

**PREVALENCE, PERCEIVED FACTORS AND KNOWLEDGE ON
EFFECTS OF TOBACCO USE ON ORAL HEALTH AMONG
SECONDARY SCHOOL STUDENTS IN DAR ES SALAAM**

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**PREVALENCE, PERCEIVED FACTORS AND KNOWLEDGE ON EFFECTS OF
TOBACCO USE ON ORAL HEALTH AMONG SECONDARY SCHOOL STUDENTS
IN DAR ES SALAAM**

By

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**A Dissertation Submitted in (partial) Fulfillment of the Requirements for the Degree of
Master of Dentistry (Community Dentistry) of
Muhimbili University of Health and Allied Sciences**

Muhimbili University of Health and Allied Sciences

November, 2011

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled *Prevalence, perceived factors and knowledge on effects of tobacco use on oral health among secondary school students in Dar es Salaam*, in (Partial) fulfillment of the requirements for the degree of Master of Dentistry (Community Dentistry) of Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, Msafiri Nicodemus Kabulwa, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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Date.....

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ABSTRACT

Background: At the time of the conception of this study there was scant information on self reported prevalence, knowledge on detrimental effects on oral health and factors influencing tobacco use among secondary school students in Dar es Salaam region.

Objectives: To determine the prevalence, perceived factors that may lead and /or deter secondary school students to use tobacco and knowledge on effects of tobacco use on oral health among secondary school students in Dar es Salaam.

Materials and methods: This was a descriptive cross-sectional study conducted among ordinary level secondary schools in Dar es Salaam. A sample of 1084 students from 9 schools was selected using stratified random sampling procedure. Selected students were requested to fill in a Swahili version questionnaire that had questions on prevalence of tobacco dipping, chewing and smoking; knowledge on detrimental effects of tobacco dipping, chewing and smoking and factors that may influence students to start tobacco dipping, chewing or smoking. Data analysis was done using SPSS version 13 and Chi-square test was used to test associations between independent and dependent variables. The level of statistical significance was set at $p < 0.05$.

Results: One thousand sixty seven out of 1084 students handed in the filled questionnaire to the researcher, constituting a response rate of 98.4%. The proportion of students reported to have ever dipped tobacco snuff, chewed tobacco and smoked cigarettes at their school was 2.2%, 4.4% and 4.4% respectively. Majority of students (70.6%, 70.8%, and 71.2%) were respectively fully knowledgeable on relationship between dipping tobacco snuff, chewing tobacco and smoking cigarettes and occurrence of oral cancer. Students who were respectively fully knowledgeable on relationship between dipping tobacco snuff, chewing tobacco and smoking cigarettes and occurrence of periodontal diseases were 71.6%, 69.3%, and 67.0%.

The proportion of students who reported that their parents and school teachers would not be concerned if they would use tobacco was 13.7% and 12.6%. '*Influence of friends*', '*Trying or experimenting taste of tobacco*' and '*Not knowing detrimental health effects of using tobacco*' were perceived as factors that may influence a person to start dipping tobacco snuff, chewing tobacco and smoking cigarettes. '*Knowing detrimental health effects caused by use of tobacco*', '*Good guidance from parents and guardians*' and '*Religious teachings*' were perceived as

factors that may inhibit a person to start dipping tobacco snuff, chewing tobacco and smoking cigarettes.

Conclusions: The prevalence of tobacco dipping (2.2%), chewing (4.4%) and smoking (4.4%) among secondary school students in Dar es Salaam appear to be low. Majority of students who participated in this study had adequate level of knowledge on the detrimental effects of tobacco use on systemic and oral health. Factors that were perceived by majority of students as important in promoting students to start dipping tobacco snuff, chewing tobacco and smoking cigarettes were: *‘Not knowing detrimental health effects caused by using tobacco’*, *‘Trying or experimenting taste of tobacco’* and *‘Influence of friends’*. Factors that were perceived by majority of students as inhibitors for students to start dipping, chewing and smoking tobacco were: *“Knowing detrimental health effects caused by tobacco use”*, *“Good guidance from parents and guardians”*, *“Religious teachings”* and *“Living in a society that dislikes tobacco use”*

Recommendations: Although the prevalence of tobacco use appears to be low there is need for intervention among secondary school students so as to prevent possible continued trend of tobacco use. There should be a call for religious leaders, parents, school teachers to be involved in discouraging use of tobacco among secondary school students. Parents/guardians and other family members should not ask children light, buy cigarettes for them or smoke in front of them. Health education should be taught to raise awareness on detrimental effects of tobacco use among secondary school students.

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1. INTRODUCTION

Tobacco can be used in various forms; it can be smoked, chewed, sniffed or dipped. In whichever the form it is used, tobacco releases nicotine which is a stimulant that increases activity in the brain just like caffeine, cocaine and amphetamine (Jarvis 2004, Jha et al 2006). The stimulant effect of nicotine to the brain creates the desire for a person to continue using tobacco until one becomes addicted therefore being exposed to harmful effects of other chemicals present in tobacco (Jarvis 2004, Dennis et al 2005, Jha et al 2006, Jiloha 2010). Unfortunately, in addition to nicotine other antigenic, cytotoxic, mutagenic and carcinogenic chemicals that are harmful to oral and general health are also released (Behr and Nowak 2002). The release of these harmful chemicals from tobacco may explain why tobacco use has been strongly associated with oral cancer (Johnson and Bain 2000, Reibel 2003, WHO 2003a), increased susceptibility to periodontal diseases (Borrell and Papapanou 2005, Do et al 2008), reduced response to periodontal therapies (Tonetti et al 1995) and increased risk of dental implant failure (Bain and Moy 1993). Other adverse effects of tobacco use on oral health include tooth staining and halitosis (Johnson and Bain 2000). On general health, tobacco use especially tobacco smoking has been associated with occurrence of lung cancer and cardiovascular diseases (van der Vliet and Cross 2000, Shamma 2007).

