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KNOWLEDGE, ATTITUDE AND PREVALENCE OF SNUFF USE: A DESCRIPTIVE CROSS-SECTIONAL STUDY AMONG ADULTS IN THE SAGNERIGU MUNICIPALITY OF THE NORTHERN REGION OF GHANA

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Abstract

This study sought to assess snuff use among adults in the Sagnerigu Municipality of the Northern Region of Ghana. This study employed an analytical study design. The study used simple random sampling technique to sample 272 respondents in the study setting who were aged above 18 years at the time of the study. The research survey was carried out at Sagnerigu Municipality of the Northern Region of Ghana. Adults between the ages of 18 and 65 years participated in the study. Findings from the study showed that, all the respondents representing 100% said they had ever heard about snuff. From the results, 96% said they had ever used snuff at the time of the study. The findings showed that, there was no statistical association between educational status of respondents and use of snuff (p=0.10). The findings however showed that there was an association between occupational status of respondents and use of snuff by respondents ($\chi 2=12.942$; P= 0.02). From the results, 56% of the respondents aged 31-35 years dominated with the males leading in all the age categories of snuff use in the study area. From the results, majority of the respondents (81%) agreed with the statement that people take snuff to enable them perform a task. From the results, majority of the respondents (68%) identified that people take snuff to treat diseases such as cold and headache. The prevalence of snuff use was high among the participants in this study, though ignorance of the potential health dangers of snuff was also high. It is recommended that concerted efforts should be made by healthcare workers to discourage the use of all forms of snuff among people at the study area.

Keywords: Snuff, Knowledge, Attitudes, Prevalence

Introduction

Globally, more than 300 million people are currently using snuff (Muttapppallymylil et al., 2010). Moreover, at least 1 in 10 adults use snuff and this figure is much higher in low-income countries (Nemeth et al., 2012) (Lund, 2012). A recent review of studies from 113 countries revealed that snuff use alone accounts for over 6 million disability-adjusted-life-years (DALYs) and has caused 266,592 deaths from cancers and heart disease (Lund and Scheffels, 2012; Hussain et al., 2017). The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death of a person. Its impact as a health problem is measured by financial cost, mortality, and morbidity (Hussain et al., 2017).

Snuff is a smokeless tobacco made from ground or pulverized tobacco leaves (Hussain et al., 2017). It is inhaled or "snuffed" into the nasal cavity, delivering a swift hit of nicotine and a lasting flavored scent (Lund and Scheffels, 2012). Snuff remained the predominant form of tobacco use throughout the world till the 19th century when the amount used exceeded that for smoking (with a pipe or as a cigar) and for chewing (plug and leaf).

In ancient times, along with this, the production of snuff bottles, boxes or bags was a portable business for many craftsmen (Sinha et al., 2014).

In Europe and China snuff boxes and bottles were not just simple containers, but highly ornamented objects of art, worn by their possessors as jewelry, or were given as valuable gifts (Muttapppallymylil et al., 2010).

The use of snuff especially among people is a major public health concern because it could lead to many health conditions (Wingate-Pearse, 2010). People used snuff alongside other substances like tobacco, because the absorption of snuff is sometimes considered inefficient to provide an adequate nicotine substitute (Sinha et al.,

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2014). Snuffing has become quite popular as a medication for long grief, pain and aches (Wngate-Pearse, 2010). The widespread use of snuff in Africa is well known (Lund and Scheffels, 2012). Owing to the high demand for snuff, there is a corresponding maintenance of a high supply by those employed in the snuff producing industry (Muttapppallymylil et al., 2010).

Snuff comes in a small pouch (like a small teabag) which is placed in the cheek or between the teeth and gums for extended periods of time. Snuff users do not chew or spit when using it (Lund and Scheffels, 2012; Delnevo et al., 2014). Sales of pouched forms of moist snuff increased by 33.8% between 2005 and 2011, with snuff sales doubling between 2009 and 2010 and snuff brands emerging among the top 10 selling moist snuff brands after just 2 years on the United States of American (U.S.A) market (Sinha et al., 2014; Lund and Scheffels, 2012).

The time course and symptoms of withdrawal from snuff use are generally similar to those of cigarette smokers (Sddiqi et al., 2015; Hussain et al., 2017). It seems also that symptoms of withdrawal are stronger with some brands of snuff delivering higher levels of nicotine compared to other brands with lower levels. Owing to the high demand for snuff, there is a corresponding maintenance of snuff brands such as Copenhagen, Skoal fine cut, and Kodiaka high supply by those employed in the snuff producing industry (Mutti et al., 2016; Popova and Ling, 2013).

