , and periodontal illness. Smokeless tobacco items additionally contain nicotine, and clients regularly exhibit indications of reliance like those of cigarette smokers, including oral cancer, oesophageal cancer, and pancreatic cancer, as well as oral health problems like mucosal lesions, leukoplakia, and periodontal disease. Smokeless tobacco products also contain nicotine, and users often demonstrate signs of dependence similar to those of cigarette smokers.

Oral snuff and chewing tobacco are most commonly consumed. Smokeless tobacco use has been associated with oral cancer and leukoplakic lesions at the site of application of the tobacco, consistent with local exposure to tumorigenic chemicals. (Razis *et al.*, 2014)

According to (Auf *et al.*, 2012), people who use smokeless tobacco have similar manifestations of nicotine dependency just as much as the users of smoke tobacco, particularly cigarette smokers do. In support of this argument, (Ayo-Yusuf, Swart, & Pickworth, 2004) stated that smokeless tobacco use among South Africans supplies them enough nicotine levels capable of triggering addiction and exposing substantially high health risks as cigarette smokers are exposed to 24.75% of all



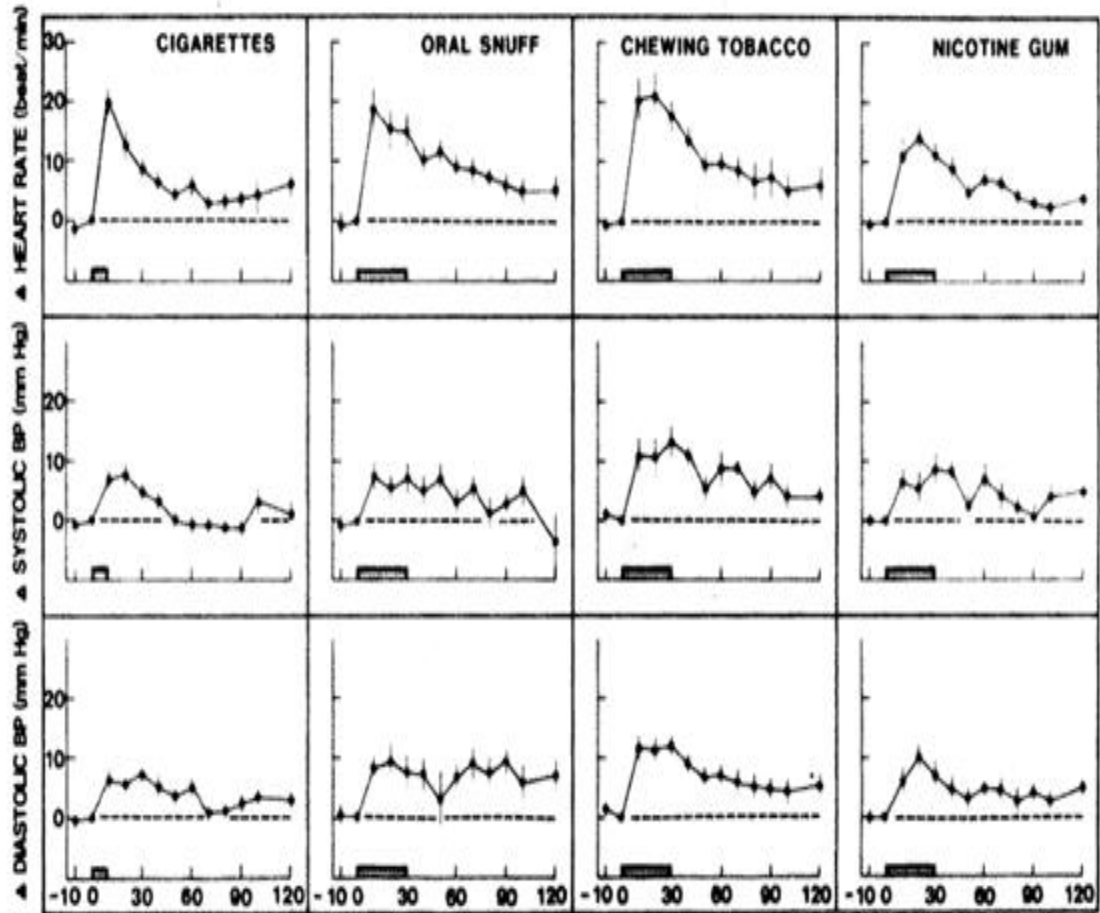
grown-ups were open to recycled smoke at any open spot 86.05% of cigarette smokers, 53.6% of bidi smokers thought of stopping smoking in light of caution name. 49.6% of snuff clients thought of stopping snuff use because of caution, (GATS, 206-2017). MarkSavitz *et al.*, (2006) indicated that, smoked tobacco contain primary agents like, polycyclic sweet-smelling hydrocarbons, carbon monoxide, nicotine, and N-nitroso mixes, with littler measures of polonium, radon arsenic, and cadmium. Polycyclic fragrant hydrocarbons are delivered by the high temperatures came to in the consuming of tobacco. Nitroso mixes, including nitrosamines, are found in tobacco leaves themselves, might be framed somewhat during burning, and are shipped through cigarette smoke (MarkSavitz *et al.*, 2006).

Savitz *et al.*, (2006) also stated in their article ‘Public health implications of smokeless tobacco use as a harm reduction strategy’ that tobacco that is smoked has the most prevalent and harmful tobacco product effect, which has overwhelming evidence showing substantially increased risks of various types of cancers; chronic obstructive pulmonary, cardiovascular, and oral diseases; and adverse reproductive outcomes.

Benowitz *et al.*, (1988) in their study also confirmed that a substantial amount of nicotine is absorbed from smokeless tobacco. While smoking, there is rapid absorption of nicotine through the pulmonary circulation and peak blood levels are achieved quickly. Nicotine is cardio active, and cardiovascular effects of the oral snuff and chewing tobacco have been reported earlier (Benowitz *et al.*, 1988). These authors also noted similar changes in heart rate and blood pressure as in those found in cigarette smoking, However they did not characterise the time course of



response and did not also examined the relationship of cardiovascular responses to blood levels of nicotine as illustrated in figure 5.



**Figure 5:** Blood nicotine concentrations during and after cigarette smoking, oral snuff, chewing tobacco, and nicotine gum (two 2 mg pieces). Data represent average values for 10 subjects; vertical bars indicate SE. Shaded bars above time axis indicate period of tobacco or nicotine gum exposure. (Benowitz et al., 1988)

### 2.9.1 Tobacco use control mechanisms

Tax on tobacco products has been shown to be the most effective way to reduce tobacco use. Studies have shown that increasing taxes will have a positive effect on lowering tobacco use among young people and low-wage earners. Increasing



tobacco taxes by 10 % generally decreases tobacco consumption by 4% in high income countries and 8% in low-middle income countries (Charles *et al.*, 2009).

Policies, such as bans on marketing and promotion of tobacco products have been used as a powerful means of curbing the tobacco epidemic. Effective bans have been those that have been complete and applied to advertising categories including national and international bans on TV and or radio, newspaper and or magazine, on billboards, point of sale and internet advertising (Charles *et al.*, 2009).

An increased in taxes on cigarette as part of policy control strategies in the United States to clip down cigarette smoking has seen significant increased correlation in the use of cheaper alternative source of nicotine in smokeless tobacco use (Hawkins, Bach, & Baum, 2018).

Comprehensive warnings about the dangers of tobacco encourage tobacco users to quit and young people not to start, and help gain public acceptance of other tobacco control measures such as establishing smoke free environments (Charles *et al.*, 2009). These authors have also noted the need for countries to establish programmes that would provide low-cost, but yet effective treatment for tobacco users who want to quit their addiction.

### **2.9.2 Control of the use Tobacco**

Several efforts have been made at national and international levels in combating and dealing with the use of smokeless tobacco (Siegel & Biener, 2000). It is important for effective policies on smoking to be implemented urgently and for public



education campaigns on smoking to be initiated with particular emphasis on educating men of lower socioeconomic status and encouraging the low smoking prevalence in women.

Studies have shown the benefits of exposure to information about the harmful effects of tobacco on reducing tobacco use (Doku *et al.*, 2012). As expected, in our study, exposure to anti-smoking media messages was seen as a protective factor against the intention to smoke in the future. In terms of the positive benefits of the inclusion of tobacco control issues in the school curriculum, as identified in a similar study (Flay, 2009).

Eniola O.C *et al* (2018) indicated that In order to keep smoking initiation and prevalence low among youths in Ghana, there should be increased focus on prevention of access to smokeless tobacco and the intensification of anti-smoking media messages, as well as the continued inclusion of tobacco control issues in the school curriculum.

Warren *et al.*, (2005) in accessing the tobacco use and cessation counselling concluded that health professional schools, public health organizations and education officials should discourage tobacco use among health professionals and work together to design and implement programs that train all health professionals in effective cessation counselling techniques. If the goal of the tobacco control community is to reduce substantially the use of tobacco products, then resources should be invested in improving the quality of education of health professionals with respect to tobacco control.





The WHO Framework Convention on Tobacco Control (WHO FCTC), adopted by the World Health Assembly in May 2003, requires state parties to adopt and implement tobacco control measures. It also guides governments with regard to suggested policies and programs for reducing tobacco use. Among the key strategies advocated are banning tobacco advertising, promotion and sponsorship, introducing smoke-free policies by prohibiting smoking in public and workplaces, imposing high taxes on tobacco products, introducing health warnings on cigarette packages, implementing anti-tobacco media campaigns and promoting smoking cessation. All of these approaches are effective, involve minimal costs and should be easy to execute. Nevertheless, numerous obstacles exist worldwide, particularly in Africa and other developing regions. Consequently, what should be a simple endeavour becomes rather difficult to achieve (WHO, 2003).

The lower rates of tobacco taxation, weaker smoke-free policies and fewer restrictions on tobacco advertising in Africa compared with high-income countries are key factors driving the tobacco epidemic on the continent. These shortcomings, enabled by the tobacco industry thwart anti-tobacco initiatives, and have allowed the tobacco industry to expand its markets in the region by capitalizing on economic growth, changing social norms and population demographics (WHO, 2003).

## CHAPTER THREE

### METHODOLOGY

As has been stated earlier, this work was undertaken to assess the use of smokeless tobacco among the youth of the Tamale Metropolis. In this chapter, the methods and techniques used for data collection for this research as well as reasons for the choice of these methods have been discussed. The presentation covered the study design and the area where the study was conducted. It also discussed the study population and sample and also the ethical consideration of the study.

#### 3.1 Study design and type

The research was a descriptive cross sectional study, where data was collected among residents within the Tamale Metropolis. The cross-sectional design was selected to provide data to explain the use of smokeless tobacco and its health implications among the youth of the Metropolis. The study sort data from respondents.

#### 3.2 Study area

The study was undertaken in the Tamale Metropolis of Ghana. Tamale is the Metropolitan Capital as well as the Regional capital of the Northern Region. The Tamale Metropolis is one of the 26 MMDA's in the Northern Region. The Tamale Metropolitan Four health zones were adopted for the study. Tamale is strategically located in the Northern Region and by this strategic location, the Metropolis has a market potential for local goods from the agricultural and commercial sectors from



the other districts in the region and the southern part of Ghana. By its location, the Metropolis stands to gain in trade from some neighbouring West African countries such as Burkina Faso, Niger, Mali and Togo. The Metropolis has a total estimated land size of 646.9sqkm (2010 PHC Report). Geographically, the Metropolis lies between latitude 9°16 and 9° North and longitudes 0° 36 and 0° 57 west. There is a total of 116 communities in the Metropolis of which 41 (35%) are urban, 15 (13%) being peri-urban and 60 (52%) of them being rural in nature. The rural parts of Tamale are the areas where land for agricultural activities is available and serve as the food basket for the Metropolis. However, these communities have inadequate basic social and economic infrastructure such as good roads, school blocks, hospitals, markets and recreational centres (2010 PHC Report).