In Tanzania oral cancer is a public health problem because most of the cases diagnosed with oral cancers come to hospital at late stages of the tumors when the lesion has exceeded the size that can be treated by conservative surgical approach. Consequent to late diagnosis majority of the cases are treated by radical surgical intervention or palliative care which causes extensive disfigurement leading to poor quality of life (Cubey 1974, Dandapat et al 1992). In addition globally, the post operative survival life span of cases with lesions greater than 2cm in diameter is short, in most cases not exceeding five years from the disease onset (Hindle and Nally 1991). Therefore, majority of oral cancer patients who report late are likely to die within five years after surgical/medical intervention. In cases where patients report at very late stage of the disease only palliative radiotherapy is given as part of terminal care. There is a need to institute appropriate intervention to reduce the occurrence of oral cancer in Tanzania. Likewise

periodontal diseases are widespread in Tanzania and have been associated with smoking (Mumghamba et al 1995, Tomar and Asma 2000, Borrell and Papapanou 2005, Do et al 2008).

Tobacco use is on increase in developing and middle income countries (Behr and Nowak 2002, Jha et al 2006). In Tanzania tobacco is grown as a commercial crop by small farmers in six regions. There are two fresh tobacco leaf processing factories and one cigarette manufacturing company. The locally manufactured cigarettes are sold within the country and some is exported. Tobacco products are also imported for local market. This makes tobacco products easily available in Tanzania and more people may be attracted to use it. Therefore there is a need to take measures to control such trend of tobacco use among its people. This would reduce the burden on health budget to the management of non communicable diseases like oral and lung cancer that are likely to rise as a consequence of the rise in tobacco use.

To justify for an intervention program against tobacco use, a thorough assessment of the magnitude of tobacco use and its associated factors is essential. Since tobacco use is a habit that has been shown to start at young age (WHO 1998, Watt and Daly 2003, da Silva et al 2006, Kwamanga et al 2003), it is therefore important to ascertain the magnitude of tobacco use and its associated factors and institute appropriate intervention at this young age.

The importance of instituting an intervention at this age is three folds. First, it would help those who had not initiated using tobacco to remain non users. Secondly, for those who have started using tobacco would stop the habit before being heavily addicted. Thirdly, those who would quit tobacco use early will have less chance of developing oral cancer and periodontal diseases because studies have shown that the adverse effects of tobacco use on health are dependent on the quantity (amount) consumed and duration of using tobacco products (Weintraub and Burt 1987, Winn 2001, Calsina et al 2002).

2. LITERATURE REVIEW

2.1: Global perspectives of tobacco use

Prevalence of different forms of tobacco use

Jha and colleagues analyzed sex-specific smoking prevalence data from studies conducted in 139 countries worldwide. Results showed that 20% of adolescents aged 15 -19 years old were current tobacco smokers in year 2000 (Jha et al 2002) while Nitcher et al (1997) reported a prevalence of 30% among girls in the United States, in Russia the prevalence was 55.5% and 26.9% among males and females respectively (Stickley and Carson 2009). The prevalence of lifetime smoking cigarettes and tobacco chewing among young adults in France was 65.9% and 11% respectively (Slama et al 2009). El-Roueiheb et al (2008) reported a prevalence of those who ever smoked to be 37.8% and current smokers to be 11.4% among high school students in Lebanon.

A study on use of smokeless tobacco (dipping tobacco snuff/chewing tobacco) conducted in Manipur India among the 13-15 years old reported a prevalence of 10.6% in 2001 (WHO/TFI 2003). Among individuals aged more than fifteen years old rural residents in India the prevalence of using smokeless tobacco were 17.5% (Daniel et al 2008). The reported prevalence of tobacco chewing among students in United States and India was 39% and 32.9% respectively (Salehi and Elder 1995, Joshi et al 2010). In Bangladesh the prevalence of tobacco chewing among adults was reported to be 20.6% (Flora et al 2009).

Knowledge on adverse effects of tobacco use on general health

Several researchers have reported different levels of knowledge on adverse effects of tobacco use on general health which ranged from 46.5% to 98.2% for lung cancer and 49.3% to 94% for heart diseases (Terrades et al 2009, Siahpush et al 2006, Rikard-Bell et al 2003, Jensen and Overgaard 1993). In their study among dental patients who attended 27 dental practices in Northern Ireland, Terrades and colleagues assessed the awareness of patients about the consequences of smoking on their general and oral health. The results indicated high knowledge on smoking as cause of lung cancer (98.2%) and heart diseases (92.3%). Similar results were reported by Siahpush et al (2006) whereby the proportion of respondents who were

knowledgeable that tobacco smoking could cause lung cancer and heart diseases were 85.8% and 94.4% for United States, 90.9% and 94.8% for Canada, 89.6% and 93.7% for United Kingdom and 88.6% and 94.3% for Australia respectively. Similar survey was conducted by Rikard-Bell et al (2003) in Central Sydney Area Health Service Australia among 1160 participants to assess patient's knowledge on conditions caused by cigarette smoking. The findings showed that majority of respondents correctly indicated that smoking was a risk factor for the development of lung cancer (91.0%) and heart disease (94.0%). Lower levels of knowledge on cigarette smoking as a risk factor of lung cancer (46.5%) and heart diseases (49.3%) respectively were reported among 14-17 years old school pupils in Denmark (Jensen and Overgaard 1993).