In West Africa, millions of people are estimated to have died from snuff-related diseases (WHO, 2011). Snuff use is the most important preventable cause of premature death and major risk factor for non-communicable diseases. Due to strict tobacco legislation in the western hemisphere, many African nations like Ghana have shifted from being a tobacco-producing nation to a snuff-consuming one (Rudatsikira et al., 2010). A country with a heavy burden of diseases like snuff-related diseases tends to experience a multiplicity of impediments to economic progress (Luo et al., 2015) (Borgerding et al., 2012).

A change in pattern of snuff use has been observed in the last decade among adults (Johansson et al., 2005). Snuff use and occasional snuff users have to some degree replaced daily snuff among adolescents and young adults (Hergens et al., 2005). Daily snuff is known to be negatively associated with social background factors, but little is known about these associations for other types of snuff use (Stepanov et al., 2008; Myers, 2008).

Snuff use is a significant part of the overall world snuff problem. When the habit is introduced early in life, it increases the chance for permanent addiction and primes adolescents for use of harder drugs, exposing them to higher risk of oral cancer and other adverse effects of snuff (Haukkala et al., 2006).

The release of harmful chemicals from snuff may explain why snuff use has been strongly associated with various diseases (Mutti et al., 2016), increased susceptibility to periodontal diseases (Palipudi et al., 2012), reduced response to periodontal therapies (WHO, 2011) and increased risk of dental implant failure (Delnevo et al., 2014). Other adverse effects of snuff use on oral health include tooth staining and halitosis (Johnson and Bain, 2000). On general health, tobacco use especially snuff use has been associated with occurrence of lung cancer and cardiovascular diseases (Muttapppallymylil et al., 2010).

Snuff-related diseases claim the lives of an estimated 13,000 persons every day. If the current trend continues, it is estimated that 10 million people between ages 35-69 will die each year due to snuff use (Colilla, 2010; Palipudi et al., 2012). Snuffing causes over 25 diseases in man (WHO, 2011), ten diseases as a result of Maligent Neoplasms (Bladder Cancer, Lung Cancer, Leukemia etc.), five diseases from cardiovascular diseases (Coronary Heart Diseases, Cerebrovascular diseases, Stroke etc.), ten diseases from respiratory diseases and host of others (including Tuberculosis, Hypertension, Heart attack, Asthma etc.) (Kotlyar et al., 2011; Yatsuya and Folsom, 2010).

Most of the existing literature on the health effects of snuff comes from western nations, particularly Sweden, where most users are Caucasian male snuff dippers (Yatsuya and Folsom, 2010). Since consistent association between snuff and major diseases is lacking (particularly in developed nations), snuff is widely considered being less harmful than cigarettes and snuff is therefore promoted as a reduced-harm product (Naufal, 2011). Although the snuff products commonly used in Africa may differ from those used in such western countries, in Africa, too, snuff use is perceived by some adolescents to

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be a safer alternative to cigarettes (Tomar et al., 2010).

Developing countries, especially on the African continent, have since the last decade experienced a persistent increase in the prevalence of snuff use among the population, the most noticeable among them being the young generation (Hussainet al., 2017; Sinha et al., 2014). Nowadays, when smoking has the characteristics of a pandemic, the use of snuff among adults could be deemed as endemic, and that of snuff sporadic (Delnevo et al., 2014). Similarly, this trend is evident among adults, where 12.7% of males use snuff as compared to 6.5% of females. The above-mentioned statistics strongly indicate that the problem of snuff use affects Africans at a very young age and that the problem afflicts more males than female (Huque et al., 2017).

Snuff use is an understudied problem in Africa. Information on snuff use among the adult population has been collected from various available sources with large missing data. Snuff use prevalence varies among countries in the region (Popova and Ling, 2013) (Lung and Scheffels, 2012). Snuff users deliver quantities of nicotine comparable to those typically absorbed from cigarette smoking, although delivery of nicotine from snuff lacks the high initial concentration that results from inhalation of tobacco smoke. Nicotine levels obtained from snuff are generally higher than those typically obtained from nicotine replacement therapy (Lund, 2012; Hussain et al., 2017).

Due to the addictive nature of nicotine, successful cessation of snuff among those who initiate its use is rare. It is estimated that five out of ten snuff users who attempt to quit, two will fail (Sinha et al., 2014). Hence, as more people take up the habit of using snuff, very few of them manage to quit. The majority of those who initiate the habit become long term users (Zhu et al., 2013; Muttapppallymylil et al., 2010). The consequences of a high prevalence of snuff use among the present adult population will manifest in the future adult population as increased morbidity and mortality rates, exerting more strain on the already stretched health system in the country (Siddiqi et al., 2015; Nemeth et al., 2012).