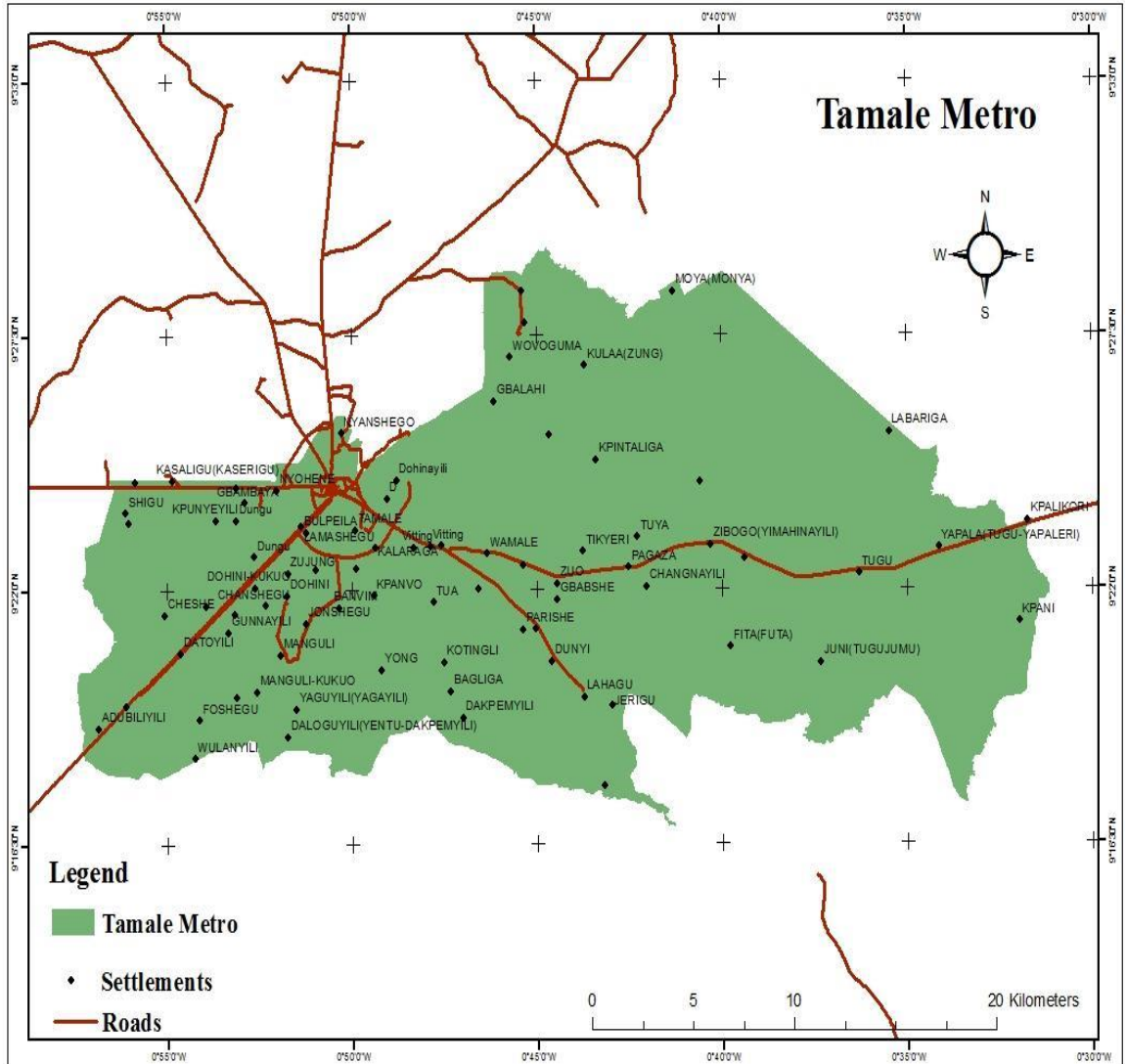


Figure 6: Map of Tamale metro; source: Extracted from Arc MAP

### 3.3 Definitions of study variables and their measurement

The main outcome variable, which was also the dependent variable was current snuff use, and was defined as the consumption of smokeless tobacco during the period of the study. This was measured by asking the respondent whether they currently use snuff. A “yes” response was taken to mean current used.



The independent variables were: addictive substances use, including, tramadol use, alcohol use and energy drink use. Others included respondent's socio-demographic characteristics such as: age, sex, religious status, marital status, educational status, and employment status. Variables on health included health benefit, health challenge, breathing problem, oral deformity and nasal deformity.

### **3.3.1 Study Population**

The population under study comprised all residents, both females and males in the Tamale metropolis who were 15 years old and above. From this population a sample size was determined and used as the minimum number of participants included in the study.

#### **Sample size determination**

To achieve a representative sample that will power the study and to allow for extrapolation of results to the entire population of the residents in the Tamale Metropolis, the following were considered, a confidence level of 95 % and a margin of error of 5% were assumed. The study sample size was calculated using the formula for simple random sampling and single proportions described by Leslie (1965):

$$N = \frac{Z^2 * p * q}{d^2}$$

Where, N=sample size, Z= is the corresponding value for normal distribution of the of the outcome variable at 95 % confidence level equivalent to 1.96. P was the expected proportion of the population using the various forms of smokeless tobacco,



which was assumed at 50 %, since this was not known.  $q = (1-p) = (1-0.5) = 0.5$ .  $d$  was the margin of error indicating the desired absolute precision of the findings.

Therefore, from the above, the sample size was calculated as follows:

$$N = (1.96)^2 \times 0.5 \times (1 - 0.5) / (0.05)^2$$
$$= 384.16$$

In allowing for 5% alteration rate (AR), the final sample size was arrived at:

$$AR = 5/100 \times 384.16$$
$$= 19.2$$
$$N = 384.16 + AR$$
$$= 384.16 + 19.2$$
$$= 403.368$$

The minimum number of respondents included in the study was 404

### 3.5 Sampling technique

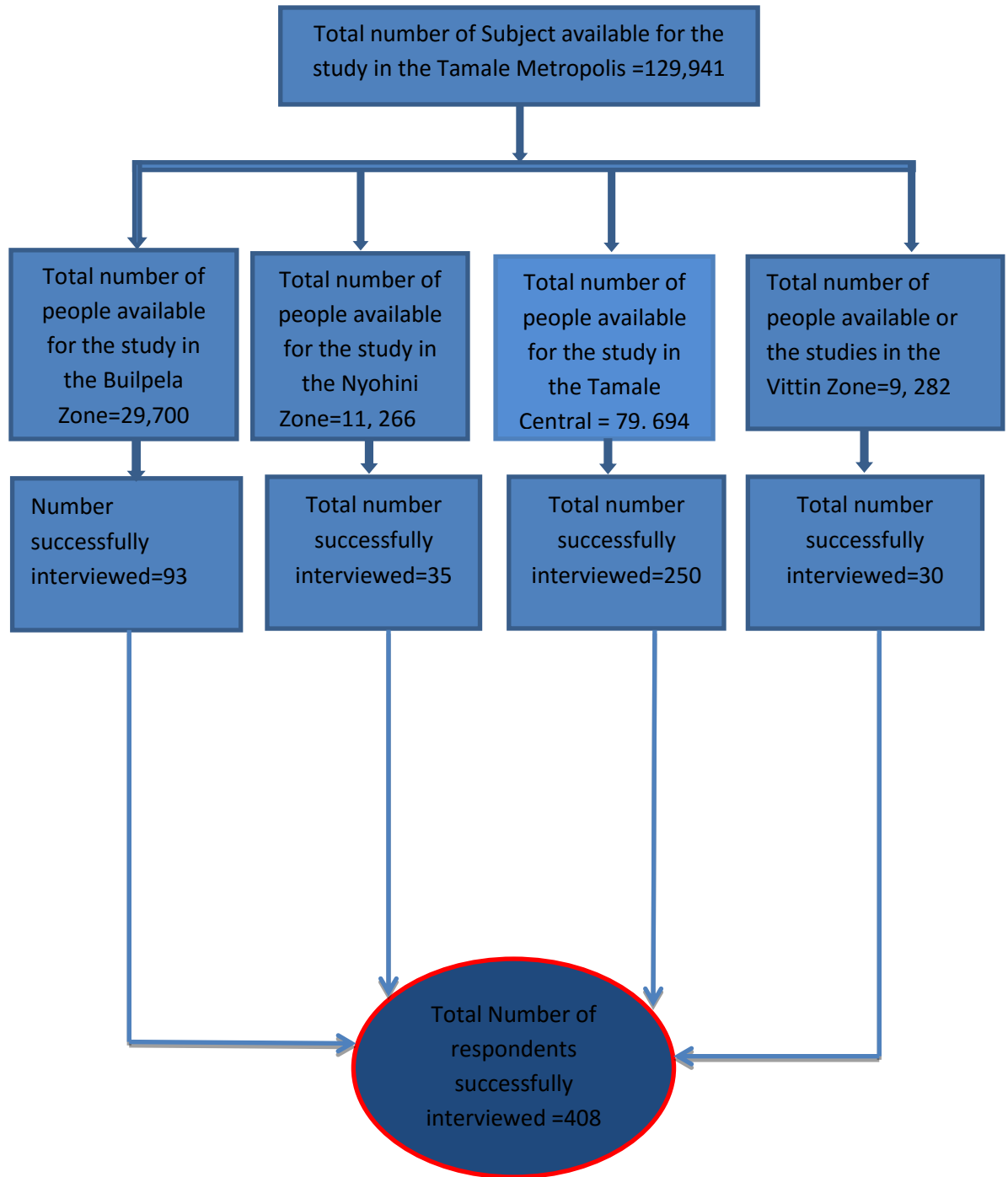
In this cross-sectional study, a multistage sampling method was used. To this effect the study area was considered as a whole, and using the Tamale Metropolis health, zoning where the Metropolis is viewed in four (4) parts. These zones are Builpela, Nyohini, Tamale Central and the Vittin zone.

The 408 participants were distributed proportionately among the various zones based on populations. Using a toss of a coin and starting randomly from the southern end of each health zone, each other fourth house to the east that had heads from the toss was included in the study. At the end of the lane, the direction was changed to the north and then to the west and north again till the required number of individuals



was reached. In each house, we randomly selected two respondents who met our eligibility criteria. To achieve this, we interviewed the first adult in the house who met the inclusion criteria. When successful, the next person from two rooms from the first is invited. This process was repeated in each community till we achieved our sample size for the community.





**Figure 7 : sample Selection process**



### **3.6 Inclusion and exclusion criteria**

The criteria for being included in the research were as follows:

- i. All persons of sound mind and aged 15 years and above
- ii. The respondent had been resident in the Tamale Metropolis for at least six months.

Individuals were excluded from the study if:

They had not stayed in the Tamale Metropolis over a period of six months.