Knowledge on adverse effects of tobacco use on oral health

Different proportions of respondents have been reported to be knowledgeable on the cigarette smoking as cause of oral cancer and periodontal diseases. Studies conducted among adults in United Kingdom, showed high proportion of participants being knowledgeable on smoking as a cause of oral cancers. The reported proportion were 76% (Warnakulasuriya et al 1999), 84.7% (West et al 2006) and 85.5% (Terrades et al 2009). Elango and colleagues 2009 evaluated the awareness of oral cancer, its risk factors and estimated the prevalence of risk factors in a high-risk semi-urban population in India aged 10 years old or more. Results showed a satisfactory proportion of participants (77.0%) who correctly identified the positive association between tobacco smoking and occurrence of oral cancer. Similarly studies conducted in Australia and Kuwait among adult dental patients indicated that 74% and 62.6% respectively were knowledgeable on cigarette smoking as a cause of oral cancer (Rikard-Bell et 2003, Al – Shammari et al 2006).

Generally, high levels of knowledge on the link between smoking and periodontal disease have been reported among periodontal patients in United Kingdom (80.4%) (Terrades et al 2009) and in Kuwait (76.2%) (Al-Shammari et al 2006). Only Lungs and colleagues reported a very low proportion of respondents (6.0%) among 1071 periodontal patients attending GKT Dental

Institute, King's College, London, United Kingdom for dental treatment who knew that cigarette smoking may cause periodontal diseases (Lung et al 2005).

Backinger et al (1993) assessed knowledge, intent to use, and use of smokeless tobacco among sixth grade schoolchildren in six selected sites in United States. The results indicated that majority of all sixth grade students surveyed (92.8%) were aware of the health risks of smokeless tobacco use. The most perceived risk was increased risk for oral cancer. A self-administered questionnaire to assess awareness about oral cancer and precancerous lesions was used to collect information from 410 randomly selected outpatients attending for dental treatment at a University Dental hospital in Sri Lanka in 2005. The results indicated that 80.7% of patients were knowledgeable about the causal relationship between betel chewing habit and oral cancer (Ariyawardana and Vithanaarachchi, 2005). Similar findings have been reported by Elango et al (2009) among cancer high-risk semi-urban population in India. Results showed that majority (79%) of the respondents were knowledgeable on relationship between pan chewing and occurrence of oral cancer.

Impacts of knowledge on adverse effects of tobacco use on tobacco use initiation

A systematic review of 11 original papers was done to evaluate programs designed to prevent adolescent smoking in South Korea and it was reported that knowledge on smoking delivered through classroom setting had significant effects in preventing adolescents to smoke tobacco (Park 2006). An intervention study by Lee et al (2007) was done among Taiwanese high school adolescents to assess the impact of classroom based smoking prevention curriculum and school wide no smoking strategy on tobacco smoking behaviour. It was found that those exposed to both combined methods had significantly higher knowledge on harmful effects of tobacco on health; had no intention to smoke and their attitude to resist smoking was significantly superior compared to those exposed to only school wide no smoking strategy and the control group. Sreeramareddy et al (2008) in their study among college students in Nepal found that students who had knowledge on the harm effects of tobacco use to their health it protected them from them from starting using it.

Factors which influence cigarette smoking

There are several factors that have been pointed out to influence adolescents to smoke cigarettes when they are in a certain specific age. Parental and school teacher smoking status has been shown to influence smoking initiation in young adolescents (Headen et al 1991, Christophi et al 2006, Sreeramareddy et al 2008, O'Loughlin et al 2009). Older adolescents are likely to be influenced to become smokers by close friends who are smokers (Covey and Tam 1990, Headen et al 1991, Ali and Dwyer 2007, Sreeramareddy et al 2008, Christophi et al 2009, O'Loughlin et al 2009), peer pressure (Headen et al 1991, Yang et al 2003, Christophi et al 2006) and seeing cigarette advertisements (O'Loughlin et al 2009).

Several studies have documented factors that influence tobacco smoking across all age groups. These include being male (Headen et al 1991, Sreeramareddy et al 2008, Stickley and Carlson 2009) and having pocket money (Christophi et al 2006, Sreeramareddy et al 2008). Other factors include purchasing tobacco products for family members (Sreeramareddy et al 2008), having stress, lower self esteem, low level of school performance (O'Loughlin et al 2009), owning an item with cigarette logo (Christophi et al 2006), having sibling who are smokers (Sreeramareddy et al 2008, O'Loughlin et al 2009) and adolescents' rebelliousness attitude (Headen et al 1991).

Factors which influence use of smokeless tobacco (dipping tobacco snuff/ chewing tobacco)

A cross sectional study was carried out in three medical colleges of Pakistan – one from the north and two from the southern region to assess factors associated with lifetime use of smokeless tobacco among 1025 students. The reported factors were being male, being a boarding student, being a cigarette smoker and the location of the college (Imam et al 2007). Likewise studies done among young adults in United States and France indicated that parents, siblings, or other relatives who smoke cigarettes or use other forms of tobacco (Roberta and Dexter 1988) and having a smoking friend (Hall and Dexter 1988, Slama et al 2009) are associated with use of smokeless tobacco.