Use of snuff among people including chewing tobacco, snuff, dip, snuff, and/or dissolvable tobacco, remains a public health problem in the world (Coogan et al., 2000; Cooper et al., 2003). Researchers have identified more than 30 carcinogens in various snuff products, and every year more than 2,300 people in the world are diagnosed with oral esophageal and pancreatic cancer because of snuff use (Nargis et al., 2014).

In Ghana, all forms of snuff put users at risk for nicotine addiction. Snuff use among the population continues to rise. Oral snuff can attract a multitude of oral problems, including leukoplakia, receding gums, tooth loss, and oral cancer. Chronic abuse of dry snuff leads to morphological and functional changes in the nasal mucosa (WHO, 2011). Snuff use also exposes users to heart disease and high blood pressure, increased risk of heart attack and stroke, increased risk of preterm delivery and stillbirth when used during pregnancy (Siddiqi et al., 2015). The WHO (2011) also showed that in Ghana, snuff users, after long-term abuse, develop a form of chronic rhinitis, as a consequence of which they develop blocked and stuffy noses. The report concluded that nasal snuff is not a suitable substitute for smoked tobacco because it does not avoid ill health.

In the Sagnerigu Municipality, the prevalence of snuff use among the residents is high. This is due to the availability of the substance, less cost and the perceived use of it for varied purposes such as sexual enhancer and for hard work. Due to which the substance is commonly seen especially at social gatherings such as weddings and naming ceremonies. Both men and women use it and at times even children also use it. This is a worrying phenomenon.

There is a lack of evidence relating to the effects of additives introduced to snuff in the manufacturing process on the initiation of use of snuff and subsequent dependence. This necessitates the need for an epidemiological study into the issue. This study is designed to address this gap in the literature by assessing the Knowledge, Attitude and Prevalence (KAP) of snuff use among adults in the Sagnerigu Municipality in the Northern Region of Ghana.

Materials and Methods

Study Design and Setting

The study was conducted in the Sagnerigu Municipality which has Sagnerigu as its capital. It is one of the six newly created MMDAs in the Northern region in the first half of 2012. It was carved out of the Tamale Metropolis by Legislative Instrument (LI) 2066. The Sagnerigu Municipality has 79 communities, comprising of 20 urban, 6 peri-urban, and 53 rural areas (GSS, 2010).

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The population of Sagnerigu Municipal, according to the 2010 Population and Housing Census, is 148,099 representing six percent of the region's total population. Males constitute 50.6 percent and females 49.4 percent. The municipality has an urban population of 93,550, representing 63.2%. The population of the district is youthful (0-14 years) representing 37.5% and depicting a broad base population pyramid which tapers off with a small number of elderly persons (60+ years) (5.9%) (WHO, 2011).

This study employed an analytical study design. Analytical study design measures exposures and outcomes of interest at the same time. The advantages of analytical study design are that it is relatively inexpensive and takes up little time to conduct. The study used a quantitative approach to collect the data from the respondents. The merit of employing mainly a quantitative data collection approach is to provide respondents the option to choose from predetermined answers to every question.

The weakness of the data collection approach does not allow respondents to express themselves deeply, and rather choose/propose responses for the interviewee. But nonetheless it is the best for this study because of the nature of this research and time considerations. It is faster, and as a student facing time constraints, it is of help.

Study Population and Sampling

The research population involved all persons 18 years and older at the study area. The research targeted both male and female adults who used/never snuff 18 years and older

Adults who were not from the study place and those who have never use snuff or are mentally retarded were excluded from the study.

The sample size was 272 respondents. This study used simple random sampling technique to sample respondents in the study setting. This sampling technique was employed to give each respondent an equal chance of being selected in the study area. Respondents were simply selected based on those who picked 'yes' from folded pieces of papers strips carrying "yes" or "no" inscriptions.

Data Collective Tools and Process

A questionnaire was used to collect the primary data. The questionnaire was designed according to the specific objectives of the study. The use of the questionnaire gave the researchers an opportunity to better describe the situation and opinions of respondents concerning snuff use.