### **3.7 Data Collection**

#### **3.7.1 Source of data collected**

This study used largely primary data which were sourced directly from respondents using semi structured questionnaires and interviews. The interview was conducted by the researcher with the assistance of four recruited, trained research assistants, which facilitated and eased the data collection process. The various questions in the questionnaire were clearly explained to study participants so that right responses would be obtained.

#### **3.7.2 Instrument for data collection**

In order to collect primary data a self-developed pre-tested questionnaire was used. This was to ensure survey flexibility and also to reduce cost of data collection. This method of data collection has been considered as the effective method of gathering

information as compared to methods such as interview or observation, where the sample population is spread over a large territory.

Questionnaire was organised into six (6) sections: Section 'A' presents the gathered information on demographic characteristics of respondents; Section 'B' covered the use of snuff to determine prevalence of use. Section 'C' accessed data to measure the level of addiction to the use of snuff, while section 'D' gathered information on the types of snuff being used by respondents. Section 'E' collected information that bordered on the health implications of the use of snuff.

The final questionnaire (Appendix 1, page 126) was arrived at after an initial draft was designed and used to conduct a pilot study of the research in the Metropolis among 10 respondents. The comments made were incorporated to enhance the clarity of the questionnaire. However the result of the piloted studies was not included in the findings of the research.

### **3.8 Data Analysis**

The data obtained from the questionnaires was analysed with Microsoft Excel and the Statistical Package for Social Sciences (SPSS) (IBM, Illinois, and USA) version 25. Both software allowed the findings of the study to be presented in frequencies and percentages using graphs, charts and tables.

The level of addiction using the Fegerstrone test was graded on a Likert scale with a maximum score of 10 points. Scores from 7 to 10 points were classified as highly dependent, a score of 4 to 6 was classified as medium dependence and those who scored below were classified as low dependence's Specifically, SPSS was used to



test for associations and predictive effects of factors that are associated with use of snuff. These were performed using chi-square test for associations and subsequently binary logistic regression analysis. The logistic regression was used to determine Odds Ratios with 95% confidence intervals (CI). Statistical significance was assumed at p-values less than 0.05 at the 95% confidence level.

### **3.9 Quality Control**

Quality control measures were undertaken to ensure that data generated were complete, reliable, and accurate and in a manner such that a repetitive study conducted would produce the same results. These measures aided in ensuring external and internal validity of the study. The measure included the fact that the field assistants used in the study had an experience in conducting both quantitative and qualitative research on the field. Additionally, they received a two-day training that focused on the research participants handling skills such as the interviewing skills, content and meaning of questions, accurate recording of responses.

The training basically included the concept of smokeless tobacco, the various forms, the methods of administration as well as some of the potential health implications. Also the field assistants were given information on ethical considerations and the importance of ensuring the confidentiality of information and seeking consent of respondents prior to administering the questionnaire as well as conducting the physical examination.





Another measure taken was that the questionnaire was pre-tested in the communities outside the four selected health zones. The pre-test helped improved the data collection tools in terms of content and order of the questions in relation to the study. Supervision of the field assistants was done regularly and randomly to observe the conduct and administration of the questionnaires. Debriefing sessions were constantly held to address the challenges that hindered the data collection process and field assistant regularly had the clarification they desired. Also, questionnaires were checked daily to ensure completeness and accuracy of those completed. Data collection forms were assessed at the end of each session of data collection and gasps that were identified were addressed with the respective research assistant.

The questionnaires were properly filled with serial numbers and were entered into the computer software packages by the researcher himself. The data that were entered were cleaned to avoid any data entry errors and inconsistent data entries. The Data was backed up by saving it in the cloud on the email and also on a pen drive as well as on the computer. The computer used was pass-worded to ensure data security.

### **3.9.1 Ethical Considerations:**

In line with the ethical requirement of scientific and medical research respondents were assured of the confidentiality regarding the information they were going to provide. The study only recruited participants after seeking their consent and their willingness to participate in the research. Responses were also anonymous, such that participants' responses cannot be traced.

### **3.9.2 Limitations of the Study**

There was a likelihood of participants to over or under report their responses. However, respondents were made to understand the importance of fair and accurate response, since that will help generate appropriate recommendations for the greater good of society by helping health planners and policy drivers with sound decisions. Furthermore, the finding in this research is subject to the inherent limitations of using a survey, where some of the questions in this research had predefined answers and that means that true answers might not be provided as an option. The answers may not, therefore, elicit the actual determinants of the use of smokeless tobacco among the residents of the Tamale Metropolis. Despite the various limitations of this study, the results will provide the valuable insight into the determinants of the use of smokeless tobacco among the residents in the Tamale Metropolis.







## CHAPTER FOUR

### 4.0 RESULTS

This chapter the thesis presents the analysis of the data collected and organized into sections to correspond with the specific objectives set to answer the research questions formulated from the problem of the study. The first section

#### 4.1. Characteristics of respondents

The socio-demographic characteristics of the study respondents are presented in Table 1. The total number of respondents were 408, with 266 males making up the majority of the respondents representing 65.2%. There were 157 respondents in the 15-30 year aged group representing 38.5% of the respondents, whilst the > 45 year aged group was accounted for by 104 respondents, representing 25.5%. This shows that a larger number of the respondents were between 15-30 years.

There were a total of 150, representing 36.8% of the respondents who had no education at all, followed by 134 (32.8%) with primary education. Of all the respondents, only 30 accounting for 7.4% had tertiary education. Two hundred and eighteen (53.3%) out of the 408 respondents were married, 152 were single representing 37.4% of the total respondents. Twenty eight of the respondents representing 6.9% of the total respondents were divorced, and only 10 (2.5%) of the total respondents were widowed.

Half of the respondents were unemployed translating to 204 (50%) of the 408, while only 30 out of 408 respondents, representing 7.4% were in the formal sector of employment.



The majority of the respondents were Muslims translating into 362 representing 88.7% of the total respondents (408). This was followed by Christians, who were 44 representing 10.8%.

**Table 1: Demographics of Respondents**

<b>VARIABLE</b>	<b>FREQUENCY (N=408)</b>	<b>PERCENTAGE (%N)</b>
<b>Sex</b>		
Male	266	65.2
Female	142	34.8
<b>Educational Level</b>		
Primary	284	69.6
Secondary	94	23
Tertiary	30	7.4
<b>Marital status</b>		
Single	162	39.7
Married	218	53.4
Divorced	28	6.9
<b>Employment status</b>		
Unemployed	204	50.0
Informal	174	42.6
Formal	30	7.4
<b>Religion</b>		
Christian	44	10.8
Moslem	362	88.7
Traditionalist	2	0.5





## 4.2 USAGE OF SNUFF AMONG RESPONDENTS

### 4.2.1 Prevalence

The past and current usage of snuff among the participants was assessed as presented in Table 2. It indicates that 71.1% (290) of the respondents mentioned that they have ever used snuff while 67.2% (274) of the respondents were current users.

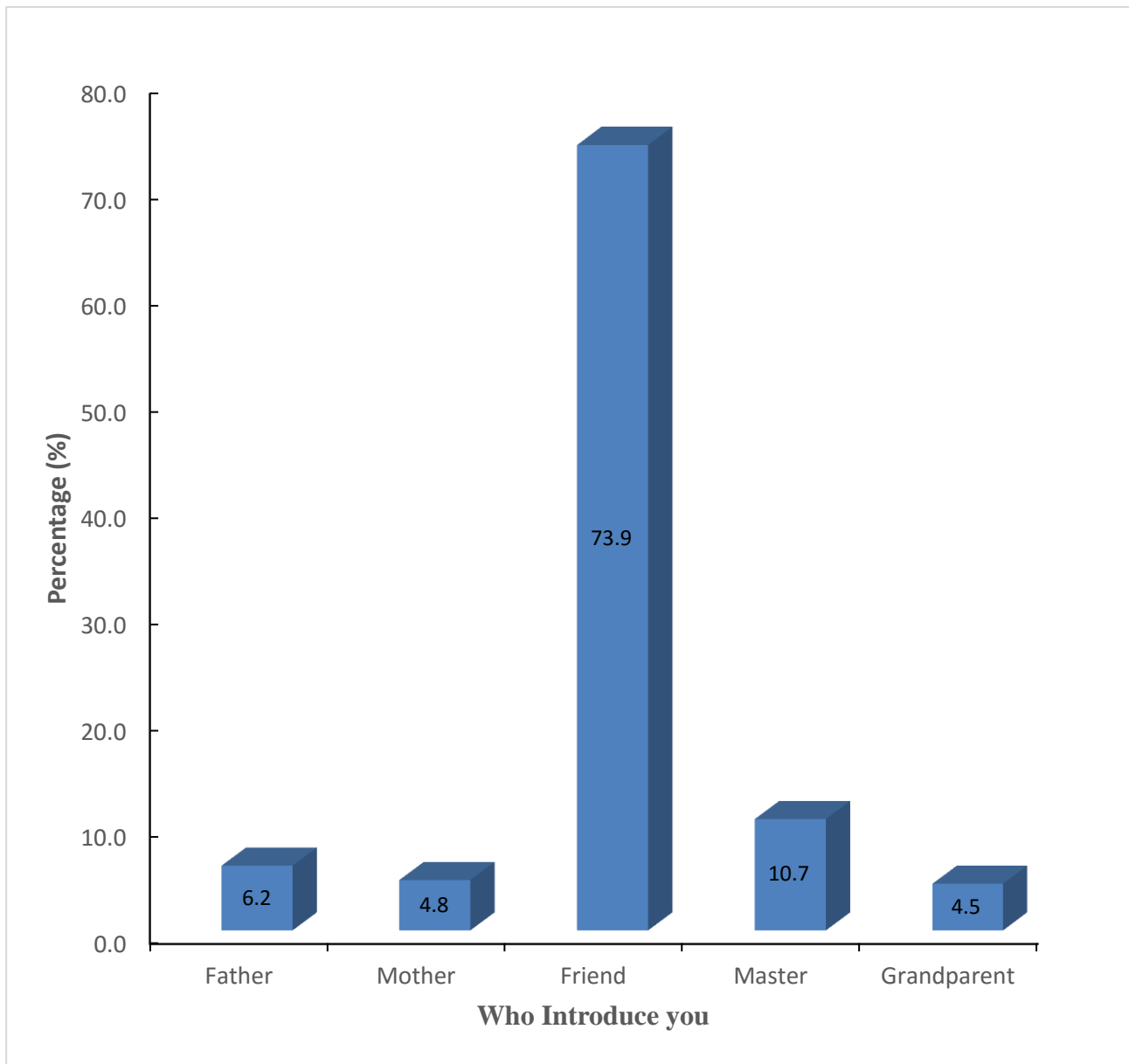
**Table 2: Snuff usage among respondents**

PARAMETER	FREQUENCY	PERCENTAGE
<b>Ever use</b>		
Yes	290	71.1
No	118	28.9
<b>Total</b>	408	100
<b>Current use</b>		
Yes	274	67.2
No	134	32.8
<b>Total</b>	408	100

### 4.2.2 Introduction to snuff use

The study was also designed to assess the source of introduction of the respondents to the use of smokeless tobacco. The results are depicted in Figure 8, where almost seventy-four percent (74%) of the respondents indicated that their friends introduced them to the use of snuff while, less than five percent of the respondents mentioned that they were introduced into the use of snuff by their mothers. Eleven percent of the respondents indicated that they were introduced into the use of snuff by their

masters; meanwhile only six percent (6%) of the respondents was introduced to the use of snuff by their fathers.