2.2: Tobacco use in Africa

Prevalence of different forms of tobacco use

The reported prevalence of tobacco smoking in Sub Saharan African adolescents range from 1% - 29% in males and 1.0% - 20% in females (WHO/TFI 2003, Ogwell 2003, Peltzer 2003, Rudatsikira et al 2007, Muula et al 2008, WHO 2008). Among 15 years old or more the reported prevalence range from 8.0% -27.3% (Pampel 2008). Tobacco chewing and tobacco snuff dipping has been studied by some researchers under a group of smokeless tobacco which gave difficulties in reporting prevalence of each tobacco product separately.

Results from studies done in several African countries indicated that prevalence of using smokeless tobacco among adolescents ranged from 3.9% to 18% (WHO/TFI 2003, Ogwell et al 2003, Peltzer 2003, Rudatsikira et al 2010). In South Africa, 16.1% of 4464 black South African women aged 25 years or more old who participated in the 1998 South African Demographic and Health Survey were current snuff users (Ayo-Yusuf et al 2008).

Knowledge on adverse effects of tobacco use on general health

The reported level of knowledge on the adverse effects caused by passive smoking among adolescents in several countries in Africa ranged from 31% in Zimbabwe to 83.1% in Malawi (WHO/TFI 2002). Also Mpabulungi and Muula (2006) reported that 57.6% of Ugandan adolescents thought that being exposed environmental tobacco smoke was harmful to their health. However, no study was retrieved on level of knowledge on the adverse effects of cigarette smoking as cause of systemic diseases like heart and lung diseases.

Knowledge on adverse effects of tobacco use on oral health

There are few published studies on knowledge on effects of tobacco use on oral health. A study by Nwhator et al (2010) assessed level of awareness of a link between smoking and periodontal diseases among 992 adults (patients and their escorts) attending dental clinics located in four teaching hospitals in southwestern Nigeria. The study found an extremely low proportion of Nigerians (2.2%) who were aware on the link between smoking and periodontal disease.

Impacts of knowledge on health effects of tobacco and initiation of tobacco use

In Alexandria, Egypt a cross-sectional survey was conducted among 1930 students in grades 7, 9 and 12 to determine the influence of known psychosocial smoking risk factors on adolescents' cigarette smoking behavior. The findings indicated that having knowledge on negative consequences of cigarette smoking was protective against susceptibility to cigarette smoking among female Egyptians adolescents but not among males (Islam and Johnson 2005). Similar findings have been reported in Ethiopia, Malawi and Nigeria where subjects who had knowledge on the effects of tobacco use were less likely to be tobacco users (Rudatsikira et al 2007, Muula et al 2008, Osungbade and Oshimane 2008). This might be explained by the fact that knowledge on effects of tobacco use gives the recipient of it awareness about the risks of mortality and disease caused by tobacco use consequently prevents to use it.

Factors which influence cigarette smoking

Various researchers have reported different factors that influence adolescents to use tobacco in various parts of Africa. Factors that influence smoking initiation in young adolescents include parents' and teachers smoking status (Kwamanga et al 2003, Islam and Johnson 2005, Rudatsikira et al 2007, Osungbade and Oshimane 2008). Older adolescents are likely to be influenced and to become smokers if they have close friends who are or having relationship with smokers (Siziya et al 2007b, Rudatsikira et al 2007, Muula et al 2008, Odeyemi et al 2009), peer pressure (Kwamanga et al 2003, Islam and Johnson 2005) and seeing cigarette advertisements (Kwamanga et al 2003, Siziya et al 2007a, Siziya et al 2007b, Muula 2007, Osungbade and Oshimane 2008).

Factors that have not been clearly shown to be age specific include being an urban resident (Ogwell et al 2003), being male (Ogwell et al 2003, Rudatsikira et al 2007, Muula 2007), having pocket money (Muula et al 2008) and seeing actors or models on television, videos and movies (Odeyemi et al 2009), individual perception on smoking habit and practice (Siziya et al 2007b, Muula et al 2008) and high levels of positive beliefs about smoking and adult smoking norms (Islam and Johnson 2005).

Factors which influence use of smokeless tobacco (dipping tobacco snuff/ chewing tobacco)

Rudatsikira et al 2010 used data from the Republic of Congo Global Youth Tobacco Survey (GYTS) of 2006 to assess factors which are associated with use of smokeless tobacco among 3034 respondents. Factors reported to be associated with use of smokeless tobacco were having parents or friends who are cigarette smokers, tobacco advertisements (newspapers, billboards and television) and perception that smoking was harmful was negatively associated with use of it.

2.3: Tobacco use in Tanzania

Prevalence of different forms of tobacco use

In Tanzania, the literature review indicate that most of the studies conducted on tobacco use were on prevalence of smoking (Kaaya et al 1992, Jagoe et al 2003, Mnyika et al 2006, Kaduri et al 2008, Siziya 2007a, Masalu et al 2008, WHO 2008). Few studies have investigated on prevalence of oral snuff (Mnyika 2006, Kaduri 2008) and none on chewing tobacco. The reported prevalence for tobacco smoking ranged from 1.0%-8.7% among adolescents (Kaaya et al 1992, Kaduri et al 2008, Siziya et al. 2007a, WHO 2008) and 5% -27% among adults (Jagoe et al 2003, Masalu et al 2008, Pampel 2008). The prevalence of smokeless tobacco use was 3.6% among adolescents in Ilala district (Kaduri et al 2008) and Mnyika et al (2006) reported a prevalence of 1.9% for tobacco snuff among individuals aged 15-36 years in Moshi rural district in Kilimanjaro region.