The data was collected with the help of trained research assistants. The research assistants used the questionnaire to collect the primary data. The structured questionnaire had sections seeking information from respondents. Demographic data and the rest of the sections were devoted to the study objectives. Under the demographic data of the respondents, the study collected data on their age assessed in years, occupational status, marital status, and education level. The study also collected data from respondents according to the specific objectives. The data collection from the study place lasted for three weeks. Secondary data was obtained from reliable records and related literature, such as books, reports from the study area, journals and internet articles.

Data Quality Assurance

The researchers carried out a pre-test on the questionnaire to authenticate the validity and reliability of the research tool before the start of the actual field work. The pre-test was carried out to translate and retranslate the questions until the desired responses intended by the researcher were obtained.

Data Analysis

Completed data collection instruments were daily checked during data collection process for completeness by the researcher

The data collected were entered into a computer after coding using IBM SPSS version 22 (IBM Corp. Armonk, NY) and Microsoft Word Excels 2013 version 16.0

The analysis of the data was done using descriptive and inferential statistics. The findings are presented using mainly frequency tables and charts. Under the inferential statistics, cross tabulation and Chi-square test analyses were used to establish the relationships. All statistical tests were performed using two-sided tests at the 0.05 level of significance. P-values less than 5% was considered statistically significant.

Results

Demographic Data of Respondents

The demographic data of the respondents are shown on Table 1. The variables assessed under this section are age, sex, educational status, marital status, occupational status, income earned, and category of respondents sampled. From the results in Table 1, majority of the respondents (68%) were males. The findings showed that, most of the respondents representing 34% were aged between 26-30 years whilst 26% of the respondents were aged between 31-35 years. The educational status of the sampled respondents showed that, 25% had no formal education whilst 26% indicated that they had tertiary education. From the results, 11% of the respondents were farmers whilst 23% were salaried workers. Regard-

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ing marital status of the respondents, it was revealed that majority of the respondents representing 61% indicated they were married whilst 81% of the respondents were others which included students, men, and women considered as residents in the study area and opinion leaders at the time of the study. The income status of the participants revealed that majority (57%) earned below GHC 500.00 per month and 24% respondents earned between GHC 500 and GHC 1000.00 per month.

Knowledge of Respondents

Table 2 shows the results of respondents' knowledge on snuff use. The results showed that, all the respondents said they had ever heard about snuff. Respondents explained snuff to be; smokeless tobacco consumed orally, not smoked and made of herbal leaves in the form of moringa, powdered tobacco, or small quantity of wee mixed with pepper and ginger. The results showed that, all the respondents said their knowledge of snuff was informed by their friends, market and base/ghettos.

The results also showed that, snuff was accessible and available to respondents in the study area at the time of the study. Table 2 further showed that, nearly all the respondents (96%) said they had ever used snuff at the time of the study. This therefore, explained why respondents had high knowledge of it.

Adult humans are born void of knowledge, but through experience, they derive the knowledge of external sensible objects. It is therefore argued that through empirical observation (through our senses), and subsequent reflection of what is sensed, humans acquire knowledge if an object is available. This therefore means that the awareness of snuff products as well as their effects on the human body is accessible to adults through their senses. For example, through hearing or seeing, adults can get to learn the types of snuff products as well as the dangers of using these products on health.

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n=272)	Percent
Age	18-25	40	15.0
	26-30	92	34.0
	31-35	71	26.0
	36+	69	25.0
Sex	Male	185	68.0
	Female	87	32.0
Education	No formal education	68	25.0
	Junior High School	57	21.0
	Senior High School	75	28.0
	Tertiary	72	26.0
Occupation	Petty trader	58	21.0
	Student	51	19.0
	Farmer	30	11.0
	Unemployed	72	26.0
	Salaried worker	61	23.0
Marital status	Never married	67	25.0
	Married	167	61.0
	Separated	38	14.0
Earned income	< GHZ 500 monthly	154	57.0
	Ghz 500-1000 monthly	65	24.0
	> Ghz 1000 monthly	53	19.0
Category	Health care worker	12	4.0
	Teacher	39	15.0
	Others*	221	81.0

Table 2: Knowledge of Respondents on Snuff

Variable	Frequency (n=272)	Percent
Ever heard about snuff		
Yes	272	100.0
Sources of information		
Media	170	63.0%
Friend	272	100.0
Base/ghettos	272	100.0
Social gathering	272	100.0
Sources of snuff for people		
Friend	272	100.0
Market	272	100.0
Base/ghettos	272	100.0
Vicinity	272	100.0
Work-place	150	55.0
Accessibility of snuff		
Yes	100	100.0
Availability of snuff		
Yes	100	100.0
Ever used snuff		
Yes	261	96.0
No	11	4.0

Attitudes of Adults Towards Snuff Use

Majority of the respondents representing 59% indicated that they take snuff daily whilst 23% said weekly. It was revealed among the respondents, that there is no evidence or scientific consensus that snuff is an effective tobacco-cessation method or proven and safer tobacco-cessation therapies.