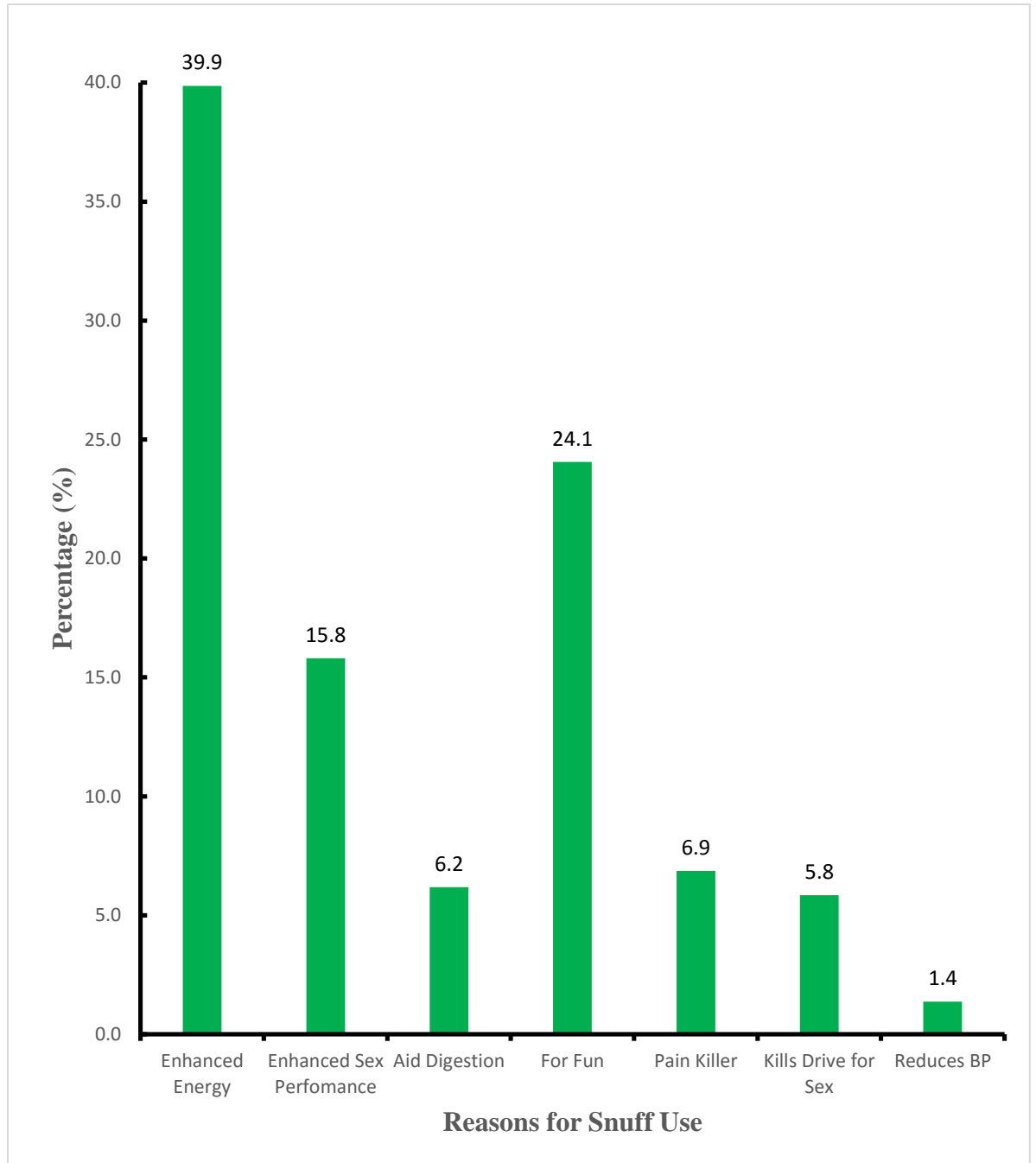


**Figure 8: Introduction to the use of smokeless tobacco**

#### 4.2.3 Reasons for the use of snuff

Respondents were asked to indicate the reasons for which they resort to the use of snuff. Figure 9 represents their responses, which indicates that, almost 40% (116/290) of the respondents mentioned that, they use snuff to enhance their energy levels while 15.9% (46/290) of the respondents indicated that they use snuff to enhance their sexual performance. However, just above 6% (17/290) of the respondents indicated that they use snuff to kill their drive for sex. From this analysis, a higher proportion of respondents use snuff to enhance their sex drive compared to those who use it to kill their drive for sex. But just less than 2% (4/290) of the respondents indicated they use snuff to reduce their high blood pressure.



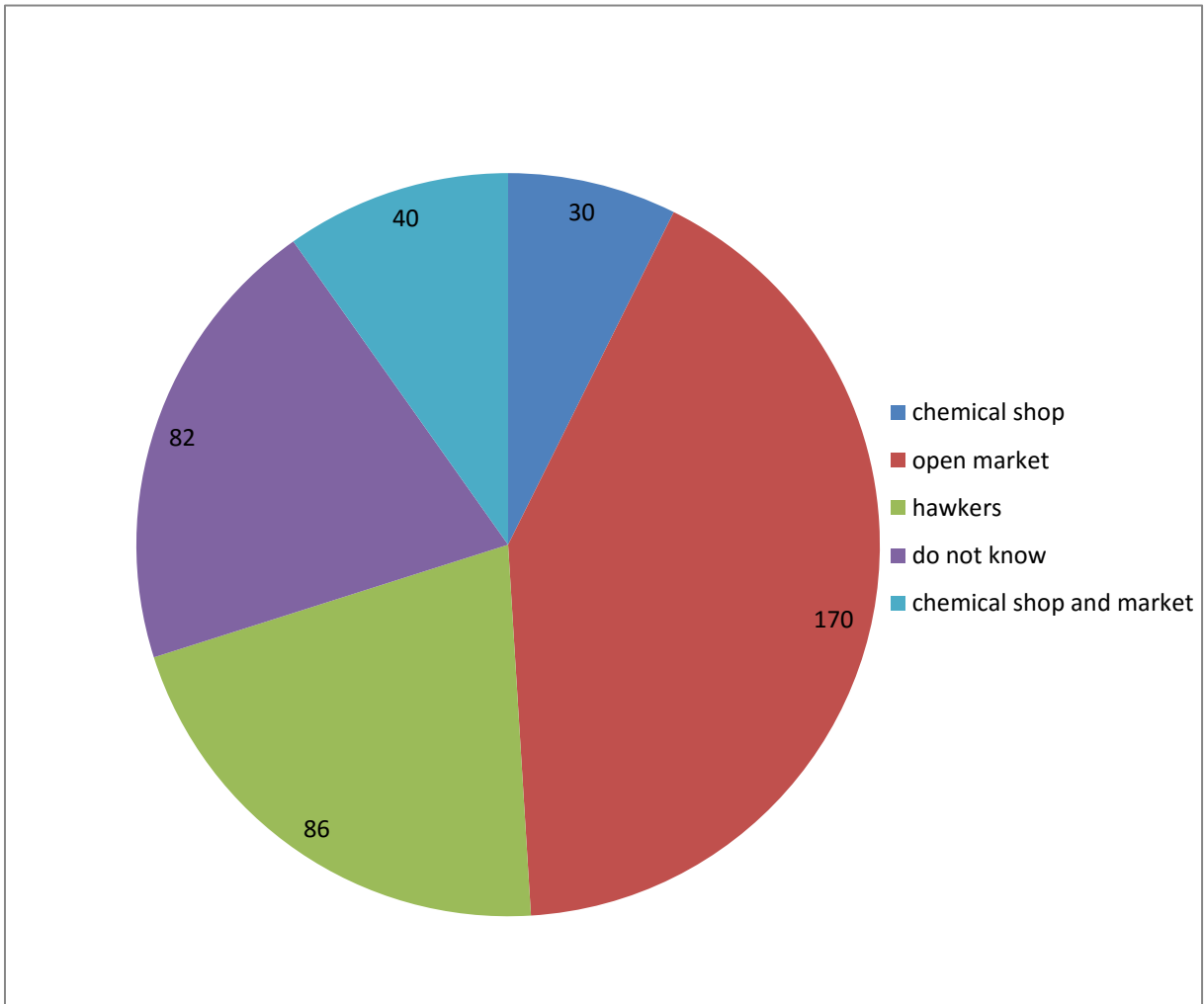


**Figure 9: Distribution on the Reason why respondents use's snuff**



#### 4.2.4 Common source of snuff in the Tamale metropolis

With regards to common sources of snuff in the Tamale metropolis, it was revealed that 170 respondents were getting their supply from the open market representing 42% of the total respondents. This was followed by hawkers which accounted for 21% (86/408) as a source of snuff. Only 30 (7%) of respondents obtained their snuff from the chemical shop (Figure 10).



**Figure 10: Showing the distribution of common sources of snuff**



**Level of addiction to the use of snuff**

Level of addiction was measured by adopting the Fagerstrom test for nicotine dependence which was modified to determine the addictive levels of smokeless tobacco among residents in the Tamale metropolis as presented in Figure 11