So far, studies done in Dar es Salaam on the prevalence of tobacco use was done in Ilala district only. There was therefore a need to conduct another study on prevalence of smoking that would involve all the three districts in Dar es Salaam. The current study also determined the prevalence of dipping snuff and chewing tobacco because the existing literature has no such information.

Knowledge on health effects of tobacco use

Studies retrieved on knowledge of the health effects of tobacco use was on tobacco smoking and none was on use of oral snuff and chewing tobacco (Kaaya et al 1992). Kaaya et al (1992) investigated knowledge on effects of tobacco smoking among adolescents in Dar es Salaam.

The findings indicated that 43.1% of secondary school students were knowledgeable on the adverse effects of nicotine present in tobacco to subjects who use it. There is no study so far that has reported the level of knowledge on effects of tobacco smoking, dipping and or chewing tobacco on oral health. Therefore there was need to investigate and to establish the current adolescents' level of awareness on effects of tobacco use on oral health. Results from this study will be used to establish if there is need to increase awareness on matters related to effects of tobacco use to health and in particular oral health.

Factors which influence tobacco use

Factors influencing tobacco use so far documented in Tanzania were those reported by Siziya et al (2007a) in their study among 2323 adolescents in Moshi Kilimanjaro. The factors were having more pocket money, closest friend smoked cigarettes, seeing actors smoke on television, videos or movies and seeing advertisements for cigarettes. There was no information on factors influencing adolescents to use tobacco in Dar es Salaam region thus there was need to study them as environment, socio economic and demographic factors has been shown to influence tobacco use habit. Studying factors influencing adolescents to use tobacco would help to reveal what drives them to consume tobacco and henceforth this information could be used to find out suitable and appropriate preventive measures that could be applied in this age stratum by targeting the strongest influencing factors.

3. PROBLEM STATEMENT

There is sufficient evidence that tobacco use, in its different forms, is a risk factor for chronic illnesses such as cardiovascular, respiratory and periodontal diseases; and for cancers of oral cavity, upper respiratory tract, and other parts of the body. Interventions against tobacco use need to be instituted in order to reduce the number of smokers in Tanzania and therefore the risk of chronic diseases. To justify for any intervention on tobacco use, one needs to determine the magnitude of tobacco use in a given society. In addition, factors that facilitate people to use tobacco and those that may deter them from tobacco use need to be identified. At the time of planning the current study, there was insufficient information on use of different forms of tobacco among secondary school students in Dar es Salaam. The extent on the level of knowledge of the health effects of tobacco use was also lacking. Similarly, factors that may influence secondary school students to start using tobacco had not been adequately investigated in Tanzania. Therefore the study was designed based on the summary of the possible interactions shown in conceptual framework shown in figure 1.

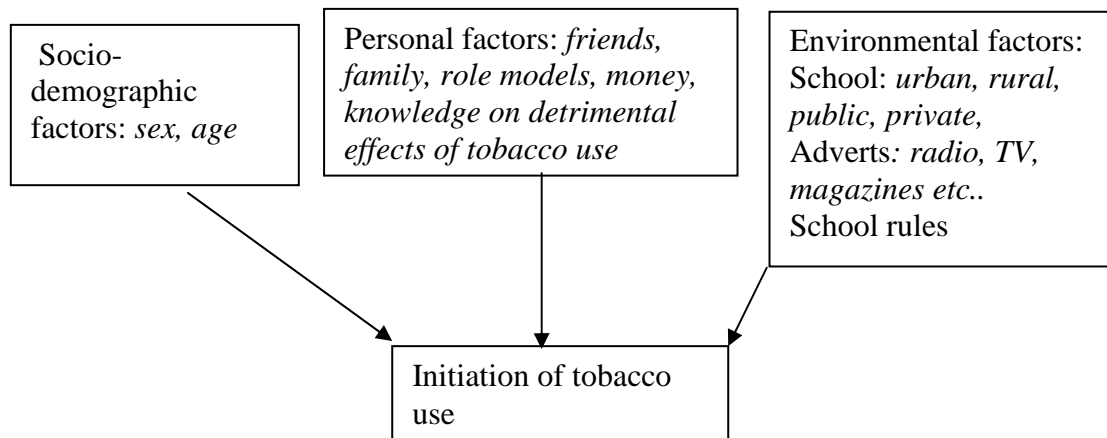
4. RATIONALE OF THE STUDY

The information on prevalence of self reported tobacco use among secondary school students in Dar es Salaam gives the magnitude of this habit in this segment of the population. This information is useful to decision makers in health because it can assist them to decide as to whether tobacco use among secondary school students in Dar es Salaam is a health problem or not. Similarly, the information on perceived factors that may lead and or deter secondary school students to use tobacco will help to plan an effective intervention program against tobacco use. The gathered information by the current study adds to the data bank on issues related to tobacco use in Tanzania and the world at large, which is in line with the call made by WHO in 2003 of gathering information on tobacco use.