Some of the respondents (35%) indicated that they knew the constituents of snuff to consist of wee whilst

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18% respondents said are tobacco. Snuff comes in different and varied forms and often used differently by adults. It can be smoked, chewed, sniffed or dipped. In whichever the form it is used; snuff releases nicotine which is a stimulant that increases activity in the brain just like caffeine, cocaine and amphetamine. The stimulant effect of nicotine to the brain creates the desire for a person to continue using snuff until one becomes addicted therefore being exposed to harmful effects of other chemicals present in snuff. Unfortunately, in addition to nicotine other antigenic, cytotoxic, mutagenic and carcinogenic chemicals that are harmful to oral and general health are also released.

The combination of these dangerous substances makes users more likely to suffer from oral cancers (Tomar et al., 2010). Other oral health issues include leukoplakia (white mouth lesions that are precancerous), tooth decay from the high levels of sugar found in chew, stained and discolored teeth, bad breath, and gum disease and recession (and eventually tooth loss). Users are also at risk for other health problems, including cancer of the kidney, pancreas and digestive system (Wingate-Pearse, 2010).

Snuff has been shown to act as an autonomic and hemodynamic stimulus by increasing heart rate, blood pressure and epinephrine levels. Snuff users have higher daytime heart rates than nonusers and have twice the risk of dying from cardiovascular disease (Schei et al., 2011).

In order to prevent and reduce snuff addiction in adults, comprehensive health education policies should include enforcement of snuff environments, prohibition of snuff use at all facilities and events, and encouragement and help to adults and staff who wish to quit snuff. A number of respondents representing 29% indicated that the reason why those who make snuff add constituents in it is because they want to make the snuff effective for users whilst 11% said to make it good for curing ailments.

The results in Table 3 revealed that one-way analysis of variance (ANOVA) showed no statistical association between educational status of respondents and use of snuff between groups and within groups (p=0.10). This therefore, means that, between the educated and the not educated all of them, were using snuff. It was also shown that, even within those in the educational ladder, snuff use was also prevalent among them. Indicating that ignorance about the health risks of snuff use was not likely an issue among this population. Based on the fact that all respondents had full knowledge and information about snuff use. This implies that snuff users apparently are not interested in the harmful consequences reduction of snuff use may lead to a dual use of cigarettes, which might cause net population harm. Population harm basically refers to a certain portion of the population who is much more exposed to dangers or harm, in comparison to the larger population.

This is particularly pertinent in the studied population considering that a significantly higher proportion of them were smokers. The fact that more uneducated people were less likely to be unaware of the harmfulness of snuff could be that educated people are more likely to comprehend and appreciate anti-tobacco messages and the harmful effects of snuff use. It could also be that going to school exposes people to more opportunities of acquiring knowledge about the harmful effects of snuff use. But in this studied population, both the educated and not educated were all using snuff.

The results in Table 4 compared occupational status of respondents with frequent use of snuff in a day. The findings showed that there was an association between occupational status of respondents and use of snuff in a day by respondents ($\chi 2=12.942$; P= 0.02). This could suggest that most of the respondents especially students used snuff occasionally whilst farmers were found to be using snuff daily.

Table 3: Education and Frequency of Snuff Use

Variable	Sum of squares	df	Mean square	F	Sig.
	7.30	1	7.30	2.80	
Between groups	7.30	1	7.30	2.80	.10
	7.30	1	7.30	2.80	
Within groups	2180.10	825			

One-way ANOVA revealed in Table 5 that there was an association between marital status of respondents and use of snuff (P=0.03). It is pertinent to note that the majority of snuff users, although exposed to the same health warnings as cigarette smokers, were more likely to believe that snuff was less harmful than cigarettes. This suggests that the observed difference within groups is a belief by snuff users as a status might partly reflect a social judgment rather than a true perceived relative risk. Social judgment is basically explained as the perception and evaluation of an idea by comparing it with current attitudes.