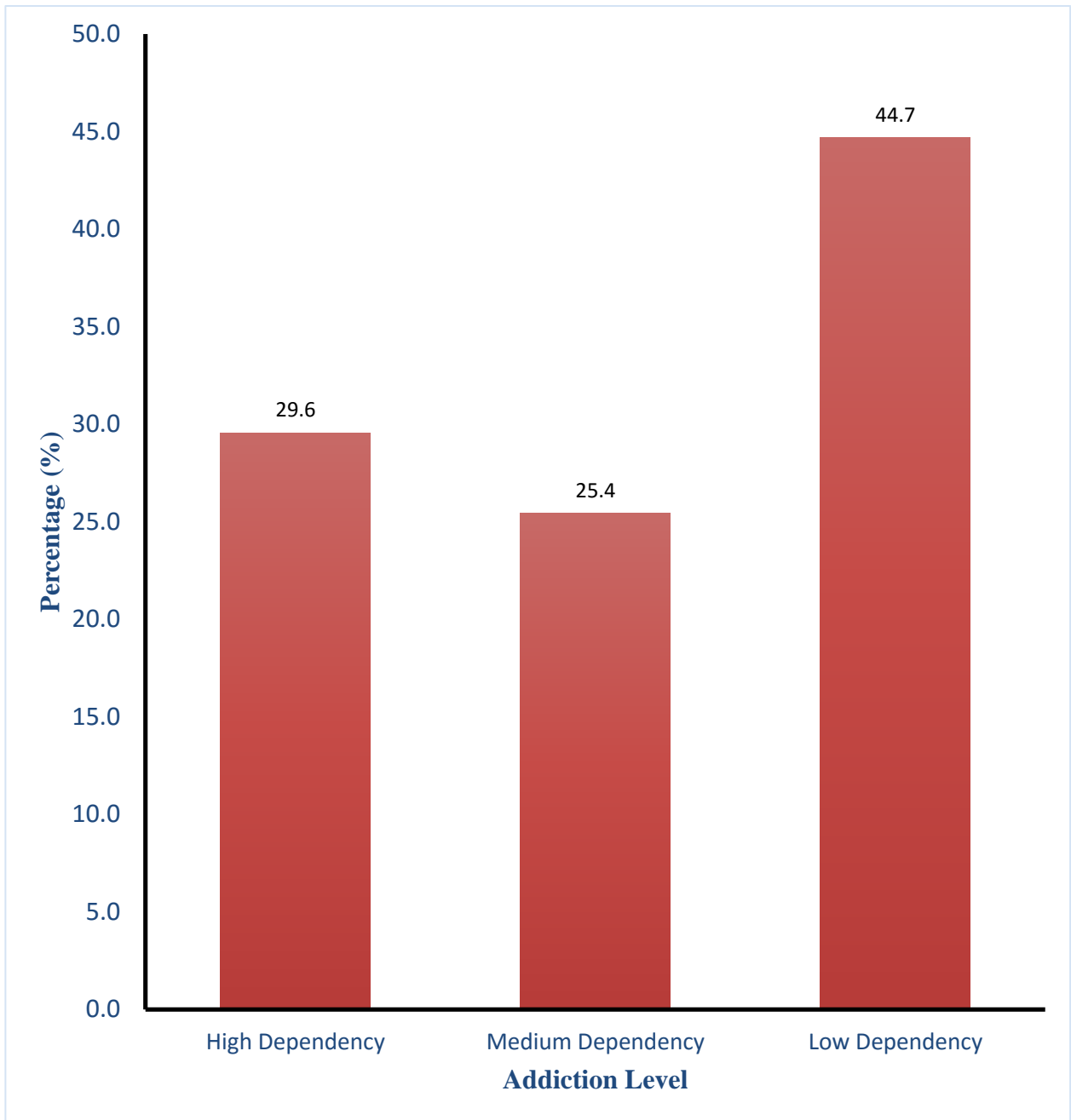


Figure 11: Level of Addiction (Dependency) Levels of Snuff

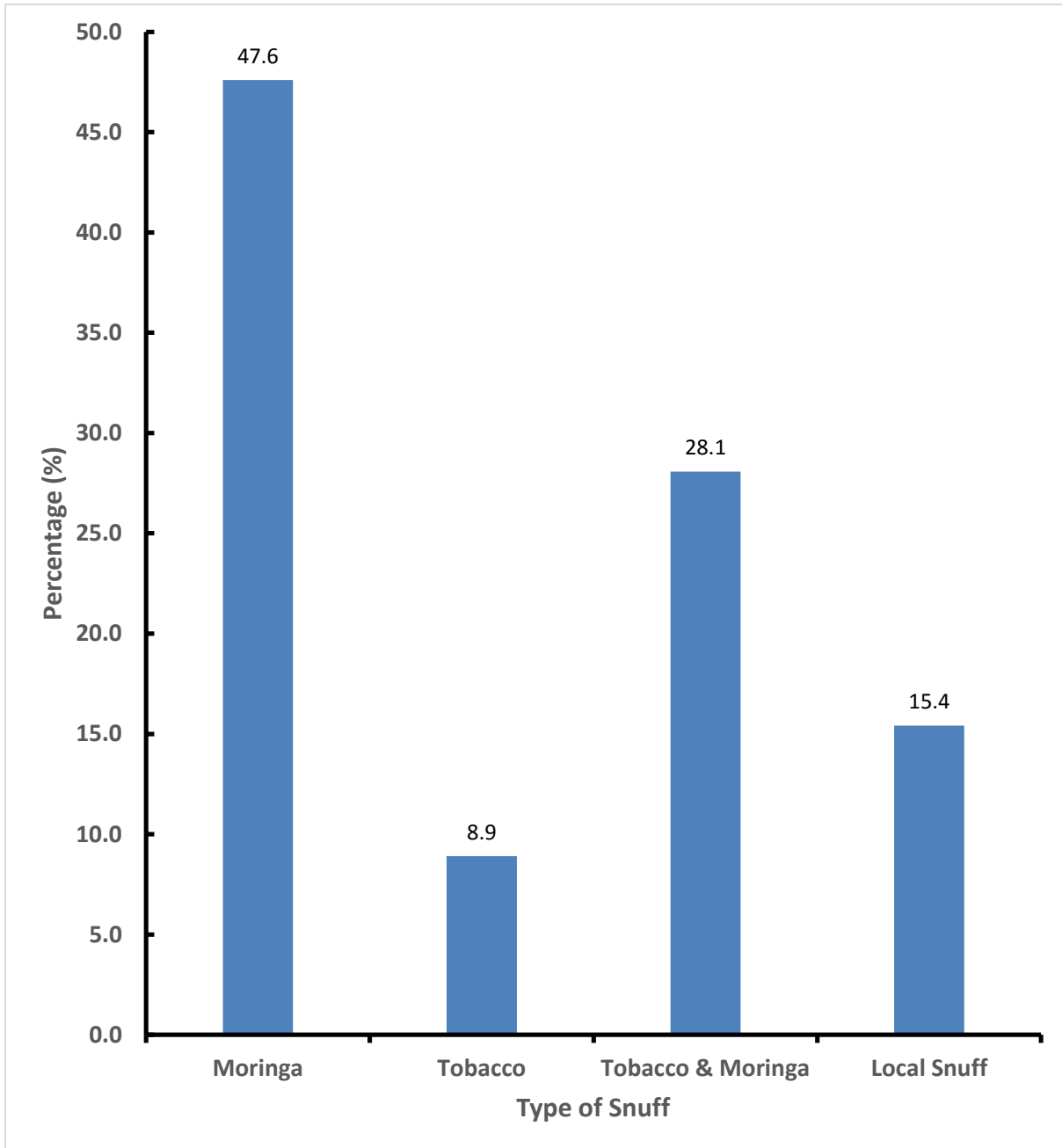
Figure 11 shows that 29.6% (86) of the respondents were highly depend on the use of snuff, while, 25.4% (74) of the respondents were found to be of medium dependence on snuff. On the other hand, 44.7% (130) of the respondents are low depending on the use of snuff.

#### **4.4 Types of snuff used**

The results of the analysis of the types of snuff used revealed that, Moringa snuff was the most available and most used in the metropolis, with 47.6% (139) of the respondents affirming to that.

Eighty two of the respondents, representing 28.1% also use a combination of tobacco and Moringa, making it the second most consumed snuff in the metropolis. Only twenty six (26) used tobacco as snuff representing 8.9% of respondents who uses snuff.





**Figure 12: Type of snuff Use among respondents**

#### **4.5 Determinants of snuff use**

The determinants of the use of snuff were assessed using binary logistic regression analysis. The factors were categorized into respondent socio-demographic characteristics, other factors (parent use, expected benefits, addictive substances use, and content of snuff).

##### **4.5.1 Respondent socio-demographic characteristics and use**

The results for respondent characteristics and use of snuff is presented in Table 4.3



**Table 3: Socio-Demographic characteristics of respondents and their association with the current use of snuff**

Variable	Current Use Of Snuff		COR	CI	$\chi^2$	<i>p-value</i>
	Yes N (%)	No N (%)				
<b>Sex</b>					4.24	0.039
Female	86 (60.6)	56 (39.4)	142	1		
Male	188(70.7)	78 (29.3)	266	1.5	1.02 – 2.41	
<b>Age Group</b>					5.59	0.061
>45	24 (23.5)	78 (76.5)	102	1		
31-45	54(35.5)	98(64.5)	152	0.55	0.32 - 0.98	
15-30	56 (36.4)	98(63.6)	154	0.54	0.31 – 0.95	
<b>Education Status</b>					24.68	<0.001
Tertiary	12 (40.0)	18 (60.0)	30	1		
Second	50 (53.2)	44 (46.8)	94	1.70	0.73 – 3.93	
Primary	212 (74.7)	72 (25.4)	284	4.42	2.03 – 9.61	
<b>Married</b>					6.15	0.046
Single	64(39.5)	98 (60.5)	162	1		
Married	60 (27.5)	158(72.5)	218	0.54	0.11- 0.98	
Divorce	10 (35.7)	18 (64.3)	28	0.16	67 - 0.99	
<b>Employment Status</b>					0.52	0.770
Formal	12 (40.0)	18 (60.0)	30	1		
Informal	56 (32.2)	118 (67.8)	174	1.31	0.60 – 2.86	
Unemployed	66 (32.5)	138(67.)	204	1.33	0.60 – 2.93	
<b>Religious Status</b>					9.74	0.002
Christian	22 (47.8)	24 (52.2)	46	1		
Muslim	252 (69.6)	110 (30.4)	362	2.75	1.46 - 5.84	





Sex was found to be significantly associated with the current use of snuff ( $\chi^2$ : 4.24;  $p$ -value: 0.039). Compared to females, male respondents had a 50% higher odds being current users of snuff (OR: 1.50; CI: 1.02-2.41). Age-group was found not to be significantly associated with the use of snuff ( $\chi^2$ : 5.59;  $p$ -value: 0.061). except age group, >45 years, both age groups 15-30 years and 31-45 years were found to have decrease Odds of snuff use: (OR:0.54;CI:0.31-0.95, OR:0.55;CI:0.32-0.98 respectively). This observation was however not statistically significant.

Educational status was found to be significantly associated with the current use of snuff ( $\chi^2$ :24.68;  $p$ -value: <0.0001). Compared to those who had tertiary education, primary education was associated with over four (4) times increased Odds of current use of snuff (OR: 4.42; CI: 2.03-9.61) while having secondary education was associated with 1.70 increased Odds of snuff used (OR: 1.70; CI: 0.73-3.93) compared to primary education.

Marriage was another variable found to be significantly associated with current snuff used ( $\chi^2$ : 6.15;  $p$ -value: 0.046). Compared to the respondents who were single, married respondents were 54% less likely (OR: 0.54, CI: 0.11- 0.98), and divorced individual were 16% less likely (OR: 0.16, CI: -0.67 - 0.99) to use snuff.

Employment status was not significantly associated with current snuff usage ( $\chi^2$ : 0.52;  $p$ -value: 0.770).

On the basis of religion, Muslims had about three times the Odds of being current users of snuff compared to Christians (OR: 2.75; CI: 1.46-5.84). And was significantly associated ( $\chi^2$ : 9.74;  $p$ -value: 0.002) with current use of snuff.

#### 4.5.3 Use of other substances of abuse as determinant of use of snuff

The influence of common substances of abuse such as tramadol, alcohol, energy drinks and cigarette, on the current use of snuff was assessed and the result presented in Table 4.

**Table 4: Associations between the use of substance of abuse and current use of snuff**

Variable	Current Snuff Use			COR	CI	$\chi^2$	p-value
	Yes (%)	No (%)	Total				
<b>Tramadol use</b>						3.84	0.05
No	192 (64.4)	106(35.6)	298	1			
Yes	82(74.6)	28 (25.4)	110	1.61	0.99 – 2.64		
<b>Alcohol Use</b>						0.4	0.525
No	224(67.9)	106(32.1)	330	1			
Yes	50( 64.1)	28 (35.9)	78	0.85	0.85 – 1.41		
<b>Energy Drink</b>						8.06	0.005
No	143(74.1)	50(25.9)	193	1			
Yes	131(60.9)	84 (39.1)	215	0.55	0.35 – 0.83		
<b>Cigarette Use</b>						1.04	0.308
No	213(68.5)	98(31.5)	311	1			
Yes	61 (62.9)	36 (37.1)	97	0.78	0.48 – 1.26		

\*COR: Crude Odds Ratio, \*CI: Confidence Interval,  $\chi^2$ : Chi-Square

Tramadol was found not significantly associated with current use of snuff ( $\chi^2$ :3.84; *p-value*: 0.05). Compared to respondents who uses tramadol but not snuff, those who said yes to current use of snuff had a 61% higher Odds (OR: 1.61; CI: 0.99-2.64).