5. CONCEPTUAL FRAMEWORK

Figure 1 depicts the conceptual framework guiding this dissertation work. This framework is derived from psychosocial factors predicting use of tobacco among adolescents and it was adopted from Tyas and Pederson (1998). According to this framework socio demographic, personal and environmental factors influences secondary school students to initiate the habit of using tobacco.

Figure 1: Conceptual framework



6. OBJECTIVES

6.1. Broad objective:

To determine the prevalence, perceived factors that may lead and or deter secondary school students to use tobacco and knowledge on effects of tobacco use on oral health among secondary school students in Dar es Salaam

6.2. Specific objectives:

1. To determine prevalence of tobacco use among secondary school students in Dar es Salaam
2. To determine the level of knowledge on effects of tobacco use on health among secondary school students in Dar es Salaam.
3. To determine perceived factors influencing tobacco use among secondary school students in Dar es Salaam

7. METHODOLOGY

7.1. Study area

The study was conducted in Dar es Salaam region, the largest commercial, industrial city and harbour of the United Republic of Tanzania. The city is cosmopolitan and culturally heterogeneous, with a mixture of culture and norms from about 120 tribes of Tanzania as well as Asian and European cultures. The heterogeneous culture in Dar es Salaam poses challenges in shaping the behaviour and habits of youths. Administratively, Dar es Salaam region is divided into three municipalities namely Temeke, Ilala and Kinondoni. The three municipalities are geographically located in such a way that each municipality radiates from the city centre to the outmost outskirts of the city. This may present variation in exposure to environmental factors that influence acquisition of adverse habits like tobacco use.

7.2. Study design

Cross-sectional descriptive study

7.3. Study population

Ordinary level secondary school students in Dar es Salaam region

7.4. Sample size determination

The sample size of 542 was calculated using the formula $n = z^2 p (1-p) / \epsilon^2$ for determining sample size for estimating prevalence of diseases and conditions in populations; whereby, n = sample size; z = standardized deviation ($z = 1.96$) for 95% confidence interval; p = proportion of adolescent smokers in Tanzania ($p = 6.0\%$) (*Kaduri et al 2008*); ϵ = marginal error = 0.02. To take care of the dilution effect of stratification during sampling procedure, a decision was made to double the calculated sample size to 1084.

7.5 Sampling procedure

By May 2010, there were 157,764 ordinary level secondary school students in Dar es Salaam region distributed in 260 schools. Since habits formation are likely to be influenced by location of school (city centre/outskirts); type of school (public/private), and size of school it was decided to stratify the sample by location of the school; and type of school, while employing proportionate sampling based on the number of schools in each strata. The size of schools varied from 90 to 2000 students per school. To take care of the possible influence of school size on habits formation, only medium size secondary schools with 500-1000 students were included in the sampling frame as shown in Table 1. The total number of medium size secondary schools was 73: - 27 schools from city centre and 46 schools from outskirts.

To ensure representation of students from city centre and outskirts schools, the ratio of schools in city centre to those in outskirts was used to calculate the number of subjects to be included from city centre and outskirts schools. This resulted into 392 students from city centre schools and 682 students from outskirts schools. These numbers of students were subsequently divided into public and private schools proportionately for city centre and outskirt schools. For city centre 27 schools composed of 20 public and 7 private schools with 291 and 101 students respectively were sampled. For outskirts 46 schools composed of 33 public and 13 private schools with 487 and 195 students respectively were sampled.

To ensure participation of as many schools as possible, it was decided that no more than 150 students should be from one school. With this condition, two public and one private school were randomly sampled from the city centre schools. Likewise, four public and 2 private schools were randomly sampled from outskirts schools. At school level, an equal number of participants by equal gender were randomly selected using random table numbers from each of form 1-3 students' alphabetic list. All selected students gathered in a prepared classroom to fill the self administered questionnaire. After collecting the filled questionnaires, it was followed by a half hour session of oral health education which included the different types of tobacco used and oral diseases caused by its use. The aim of the health education given was to raise students' awareness on harmful effects caused by tobacco use. Form four students were not included in the sampling list because they were involved in preparations of their final ordinary

level secondary examinations. It was perceived that students who are in preparation of examinations may not concentrate in filling questionnaires, therefore could compromise the quality of data. Schools involved in the study from city centre were (Kidete, Kisarawe II and Ridhwaa seminary) and from outskirts were (Bunju A, Kamene, Kitunda, Tabata, Ugombolwa and Ulongoni). The sampling procedure was as shown in figure 2 below.

Table 1 Distribution of 73 medium size secondary schools by location (city centre-outskirts) and type (public-private).

	School		
	Public	Private	Total
Location	N	n	n
City centre	20	7	27
Outskirts	33	13	46
Total	53	20	73