Perceived relative risk is explained as the time a consumer considers buying a product, he or she has certain doubts about the product, especially if the product in question is highly priced. It is conceivable that users of a particular product that is considered socially undesirable may want to justify continued use by believing their

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Table 4: Occupation and Frequency of Snuff Use

Variable			Frequency of use (%)		
			Daily	Weekly	occasionally
Occupation	Salaried worker	Count	3	11	40
		% within	1	4	15
	Farming	Count	26	4	0
		% within	10	2	0
	Petty trading	Count	45	9	0
		% within	17	3	0
	Student	Count	30	3	18
		% within	43		57
	Unemployed	Count	55	7	10
		% within	12	3	4

product to be less harmful than another. The alternative explanation though is that snuff users use it because they correctly believe it to be safer than cigarette smoking.

Prevalence of Snuff Use Among Adults

The prevalence of snuff use among the population was assessed and calculated. The findings show that majority of the respondents representing 89% said that everyone in the study area used snuff whilst the rests said only adults used snuff in the study area (figure 4). Consistent with declines in smoking, the prevalence of current snuff use has increased in the study area over the period for males and females aged 18 and older. The overall separate snuff use is mirrored by a decline in concurrent use of snuff and cigarette.

Age and sex category of respondents were compared to examine the frequency of snuff use at the study area (Figure 5). From the results, 56% of the respondents aged 31-35-years dominated with the males leading in all the age categories of snuff use in the study area.

Calculation of prevalence of snuff use as at 2019 based on the data collected. Point prevalence of snuff was determined among the population using the GSS population of 148, 099. The assumption is that the population is in a steady state.

Point prevalence =n/N× 10n

n = Sampled participants using snuff at the study area

N = Total population at the study area

10n = Constant

= 261/148,099

=0.00167 ×100

=17 per 100 population

This value means that for every 100 people, 17 of them use snuff at the study area. Prevalence is determined by not only the number of persons affected but also their survival; prevalence is considered a less useful measure in studies of etiology than incidence rates.

Table 5: Marital Status and Use of Snuff

Variable	Sum of squares	Df	Mean square	F	Sig.
	33.30	1	33.30	19.70	
Between groups	33.30	1	33.30	19.70	
	33.30	1	33.30	19.70	0.03
Within groups	1393.90	1	1.70	19.70	

The mean knowledge score of respondents was calculated to be 11.19 ± 0.11. The results showed the mean score of male respondents to be (8.36 ± 0.11) which indicated that they were more likely to be knowledgeable as compared to female respondents which scored (6.9 ± 0.11). From Table 4.6, the knowledge category across users and never used was assessed. Respondents were grouped into three main categories based on the total score distribution (poor knowledge, average knowledge, good knowledge). Overall, 75% of respondents who were snuff users had good knowledge about snuff whilst 4% of never users also had good knowledge.

Table 6: Overall Knowledge of Respondents

Variable	Poor	Average	Good	P value	χ^2
Users	0 (0.0%)	67 (25.0%)	205 (75.0%)	0.003	20.95
Never used	2 (0.0%)	0 (0.0%)	11 (4.0%)	0.002	12.19

Discussion

Respondent's Knowledge and Attitude on Snuff Use

Snuff is a nasal intake which produces a unique short-lasting feeling among the users. From the results all the respondents (100%) indicated that they had ever heard of snuff at the study area. This finding from the study agrees with the study done by Cunningham (2011) in Zambia where participants in a survey cited that they had ever heard of snuff use at the study place. However, the finding disagrees with the results of the study done by Popova & Ling (2013) in Ethiopia where participants in a survey mentioned that they had no knowledge on snuff use at the time of the study. Nasal application of snuff comprises intri-

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cate sensor motor rituals, which provide further motivation for the user. The snuffers place the substance in the anatomical snuff-box (between the tendons of extensor pollicis longus and extensors pollicis brevis) and inhale consecutively through both nostrils. The most popular use of snuff is to take a pinch between the thumb and the fore finger and sniff it into the nose. This gives the snuffer a feeling of excitement. The results also showed that, participant's knowledge of snuff was enforced by people meeting at the base/ghettos or at social gatherings such as weddings and naming ceremonies at the study area. This finding from the study agrees with the study done by Yatsuya & Folsom (2010) in Ethiopia where participants in a study indicated that they had ever heard of snuff from their friends at the neighborhood.

The results further showed that, majority of the respondents representing 96% indicated that they had ever used snuff at the study place. This finding from the study agrees with the study done by Cunningham (2011) in Zambia where participants in the study showed that they had ever used snuff before at the time of the study.

From the results, majority of the participants indicated that they use snuff daily. This finding from the study disagrees with the study done by Palipudi et al. (2012) where people sampled in a study revealed that they did not use snuff daily. This could be due to the fact that majority of the people sampled were using snuff and it was available to them and less costly.