Alcohol was seen not to be associated with the current use of snuff ( $\chi^2$ : 0.4;  $p$ -value: 0.525). Comparing alcohol users who were not current users of snuff to alcohol users who currently use snuff, the latter had 15% decreased Odds (OR: 0.85; CI: 0.50-1.41)

Energy Drink was also associated with current use of snuff ( $\chi^2$ : 8.06;  $p$ -value: 0.005). Compared to residents who uses energy drink and said no to current use of snuff, residents who affirm to the use of energy drink and current use of snuff had decreased Odd of 45% (OR: 0.55; CI: 0.35-0.85).

On the basis of cigarette use and current snuff usage, decreased Odds were observed when smokers who were none users of snuff were compared to smokers who are current users of snuff (OR: 0.55; CI: 0.48-1.26).which was not also not significant ( $\chi^2$ : 1.04;  $p$ -value: 0.308)

#### **4.5.2 Other factors associated with use of snuff**

Factors including parental use of substance of abuse, knowing the composition of snuff, having a friend using snuff and the source of snuff were assessed for their possible influence on current snuff use. (Table5).

**Table 5: Other factors and their association with current snuff use**

Variable	Current Snuff Use		COR	CI	$\chi^2$	p-value
	Yes	No				
	N (%)	N (%)	Total			
<b>Parent use</b>					13.86	0.002
No	63 (53.4)	55(46.6)	118	1		
Yes	211(72.8)	79(27.2)	290	2.33	1.49 –3.64	
<b>Content of Snuff</b>					224.06	<0.001
No	46 (27.4)	122(72.6)	168	1		
Yes	228(95.0)	12 (5.0)	240	50.29	25.73-98.70	
<b>Friend and Snuff</b>					32.38	<0.001
No	20 (33.9)	39 (66.1)	59	1		
Yes	254(72.8)	95 (27.2)	349	5.21	2.89 – 9.39	

Table 5 shows the association between other variables and current snuff use.

Parent's use of snuff was found to be significantly associated with current use of snuff ( $\chi^2$ : 13.86; *p*-value 0.0002). Compared those whose parents' were not users of snuff, Residents whose parents were current users of snuff had increased Odds of more than 2times (OR: 2.33; CI: 1.49).

Content of snuff proves to be significantly associated with current use of snuff ( $\chi^2$ : 224.06; *p*-value: <0.0001). Compared to those who do not know what snuff contains, those who knew what snuff contain had an increase Odds of more than 50times (OR: 50.29; CI: 25.73-98.70)

Residents who have friends that use snuff also shows strong association with current use of snuff. ( $\chi^2$  : 32.38;  $p$ -value: <0.0001).

Comparing residents whose friends do not use snuff, residents whose friends were current users had an increase Odds of more than 5times (OR: 5.21; CI: 2.89-9.39)



**Table 6: Other factors and their association with current snuff use**

Variable	Adjusted Odds Ratio	<i>p</i> -value	CI
Sex	0.31	0.042	0.10 – 0.96
Education	2.79	0.032	1.09 – 7.10
Marital status	0.92	0.834	0.41 – 2.07
Religion	0.39	0.234	0.84 – 1.83
Parent Snuff	1.92	0.203	0.70 – 5.25
Friend Snuff	3.16	0.070	0.91 – 10.95
Source of supply	0.38	<0.0001	0.25 – 0.60
Use Energy Drink	0.33	0.028	0.12 – 0.89
Content of snuff	85.90	<0.0001	22.95 – 321.51

Factors that drive current use of snuff among respondents on multiple logistic regressions; nine (9) variables fitted into the model and significantly predicted the current snuff use among respondents.

Out of these nine variables, five of them were significantly contributed to the current use of snuff: and are; source of snuff supply, content of snuff, education, sex and use of energy drink (<0.001, <0.001, 0.032, 0.042 and 0.028 respectively).





#### 4. 6 Health implications of the use of snuff

##### 4.6.1 Health defects

A physical examination was performed on respondents to assess the presence of health defects that could be linked with the use of snuff. Examinations were in the form of inspections of the oral cavity and the nasal canal, carried out by professionals from the Dental Clinic of the Tamale Teaching Hospital (TTH). The results are summarised in Tables 8 and 9.

**Table 7: Oral defects of respondents**

<b>Health Defect</b>	<b>Frequency (N)</b>	<b>Percentage (%)</b>
Receding gums	46	15.2
Decay cavities	56	18.5
Decay tooth	80	26.5
Abrasions in the mouth	44	14.6
Leukoplakia	72	23.8
Others (colouration of teeth)	4	1.3
<b>Total</b>	<b>302</b>	<b>100.0</b>

About 11% (46) of the respondents were seen to have receding gums and 13.7% (56) of them had decayed cavities. Also, about 20% (80) of the respondents were having decayed tooth and 10.8% (44) of them showed signs of abrasions in the mouth. In terms of Leukoplakia, 23.8% (72) showed signs, 1.3% (4) also showed other signs (coloration of teeth) and 26.5% (80) had tooth decay.

With regards to examination of the nose of respondents, there were 14.7% (40) of the respondents who had abrasions in their nose, 35.2% (96) showed signs of turbinate, and 19.0% (52) of them had wet nose. A sign of growth or nasal polyps was found in 23.1% (63) of the respondents, while 8.1% (22) of respondents had epistaxis. This indicates that almost 70% of the respondents were identified to have some levels of abnormalities in their nose (Table 8).

**Table 8: Nasal defects found upon examination of respondents**

<b>Defect</b>	<b>Frequency</b>	<b>Percentage</b>
Abrasions in the Nose	40	14.7
Turbinates'	96	35.2
Wet Nose	52	19.0
Growth Nasal Polyps	63	23.1
Epistaxis	22	8.1
Total	273	100.0

#### **4. 6.2 Health risk associated with the use of snuff**

The risk associated with use of snuff was assessed using the binary logistic regression analysis. The results are presented in Table 9



**Table 9: Health related factors and their association with current snuff use**

Variable	Current snuff use			COR	CI	$\chi^2$	p-value
	Yes (%)	No (%)	Total (%)				
<b>Health Benefit</b>						109.99	<0.001
No	89 (21.8)	116(28.)	205	1			
Yes	185(45.)	18 (4.4)	203	12.75	7.31-22.23		
<b>Health Challenge</b>						16.37	<0.001
No	218(63.4)	126(36.6)	344	1			
Yes	56 (87.5)	8 (12.5)	64	4.05	1.87- 8.76		
<b>Breathing Problem</b>						31.21	<0.001
No	165(58.7)	116 (41.3)	281	1			
Yes	109(85.8)	18 (14.2)	127	4.19	2.41 –7.29		
<b>Oral Deformity</b>						25.58	<0.001
No	54 (46.6)	62 (53.5)	116	1			
Yes	220(75.3)	72 (24.7)	292	3.14	2.01 - 4.90		
<b>Nasal Deformity</b>						101.32	<0.001
No	73(40.6)	107(59.)	180	1			
Yes	201(88.)	27(11.8)	228	9.97	6.10-16.28		

Current use of snuff was found to be significantly associated with a risk health challenge ( $\chi^2$ : 16.37;  $p$ -value: <0.0001). Compared with the residents who never had any health challenges, residents who had health challenges had increased Odds of 4 times to be users of snuff (OR: 4.05; CI: 1.87-8.76).

Breathing problems was also associated with Current use of snuff ( $\chi^2$ : 31.21;  $p$ -value: <0.0001). Compared with respondents who did not have a breathing problem,



respondents who had a breathing problem were seen to be four times more likely to be users of snuff (OR: 4.19; CI: 2.41-7.29,  $p$ -value: <0.0001)

There was an association between snuff use and oral deformity ( $\chi^2$ : 25.8;  $p$ -value: <0.0001). When residents who appear not have any oral deformity were compared to residents who had oral deformity, the later had a three times increased of Odds of using snuff (OR: 3.14; CI: 2.01-4.90,  $p$ -value: <0.0001). With regards to nasal deformity, it was observed to be statistically significant ( $\chi^2$ : 101.32;  $p$ -value: <0.0001). Respondents with nasal deformity had ten times Odds of using snuff compared with those without nasal deformity (OR: 9.97; CI: 6.10-16.28,  $p$ -value: <0.0001).





## CHAPTER FIVE

### Discussion

As earlier indicated, this thesis is a report of the work undertaken to assess the use of smokeless tobacco and its health implications in the Tamale Metropolis. This chapter of the thesis discusses the findings of the study in the context of already published evidence. The discussion is done under the corresponding objectives set out in Chapter one.

#### 5.1 Pattern of smokeless tobacco use

The pattern of smokeless tobacco use was described by the prevalence, sources of introduction (first use), reasons for use and common sources.

##### 5.1.2 Prevalence of smokeless tobacco

Nicotine in tobacco has a psychoactive property and associated with strong addiction tendencies (Milkie *et al.*, 2018). The findings from this study show that a good number of the respondents (about 71 percent) were ever exposed to nicotine. Whereas, another considerable number 274 (67.2%) of them was currently exposed to the psychoactive substance from the use of smokeless tobacco, (snuff). This indicates that the prevalence of snuff use in the Tamale Metropolis is high among the people. Several factors may be attributed to the use of snuff within the Metropolis such as influence from family and friends, availability of the substance and it being more socially acceptable among the people in the Metropolis. This finding of the study is consistent with the study of Shrivastava *et al.* (2015) who argue that age was





significantly associated among adult users in their studies of the prevalence of smokeless tobacco use among school going adolescent students. Additionally, this findings is consistent with the findings of Yawson *et al.* (2013) who found that tobacco use was high and associated with older adults living in the rural parts of Ghana, giving the indication that the public health of the people in the area could be affected.

The higher percentage of respondents who were exposed to smokeless tobacco, reflecting a 71 percent prevalence rate found in this study is in agreement with findings from South East Asia, where the use of smokeless tobacco use was on the rise (Suliankatchi *et al.*, 2019). Mohan & Lando, (2014), also confirmed that tobacco use in Bihar is also high. The authors demonstrated a rate of 77% use of tobacco among school going age in Bihar. There is a recent increased in the prevalence in developing nations of which Ghana is not exempted.

However, there are reports of lower rates compared with our current finding. For instance, Rozi *et al.*, (2007) had a lower prevalence compared to this study; they had 16.1 % of prevalence, and the reason could be that, their research was among a narrow population, specifically students, and therefore could not tell the true picture in the wider population.

Another study in some parts of India, which was on tobacco itself as a substances of abuse showed a high prevalence of tobacco use, although there were variations across the regions in the country, (India), (Bhawna, 2013). These authors reported a prevalence of 59% for male and 31% for females in the eastern region, while the

Northern region showed a slightly lower prevalence, where it was 31% among males and 4% among females. It is also possible from the ensuing findings that a varied prevalence may be discovered if the current study being reported is replicated throughout the country.

### **5.1.3 Source of first use**

Studies conducted Holman, *et al.*, 2013 on smokeless tobacco use revealed that friends were more likely to be influenced by their peers on their first use of smokeless tobacco, and as well users might have had a parent, sibling or friend who uses the tobacco substance (Holman,*et al.*,2013, Rudatsikira,*et al.*,2010). Therefore the 73.9% of respondents found in this study who asserted they were initiated into the use of smokeless tobacco by friends agrees with the findings of these earlier studies.