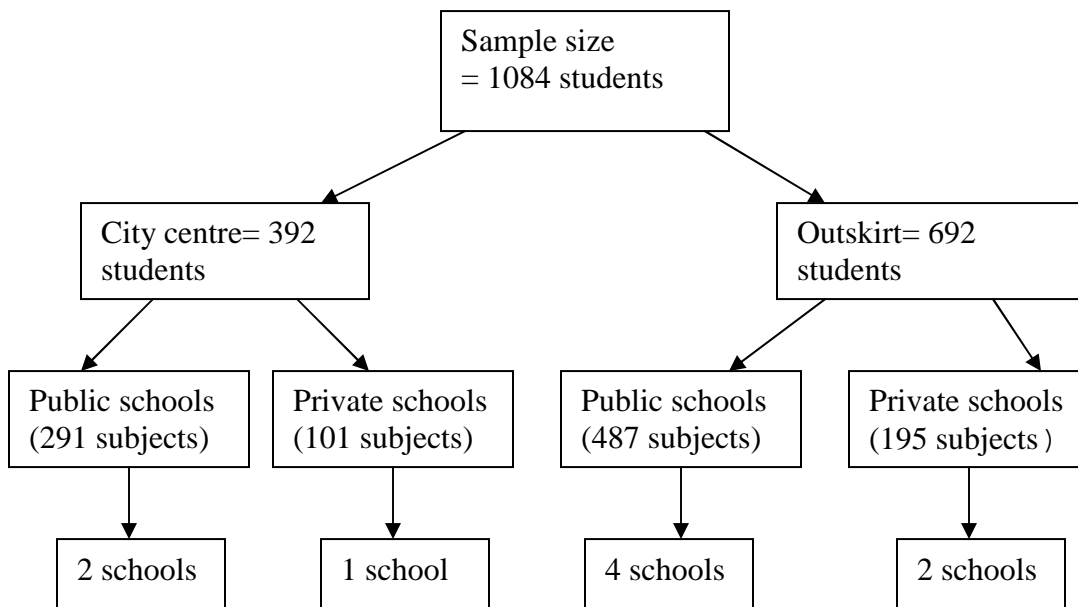


Figure 2: Sampling frame

7.6. Inclusion criteria

Form one to three secondary students enrolled in a medium size secondary school registered with Municipal Secondary Education Offices in Temeke, Ilala and Kinondoni districts

7.7. Exclusion criteria

Being a form IV student and /or illness hindered proper filling of questionnaire

7.8. Ethical consideration

Permission to conduct this research was provided by Muhimbili University ethical committee. Ref.No.MU/PGS/SAEV/Vol. IV/263. Permission to conduct the study in the secondary schools students was obtained from each Municipal secondary education officer and head of schools. Oral informed consents were obtained from the students. Students were requested to respond to questionnaires on tobacco use and other related items. Information recorded in the questionnaire was used only for the purpose of study and not otherwise. After filling the questionnaire, the study participants had an opportunity to have a one hour health education session on detrimental effects caused by tobacco use on oral health in a classroom setting.

7.9. Questionnaire development

The questionnaire development was done in two stages. Firstly 30 students (15 boys, 15 girls) were asked to list ten (10) factors (issues) that may attract them to start using tobacco, and 10 factors (issues) that may inhibit them from starting using tobacco. Their responses were tallied into 12 factors that may attract and 9 factors that may inhibit them from using tobacco (see appendix).

Using these factors a closed ended questionnaire was constructed to enable respondents to rate to which extent they thought that individual factors really could attract or inhibit them from starting smoking by choosing one option from four options that ranged from ‘strongly disagree’ to ‘strongly agree’. Respondents were also asked 6 questions on whether they had ever heard or

seen a student chewing or snuffing other forms of tobacco. The questionnaire was then administered to 60 students (30 boys, 30 girls).

After analysis, all those factors which were rated by 50% or more respondents as having an influence on starting using tobacco were picked for the construction of the final questionnaire. Therefore the final questionnaire included use of other forms of tobacco. The final questionnaire consisted of 52 questions (6 for demographic variables, 15 for prevalence of tobacco use, 19 for knowledge of detrimental effects of tobacco use and 12 for factors influencing tobacco use).

7.10. Data management and analysis

7.10.1. Data entry

All questionnaires returned by students were marked and coded. Data was entered into the computer using SPSS software version 13. After checking for accuracy (data cleaning), the data were analyzed by a statistician.

7.10.2. Statistical analysis

7.10.2.1: Constructing variables and coding for analysis

The independent variables studied were location of school, sex, type of school and year of study. The location of school was dichotomized as city centre and outskirt; sex into boys and girls; type of school into public and private. Year of study was coded as 1 (form 1), 2 (form 2) and 3 (form 3). These independent variables were coded as follows; location of school (0 = city centre, 1 = outskirt), sex (0 = boys, 1 = girls), type of school (0 = public, 1 = private), year of study (0 = form 1, 1 = form 2, 2 = form 3).

Prevalence of tobacco use was measured for the three types of tobacco use: dipping, chewing and smoking. For each type of tobacco use the prevalence was determined at three levels: ever heard, ever seen and ever used. The responses were coded as 0 = yes and 1 = no or never. Therefore prevalence of tobacco use was assessed by asking a student if had ever heard and

seen a student at their school either dipping tobacco snuff, chewing tobacco or smoking cigarettes. The response for each question was i) yes and ii) no. The actual practice of either dipping, chewing or smoking was assessed by a statement '*Which description fits you best on tobacco dipping, tobacco chewing and cigarette smoking?*' The response category for each question ranged from i). I have never dipped tobacco, chewed tobacco or smoked cigarettes to v) I dip, chew or smoke everyday. The responses were later dichotomized into never dipped, chewed or smoked and ever dipped, chewed and smoked.