The results also showed that, many of the participants (35%) explained that the snuff they were taking contain small quantity of wee as a constituent. This finding from the study disagrees with the study done by Haukkala et al. (2006) in Republic of Congo where participants in a study indicated that they had no knowledge of the composition of the snuff they were taking.

People who snuff are numbered in millions throughout the world, and several million more are dependent on snuff use in other ways. The number of snuffers increases daily, not only because of the world's fast-growing population, but also because smoking cigarettes is being fostered and encouraged worldwide for commercial gain and, in spite of incontrovertible evidence on the toll of death, disease, and disability that is being caused, many governments have remained ambivalent towards a problem that has implications for excise and tax revenue, health and welfare expenditure, and political expediency. The results showed that, there was no association between educational status of participants and using snuff (P=0.10). This finding from the study agrees with the study done by Engstrom et al. (2010) in Stockholm County, Sweden where analysis of results showed that they was no statistical association between educational status and use of snuff among participants sampled in a study.

There are many areas of the world, particularly in the developing countries, where snuff use is still at a low level and may as yet even be nonexistent among people. There is, however, a lack of knowledge on snuff use by people in most countries and efforts to obtain more factual information are needed so that counter measures can be developed and used more effectively.

With proper counseling and therapy, the prospect to quit snuff use is good in this category of snuff users. Social acceptance was the most common reason for using snuff followed by availability and pleasure. Ignorance of dangers of snuff use coupled with, inadequate intake of fruits and vegetables which are known to produce antioxidants that are protective to the body against malignant transformation of cells in the body tissue makes continuous use of snuff dangerous among the population in the study area.

Although the knowledge of snuff use was high among the participants in this study, the number of persons aged 31-35 years using snuff was high (56%) and the ignorance of the dangers of snuff use was very significant. Therefore, governments and stakeholders need to draw up a comprehensive tobacco control policy that will discourage the use of not only cigarette smoking, but all forms of tobacco use in the study area as a measure to curb the rising cases of snuff use.

In addition to knowledge about the harmful effects of snuff, schools should provide a platform for inculcating other personality and life skills that are important in deterring the initiation of snuff use among students. The survey also established that users of smoked and snuff products were significantly more likely to be unaware of the harmfulness of snuff. Snuffers have been shown to have significant gaps in their knowledge of the risks of snuffing.

Research has shown that people perceive snuff as more tolerable and less harmful compared with smoked tobacco. One of the documented ways of educating snuff users on the perils of snuff use is through instituting

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graphic health warnings on snuff products. The cross-sectional nature of the survey does not preclude the possibility that the perceptions that people hold about the harmfulness of snuff might be because of their tobacco use status.

The reasons why snuff users are unaware about the harmfulness of snuff might be attributed to an optimistic distortion in risk assessment called optimistic bias. Optimistic bias is an error in perception whereby people believe that they are less likely to experience negative events. The bias in judgment occurs in such a way that snuff users do not believe that they will experience the negative health effects of using snuff, even though they may be aware of these effects.

It has been shown that snuffers are more likely to doubt that they would die from smoking if they smoked for 40 years or even till old age. Optimistic bias has been attributed to the false perception of being in control of the negative events that could happen to an individual. It has been demonstrated that the perception of control could originate from beliefs that the quantity of tobacco someone uses is too little for it to have harmful effects, or that the way someone smokes can protect them from any snuff use related morbidity. The optimistic distortion in the perception of risk has also been attributed to ineffective warning labels on snuff product packaging.

Prevalence of Snuff Use Among Adults

Available data suggests that the prevalence of snuff use in sub-Saharan African countries is considerable. The findings from the study showed that, majority of the respondents (89%) said that everyone in the study area uses snuff. This finding from the study agrees with the study done by Nemeth et al. (2012) in Ethiopia where participants in a study showed that everyone said they use snuff at the time of the study. This huge number of participants in the study area showed that snuff use was prevalent among the participants at the time of the study at the study area.

From the results, it was shown that the overall prevalence of snuff use was high. This value means that for every assumed population of 100 people, 17 of them will be using snuff at the study area. This finding from the study agrees with the study done by Lund and Scheffels (2012) in Uganda where the prevalence of snuff use among the participants was high.

The prevalence of snuffing of tobacco powder/ moringa powder or wee powder was the commonest method of using snuff, whereas in other studies chewing of tobacco was the commonest method of snuff use. More than ninety percent of the current snuff users (93.2%) were high to moderate (once to many times every day) users of snuff.