This finding was also in line with many studies on tobacco usage, where the authors stated that individuals learn and continually use this deadly substance (tobacco) via friends, family members and neighbour who use it (Amota, 2008; Mishra *et al.*, 2015; Bahl *et al.*, 2014).

Brown & Rineli (2010) in their report also confirms that, one's interaction with his community setup, i.e., laws friends and family relations usual leads to change in attitude.



#### **5.4 Reasons for the use of snuff**

This study revealed that, more than a quarter of the respondents derive the motivation to use smokeless tobacco for the purposes of energy invigoration. Contrary to the findings in this study, the tempting motivation to use smokeless tobacco among people elsewhere was linked to increased taxes on cigarettes (Hawkins, 2018). It is understandable that with higher taxes on branded cigarttes, users of tobacco would turn to cheaper alternatives, and snuff products present tobacco-dependent individuals with a cheaper alternative for obtaining sufficient enough nicotine (Mistry & Dasika, 2017). Therefore, the relative advantage of price for smokeless tobacco such as snuff contributes to the increased swing in use of smokeless tobacco over a cigarette (Rantao& Ayo-Yusuf, 2012).

The findings in this current study is in contrast with those of Rudatsikira et al. (2010), in which the authors reported that, people had false beliefs that smokeless tobacco has less health risk compared to smoking tobacco.

#### **5.1.5 Common source of snuff**

This study revealed that 42% of the respondent gets their supply of snuff from the open market; making it the most common source while others studies have reported common sources as supermarkets, gas filling stations, and chemical shops. Such common sources prevail in developed countries such as the USA, where supermarkets are the equivalentents of the open markets that pertain in Africa including Ghana. In these latter outlets, the product is mostly placed either very close to sales manager or kept in locker and only give out to buyer who pay for them. Rather than

a regulatory measure to control use, such as is required for certain age category, this noted security is to prevent theft; tobacco theft is very common in the U.S.A as reported by (Simmer, 1985).

## 5.2 Addiction to smokeless tobacco

Nicotine is the main ingredient in tobacco capable of being psych activity in the brain and the trigger for tobacco dependency (Uysal et al., 2004). The proportion of respondents who were highly dependent on smokeless tobacco was 29.6%. This estimate is way higher than that of an earlier study in India with only 1% and 3% tobacco dependency among males and females respectively (Manimunda et al., 2012). According to Auf et al. (2012), smokeless tobacco users show several of the features of nicotine dependency that is common to tobacco smokers. The high level of addiction in users in the Metropolis may be explained in a number of ways. One is that it may be attributed to the influence family and friends have on users thereby encouraging and making the substance readily available for use. As suggested by Islam *et al.* (2014), the addiction level of adult tobacco users is mainly caused by influence from friends as well as the easy accessibility of the substance to the users. This finding is consistent with what other studies have reported. For example Doku (2011) in his study of the socioeconomic differences in tobacco use among Ghanaian adolescents found that tobacco addiction is as a result of exposure to tobacco advertisement and influence from peers among adolescent. This is a probable indication of the fact that smokeless tobacco user may be taking in nicotine in similar quantities as smokers of tobacco. Additionally Ayo-Yusuf and co-workers (2004) earlier found that smokeless tobacco users in South Africa were exposed to



high enough levels of nicotine capable of setting off nicotine dependency as in regular smokers of tobacco.

### **5.3 Forms of snuff use**

This study also revealed that there are several types of snuff used by people in the Tamale Metropolis, with Moringa products being the most used (47.6%). The widespread use of Moringa snuff is as a result of the perceived health benefit of Moringa, as stated by (Khawaja et al., 2010; Hamza, 2010; Singh et al., 2012), that Moringa has been utilized to treat conditions like: skin diseases, frailty, nervousness, asthma, clogged pores, blood contaminations, bronchitis, catarrh, chest blockage, cholera and numerous different sicknesses

This result may also seek to suggest that, they are varied types of snuff used in depending on the geographical location of the user. For instance Nemeth *et al.*, (2012) indicated that chemma or shammah is the most common type of snuff use in Algeria, and (GATS, 2009-2010), suggested that khaini is the most common snuff in India. Of all types, chemma is the most known type of tobacco used worldwide (Algyacil & Silverman, 2004). These types however are not available in Tamale or Ghana, as none was mentioned by participants in our study.

Contrary to Mike *et al.*, (2013), claim that snuff use is considered outmoded by many African people, users of snuff in the Tamale Metropolis carry the substance wherever they find themselves. This was a major indicator of the level of addiction



to smokeless tobacco as used in the adopted Fagerstrom scale. Many of the respondents did not find it difficult to use snuff in public.

## 5.5 Determinants of snuff use

### 5.5.1 Socio-demographic characteristics

Sex of the user was found to be significantly associated with current snuff use ( $\chi^2$ : 4.24;  $p$ -value: 0.039). Compared to females, male respondents had a 50% higher odds being current users of snuff (OR: 1.50; CI1.02-2.41). Male adults have been proven to be the most users of snuff as compared to their female counterparts (Mia *et al.*, 2016; Sinha *et al.*, 2012) in the study of pattern of smoking among Ghanaian civil servants, reported a higher prevalence for male than females, (6.1% and 0.3% respectively). Although this was on smoked tobacco, it mirrors the patterns of substance use among sexes to the extent that it reflects in our finding. In a similar fashion, studies in Pakistan, Bangladesh, and India found smokeless tobacco use to be associated with males than females (Alam *et al.*, 2008; Pedro, Brito, & Barros, 2017; Suliankatchi *et al.*, 2019).

Age was found not to be significantly associated with the use of snuff ( $\chi^2$ : 5.59;  $p$ -value: 0.061). This finding is inconsistent with the findings of Shrivastava, *et al.*, (2015) who found age to be significantly related to the use of smokeless tobacco among adult users.

For the current use of snuff, it was revealed that educational status of respondents played a significant role in the current snuff use ( $\chi^2$ :24.68;  $p$ -value: <0.0001). It was



also revealed that respondents with primary education only were the highest users of snuff in the Metropolis.

The finding in this study supports a finding in a multi-country study in low- and middle-income countries and a study in Pakistan (Alam et al., 2008; Do & Bautista, 2015). Where they stated that, education is key when it comes to use of smokeless tobacco in several places in the world including this study area. Contrary to our study, Krishna et al (2012), indicated that riches and education were not related with tobacco use, where it was observed in Mexico that there was a lower tobacco use among poor people.

Our study also revealed that, marriage was an important factor determining current snuff use ( $\chi^2$ : 6.15;  $p$ -value: 0.046). Compared to the respondents who were single, married respondents were 54% less likely (OR: 0.54, CI: 0.11- 0.98), and divorced individual were 16% less likely (OR: 0.16, CI: -0.67 - 0.99) to use snuff. This finding contradicts with Hossain, *et al.*, (2014) when they stated that being a widow was associated with smokeless tobacco use.

However, employment status of respondents was not significantly related to the current snuff usage ( $\chi^2$ : 0.52;  $p$ -value: 0.770). This finding is inconsistent with the findings of Jallow and co-workers (2017), who indicated that employment status offers users of smokeless tobacco the opportunity to increase their usage of the substance. Religion on the other hand was determined to significantly relate to the current use of snuff in the Metropolis. This is inconsistent with Hossain, *et al.*, (2014) in their study to assess the prevalence among married and pregnant woman





on the use of smokeless tobacco in Madaripur, Bangladesh concluded that, people aged 25 years or older, a lower level of education, being a salary worker, being Muslim, and being separated, isolated or widowed, Were related to snuff use

### **5.5.2 Other factors associated with the use of snuff**

Among other factors that may influence the use of snuff or smokeless tobacco we assessed use of substances of abuse, parental use and knowledge about the benefits of snuff use.

In relation to other substance of abuse as a determinant of snuff use in the metropolis, tramadol was revealed to be less significantly contributing to the current use of snuff ( $\chi^2$ :3.84;  $p$ -value: 0.05).With regards to alcohol use as a determinant for the use of snuff, the study revealed that alcoholic addiction did not determine the current use of snuff among the people in the Tamale metropolis. Energy drinks was associated with current use of snuff ( $\chi^2$ : 8.06;  $p$ -value: 0.005). Compared to residents who did not use energy drinks, those who used the drinks were 45% less likely to use snuff (OR: 0.55; CI: 0.35-0.85). This finding of the study is not consistent with the findings of Papoova & Ling (2013) whose findings showed that other substances such as drugs and alcohol promote the use of smokeless tobacco.

With respect to parental use, it was revealed that a previous use of any tobacco product by a parent significantly influenced the current use of snuff in the metropolis. This could be attributed to the fact that children learn from their parents and if their parents are addicted to the use of snuff, it is seen to be a good thing to do. This claim is supported by the social learning theory espouse by Albert Bandura





(Amota, 2008; Mishra et al., 2015; Bahl *et al.*, 2014). These authors have suggested that numerous youngsters gain and keep up tobacco use through the influence of friends and guardians who smoke. Rudatsikira *et al.*, (2010), also testify that having a parent, sibling or close friend who uses some form of tobacco may reinforce the habit of tobacco use.

It was also revealed that content of snuff prove to be highly significantly associated with current use of snuff ( $\chi^2$ : 224.06;  $p$ -value: <0.0001). Compared to those who did not know what snuff contains, those who knew had an increase of Odds more than 50 times (OR: 50.29; CI: 25.73-98.70). This high level of significance could be attributed to the perceived benefits of snuff, which include; energy enhancement, help in sex performance and as a pain killer.

Another significant finding which was consistent with earlier findings (Jallow et al., 2017; Mia, *et al.*, 2016; Doku, 2011) was that friends who use snuff also determined current snuff use. ( $\chi^2$ :32.38;  $p$ -value: <0.0001), where those whose friends were current users had increased Odds of more than 5times (OR: 5.21; CI: 2.89-9.39).

This study also was in line with the theoretical models adopted by this study on tobacco and other addictive substances. Rudatsikira et al., 2010, mentioned that; having a parent, sibling or close friend who uses some form of tobacco may reinforce the habit. Additionally, Darker and Rineli, (2010) proposed that all conduct of an individual result from the interrelationship between natures' framework (for example enactment, peer impact and parental help)

Other factors that were looked at in this study included perceptions of health benefits that could be attributed to the use of snuff. It was clear that respondents who had the

notion that snuff had a positive health benefit turn to be involved in the use of snuff. This was seen in most of the responses where respondents saw snuff to be an energy booster, others seeing it as pain killer or sex enhancing substance.

From the finding of this study, we could suggest that, Positive health benefit was inversely proportional to the knowledge of health challenge that comes with snuff. Out of the total number of respondents (408), 344 had no knowledge or have never heard of any health challenge associated with snuff, and 63.4% of this 344 were involved in the current use of snuff, which is in consistent with previous studies that placed education as key when it comes to tobacco use, if these respondents were able to read, they would have had a bit knowledge about snuff and health, (Krishna *et al.*, 2012)

### **5.6 Health ramifications of smokeless tobacco use**

Health effects of the use of tobacco can never be overstated as far as public health is concerned. In this vein, considerable proportions of certain health conditions of public health significance were found among current users of smokeless tobacco in this study. It was evident that oral deformity was associated with the use snuff, ( $p$ -value  $<0.001$ ) with an increase Odds of 3. 14. And in terms frequencies, out of the total subjects (408), 75% of these respondents (302) involved in the oral use of snuff, had at least one form of oral deformity or the other. Notably periodontal related conditions such as; receding gums (15.2%), tooth decay (26.5%), decay cavities (18.5%) and leucoplakia (23.8%) were found in our studies. These deformities can persist and lead to any form oral cancers. This finding is consistent with previous



studies, were it was reported that smokeless tobacco use is associated with leukoplakia, a disease of the mouth characterized by white patches and oral lesions on the cheeks, gums, and or tongue. Leukoplakia can sometimes lead to oral cancer (American Cancer Society 2015).

Similarly we examined respondents to see whether there was a relationship between nasal deformities and the use of snuff. The examinations on the respondents showed numerous nasal deformities including: abrasions in the nose 9.8%, epistaxis 5.4%, and turbinates' 23.5%, wet nose 12.7%, nasal polyps 15.4%. It was observed that there was an increased in odds of about ten times for deformities among users. These deformities are predisposing factors to various forms of nasal cancers or oesophageal cancers, as confirmed in the report by CDC and the National Cancer Institute in December 2014.

Smokers and users of smokeless tobacco have earlier been shown to have similar health risks as cigarette smokers, including oral cancer, oesophageal cancer, and pancreatic cancer, as well as oral health problems like mucosal lesions, leukoplakia, and periodontal disease (American Cancer Society 2015).

Findings from studies by Mariann *et al.*, (2010) and Razis et al. (2014), who both found significant association between smokeless tobacco use and periodontal conditions goes to support the health consequences of use of smokeless tobacco. In furtherance of the agreement with the finding in this study, CDC in 2014 also reported that users of smokeless tobacco like smokers of tobacco are equally exposed to high likelihood of oral health risks at conditions including mucosal lesions, leucoplakia, and periodontal disease found in this study.



## CHAPTER SIX

### 6.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

This thesis is the report of the study of the use a health implications of smokeless tobacco, otherwise referred to as snuff in the Tamale Metropolis. This chapter presents the summary of the findings, the conclusion and recommendations thereof.

#### 6.1 Summary of Findings

The study revealed that, the prevalence of snuff use in the Metropolis was high, with 71.1% of the respondents' having ever used snuff, while 67, 2% were current users of snuff. It was also revealed that respondents were introduced to the use of snuff through various means. The role of friends was seen as the highest reason for first time use of snuff among. It was also found that majority of the respondents resorted to the use of snuff to enhance their energy levels as well as taking it just for fun.

Sex and age of respondents were also important determinants of use of snuff. Education and employment status were also revealed to significantly influence the use of snuff in the Metropolis. With regards to the usage of other substance of abuse, it was revealed that tramadol and alcohol did not associated the use of snuff. On the other hand, energy drinks and cigarette use determined the use of snuff among the people of Tamale Metropolis.

With regards to addiction to snuff use, the study revealed that, majority of the respondents were not addicted to the use of snuff as 32% were categorized as low dependency while 29% were not at all dependent on the substance.



Another important finding of the study was that, parent use of snuff significantly influenced the adoption of the use of the substance in the Metropolis. Content of snuff was also found to be associated with use of snuff in the area.

A proportion of the respondents showed a varied range of oral and nasal health conditions highly associated with smokeless tobacco use.

The findings suggest that there is an urgent need to advocate for and promote education as this can greatly promote better maternal health seeking behaviour and thereby contributing to reducing maternal morbidity and mortality.

## 6.2 CONCLUSIONS

The following conclusions were drawn from the findings of the study:

- The prevalence level of use of snuff in the Metropolis was high. 71.1% of the respondents had ever used snuff before while 67.2% of the respondents are current users of snuff in Tamale Metropolis
- The most commonly snuff used in the Tamale Metropolis was Moringa (47.6%; 139/408).
- The main reason for snuff use in the Tamale Metropolis was to enhance energy (40%), while 15.8% used it for sexual enhancement.
- Majority of respondents were introduced to the use of snuff by friends in the Tamale Metropolis.





- Majority of the respondents were deeply dependent on use of snuff. According to Fagerstrom scale, 29.6% of the respondents were highly dependent and 32% of them were low dependent.
- With regards to factors that drive the use of snuff, the following factors were noticed: Male sex was associated with 50% odds of use; primary level of education, and also being married were associated with the use of snuff. Being a Muslim was seen to be a driver of use of snuff in the Tamale Metropolis.
- The use of snuff in the Tamale metropolis shows a considerable proportion of certain health conditions of public health significance; they was 75% (302) and 67% (273) who had oral and nasal deformities respectively.

### 6.3 Recommendations

**Based on the findings of this study, the following are recommended:**

- The Tamale Metropolitan Assembly led by the Metropolitan Chief Executive should enact by-laws to limit if not eliminate entirely the promotion and sale of smokeless tobacco in the metropolis. This would go a long way to limit the saturation of availability and access to the substance to potential users. Laws and local bylaws at the community level should also be punitive enough to serve as deterrent to offenders of such laws.
- Parents and duty bearers should take the education of the young generation seriously to get children educated to the highest level possible.
- The Ministry of Health, Ghana should promote public health education to sensitize communities, especially where tobacco is grown and used such as the Muslim



communities to know that, smokeless tobacco use carries as equal risk of several health complications as people who smoke it.

- In the same vain, the Ghana Food and Drug Authority should take serious steps to stop the sales of all health risk products including snuff (smokeless tobacco).

#### **6.4 Suggestion for future work**

The study has unearthed that Moringa is the most used snuff by the residents of the Tamale Metropolis. It is therefore prudent to scientifically investigate in detail, the constituents of Moringa as snuff, and other socioeconomic factors that drive the urge of the use of Moringa snuff. This should be linked to the route of administration and the health implications that is associated with its use.



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**APPENDIX**

**UNIVERSITY FOR DEVELOPMENT STUDIES**  
**Graduate School**  
**Department of Community Health and Family Medicine**

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P. O. Box 1883  
Tamale

Our Ref:  
Your Ref:

**QUESTIONNAIRE**

**TITLE:** ASSESSMENT OF SMOKELESS TOBACCO USE AND ITS HEALTH IMPLICATION IN THE TAMALE METROPOLIS

**BY:** TAHIRU MUSTAPHA AL-KABIR

**RESPONDENT ID NO:** .....

**DATE:** .....





**Invitation/informed consent**

I am a student from above school and wish to invite you to participate in this study, on the topic: smokeless (snuff) tobacco use in Tamale Metropolis and its health implications. This study is in partial fulfilment of the requirements for the award of Master of Public Health (MPH). Your involvement requires you to provide answers to questions concerning the use of Snuff and its health implications.

You would be involved in the study for not more than 20 minutes. Any information you provide will strictly be confidential. Participation is voluntary, you can withdraw at any point in time should you decide to do so without any consequences. However, I hope that you participate in this study since your views are relevant.

**Thank you**

**INTRODUCTION:**

Please circle the alphabet that applies to your choice of answer. And also supply the answers where options are not provided to choose from.

**SECTION A: CHARACTERISTICS OF THE RESPONDENTS.**

1. Sex? Male / Female
2. Age? ..... (age in years)
3. Highest **education** you received? (a) None at all (b) Primary (c) Secondary (d) Tertiary
4. **Marital status**? (a) Single (b) Married (c) Divorced (d) widowed





- 5. **Employment** status? (a) Unemployed (b) Informal employment (c) Formal employment
- 6. Religious affiliation (a) Christian (b).Moslem (c) Traditionalist (d) pagan

**SECTION B: Snuff use**

- 7. Which of the following do you use? (a) Tramadol (b) energy drink (d) coffee (f) cigar (g) cigarette (h) bitter cola (i) if others specify .....
- 8. Have you ever **used** snuff? Yes/No, if no move to **QNS. 20**
- 9. Do you **currently use** snuff? Yes/No
- 10. Who introduced you to snuff? (a) father (b) mother (c) friend (d) master (e) grandparents
- 11. At what **age did you start** to use snuff? .....
- 12. What do use snuff for? (a) Energy (b) Enhance sex performance (c) Aid Digestion (d) fun (e) if others specify.....
- 13. Do you want to stop? Yes/No

**SECTION C: Levels of addictions of snuff use**

- 14. How soon after waking up do you use smokeless tobacco?  
(a) Within first 5 minutes (b) 6-30 minutes (c) 31-60 minutes (d) after one hour



15. Do you find it difficult to abstain from using snuff in public places? Yes/No
16. Which snuff would you hate to give up? (a) within first 5 minutes after working up (b) 6-30 minutes after working up (c) 31- 60 after working up (d) 1 hour after working up
17. Do you use snuff even when you are sick in bed? Yes/No
18. Do you use snuff more frequently in the morning than in the rest of the day?  
Yes/No
19. How many times do you use snuff in a day? (a) 1 (b). 2-3 (c). 4-5 (d). >6

**SECTION D: *Factors that drive snuff use***

20. Has any of your parent use any addictive substance before? Yes/No
21. If yes, which of the following has your parents use before? (a) Snuff (b) cola (c) Tramadol (d) Diazepam (e) Energy drinks (f) Petidine (h) If others specify .....
22. Has any of your **family members** used Snuff before? Yes/No
23. If yes, which of your **family members**? (a) Father (b) Mother (c) others (d) siblings



24. Do you have a **friend** who uses Snuff? Yes/No
25. If you use snuff where do get your supply from? (a) Chemical shops (b) open market (c) hawkers (h) if others specify .....
26. Do you know any source of snuff supply? (a) Chemical shops (b) open market (c) hawkers (h) if others specify .....
27. Do you know if the following are on your snuff packaging? (a) trade name (b) warning signs (c) ingredients (d) manufacture date (e) expiry date
28. **Who** introduced you to the use of smokeless tobacco?  
(a) Friend (b) Father (c) Mother (d) Guardian (e) Siblings
29. Do you have the following conditions? (a) BP (b) Ulcer (c) Mouth Odor (d) Tooth Ache (f) None
30. Have you ever use any of the following? (a) Alcohol (b) Tramadol (c) Cigarette (d) Energy drink (e) Others, Specify  
.....

**SECTION E: *Types of Snuffs that are used***

31. Do you know what snuff contains? Yes/No
32. If yes which of the following (a) Moringa (b) tobacco(c) bitter salt, (d) if others specify .....
33. Which type of snuff do you use? (a) Moringa (b) tobacco (c) Moringa and Tobacco (d) local one (f) if others specify  
.....

34. What is the route of administration? (a) Orally (b) Nasal (c) Oral and Nasal  
(d) if others specify .....

**SECTION F: *Health Implication***

35. Do you think that Snuff has health benefit to you? Yes/No

36. If yes, what do you think are the benefits of using Snuff?

.....

37. Do you have any health challenges that you can attribute to your use of  
Snuff? Yes/No

38. If yes what are they?

.....

39. Oral examination (a) receding gums (b) decay cavities (c) decay tooth (d)  
abrasions in the mouth (e) leukoplakia

40. Nasal examination (a) abrasions in the nose (b) Turbinates' (c) Running  
nose (d) Growth nasal polis (e) Epistasis (f) if any state

.....

41. Do have any problem with breathing? Yes/No

42. If yes, which of the following (a) Difficulty in breathing (b) snoring during  
sleeping (c) if others specify .....