From the results, the prevalence rates of snuff use among the respondents did not show any signs of decline as compared to few other countries. Today, in many developed countries, snuff is predominantly a practice of young men, women with/without limited education, and women of low socio-economic status. In the past, cultural norms were a powerful deterrent to men's snuffing in the developing world, although there have always been areas in which women have practiced traditional forms of snuff use.

Currently, in the developing world, snuffing is linked with a cosmopolitan and affluent life-style. With increasing urbanization and career-oriented education, and increasing spending power, many young women who aspire to this life-style have taken up snuffing. There is grave concern that these aspirations, fueled by aggressive snuff marketing, will result in increased prevalence rates among the population in developing countries, further compounding their present difficulties for people to quit. The increased use of snuff products therefore represents a threat to developing countries in particular and raises the likelihood that there will be an increasing prevalence of dual users. It is important to emphasize that all forms of snuff have an adverse impact on health and that snuff should not be promoted as a harm-reduction product. The consumption of snuff tobacco is a global concern and should not be limited to a few countries. Therefore, during negotiations leading to policy change, parties should agree to address concerns relating to all forms of tobacco, not only the smoking forms.

Parties need to formulate comprehensive tobacco-control legislation that is fully compliant with best practice and are therefore addressing the issues related to both smoking and snuff forms of tobacco as this will prevent the use of snuff among people. It is vital to work out specific strategies that can "target" issues related to snuff. However, given resource constraints and capacity challenges, parties need to work towards developing an integrated tobacco-control programme as part of their ongoing programmes and initiatives. This may include training and capacity building and well-planned information, education and communication strategies and campaigns to boost awareness of the negative effects of snuff, especially in vulnerable groups such as youth and pregnant women.

Conclusion

Snuff has been in use for as long as other forms of tobacco consumption and its use has increased. The main type of snuff use in the study area was the oral snuff. In

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developing countries, snuff is mostly made with other ingredients. Snuff comprises a variety of tobacco-containing products that are often region-specific.

The known and suspected health risks associated with the use of snuff provides a basis for preventive action. In particular, efforts are needed to limit the introduction of such practices among people, which may serve as a gateway to smoking. From the results snuff use practices are common in the study area. The use seems to be increasing. The health implication of this practice is that nicotine in snuff gives rise to strong physical dependence similar to tobacco smoking. Thus, habitual use of snuff may serve as a gateway to smoking, which should be of particular concern among the people.

In comparison to smoking, the evidence on health risks related to snuff use is relatively limited. Habitual use of oral snuff can increase the risk of oral cancer. The data are insufficient to assess in detail the risk associated with many types of snuff products, but in some parts of the world the attributable proportion of oral carcinoma in regular users appears substantial. Effects on the cardiovascular system, such as myocardial infarction, are potentially of great public health importance. Unfortunately, available evidence is limited and inconclusive, and further studies are urgently needed.

There is much to be learned about the use and health risks of novel snuff products. However, what is clear is that these products are marketed to youth and young adults, and the snuff companies are marketing them as products that can be used in smoke free settings. In addition, the increasing availability of these types of snuff products at the study place may have contributed to increased dual use of snuff products. Dual use has grave implications for public health as it may mean fewer people quit smoking. More research, education and effective oversight by the FDA is needed to ensure these products do not addict more Ghanaians, cause deaths and diseases and prevent others from quitting snuff use for good.

Costs of snuff-related diseases can be useful evidence for important macroeconomic health policy. The costs can be enormous given that snuff-related diseases have major adverse effects on the quality of life and productivity of affected individuals. The overall health impact appears less from snuff use than from smoking. However, the known and suspected health risks associated with snuff indicate that it should not be viewed as an alternative to smoking. The study findings also highlight the need for public health interventions that discourage the adoption of any form of tobacco use and promote tobacco use cessation, particularly among adults and adolescents.

Based on the findings of the study, it is recommended that health care workers at the various health centres in the Sagnerigu municipal should increase their health education activities to dispel the myths attached to the perceptions on use of snuff among people. Opinion leaders and religious leaders in the study area should intensify their message to the people to stop taking snuff especially among the youth. Health partners should encourage the mass media in the Sagnerigu municipal to contribute to the fight against snuff use by intensifying education on stopping snuff use.

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Ethical Approval

The study received ethical approval from the Tamale Teaching Hospital Ethics Review Board, with approval reference number TTHERB-22-211. Also, permission was granted by the head of research department at the Sagnerigu Municipal Assembly. We also obtained informed consent from all participants in the study.

Competing interest

There are no competing interests associated with this study as the study was self-financed.

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