Knowledge on effects caused by cigarette smoking on general health was assessed by asking 'Smokers are more likely to develop various diseases like lung cancer and hypertension than non smokers'. The response was i) true and ii) false. Level of knowledge on effects of tobacco use on oral health was measured for the three types of tobacco use: dipping, chewing and smoking. For each type of tobacco use, the knowledge on effects caused by tobacco use on oral health was determined for: 1) oral cancer; 2) periodontal diseases. Knowledge on tobacco dipping as a cause of oral cancer /periodontal disease was assessed by summing the scores for the responses to the following three question statements '*people who dip tobacco snuff are more likely to develop oral cancer /periodontal disease than non tobacco snuff users*', '*Chain (heavy) users of tobacco snuff in the oral cavity are more likely to develop oral cancer /periodontal diseases than sporadic (light) users of tobacco snuff*' and '*A person who has dipped tobacco snuff for many years is more likely to develop oral cancer/periodontal diseases than a person who dipped for a short duration*'. A score of two points was assigned to correct response of each of the first two question statements and five points to correct response of the third question statement. This gave a maximum score of 9 points that denotes excellent knowledge and a minimum score of zero denoting complete lack of knowledge. A respondent was regarded fully knowledgeable if scored 6.75 - 9.0 points, moderately knowledgeable if scored 4.50 - 6.74 points and not knowledgeable if scored less than 4.5 points. The same question statements, computation of scores and grading of respondent's knowledge was done for tobacco chewing and smoking respectively.

Social inclination towards tobacco use was assessed for tobacco dipping, chewing and smoking. Members of society considered were parents and school teachers. Three questions

were used to assess respondent's perception on how their parents would react if they discovered that they dip, chew or smoke tobacco. The responses for the questions were on a four points Likert scale ranging from 1= strongly disagree to 4= strongly agree. Respondents were required to indicate one option that best described their perception. The scores for the three questions were added to obtain a total score of respondent's perception on how his/her parent would feel if they discovered he/she dipping, chewing or smoking tobacco. A respondent could score a maximum score of 12 points indicating that their parents would be highly disappointed and a minimum score of 3 points indicating that parents would not bother at all. The total score of respondent's perception was divided by three to obtain the average score (reduced interval scale) indicating respondent's perception on how their parents would react if they discovered that they either dip, chew or smoke tobacco i.e. (minimum value = 1 and maximum value = 4). The reduced interval scale was dichotomized into two categories; parents who favours use of tobacco (1.0 – 2.49) and those who do not approve adolescents to use it respectively (2.50 – 4.0). The same question statements, computation and dichotomization were done for school teacher's inclinations towards dipping, chewing or smoking tobacco by their students.

The seven perceived factors influencing a person to start dipping snuff were assessed by a question statement '*To what degree do you agree that the following factors attract a person to start dipping tobacco snuff?*' The responses were given on a 4 points Likert scale ranging from 1= strongly disagree to 4= strongly agree. Frequency distribution and descriptive statistics were ran to obtain the mean agreement score and the percentage score of each option; strongly disagree - strongly agree for each perceived factor influencing dipping tobacco snuff. These perceived factors were sorted and arranged in descending order of their agreement mean score. The same question statements, factors, frequency distribution and sorting of perceived factors was done for tobacco chewing and smoking respectively.

The six perceived factors inhibiting a person to start dipping snuff, were assessed by a question statement '*To what degree do you think that the following factors may inhibit a person from dipping tobacco snuff?*' The responses were given on a 4 points Likert scale ranging from 1= extremely do not inhibit to 4= inhibits extremely. Frequency distribution and descriptive statistics were ran to obtain the mean agreement score and the percentage score of each option;

extremely do not inhibit – extremely do inhibit for each perceived factor inhibiting students to dip tobacco snuff. These perceived factors were sorted and arranged in descending order of their agreement mean score. The same question statements, factors, frequency distribution and sorting of perceived factors were done for tobacco chewing and smoking respectively.

7.10.2.2: Analysis

Cross tabulation between location of school and other independent variables sex, type of school and year of study were generated and chi-squared test was performed to identify the differences between respondents from city centre and outskirts. The analysis on the association between the independent variables and dependent variables was performed using cross tabulation. Binary logistic regression was not performed as no more than two variables were found to be statistically significant at binary level. Therefore only chi-squared test was performed.

8. RESULTS

A total of 1084 questionnaires were distributed to form 1-3 students from randomly sampled schools. The students filled in the questionnaires in a classroom in the presence of the researcher. One thousand sixty seven students handed in the filled questionnaire to the researcher. This constituted a response rate of 98.4%. The study participants were aged 13-26 years old with the mean age of 16 years.

Table1: Percent distribution of 1067 secondary school students by location of the school, sex, type of school and year of study

Location of school	Sex		Type of school		Year of study		
	Boys	Girls	Public	Private	Form 1	Form 2	Form 3
- City centre (n=361)	52.6	47.4	69.0	31.0	33.5	36.6	29.9
- Outskirt (n=706)	48.4	51.6	73.2	26.8	34.7	30.6	34.7
- Total (n=1067)	49.9	50.1	71.8	28.2	34.3	32.6	33.1
χ^2	1.677		2.135		4.362		
<i>p</i> -value	0.197		0.151		0.113		

The percent distribution of 1067 secondary school students who participated in the study by location of their schools, sex, type of school and their year of study is presented in Table 1. The distribution was similar with no statistically significance differences between all variables studied: χ^2 values ranging from 1.677- 4.362 with *p*-value of 0.113 to 0.197.

Table 2: Proportion of students who have ever heard or seen their fellow students dip and or whether they have ever dipped tobacco snuff by location, sex, type of school and year of study

	% students who have ever		
	Heard student dip ^β	Seen student dip ^ψ	Dipped [§]
Location			
City centre	3.7	3.7	3.6*
Outskirt	8.0**	3.4	1.4
Total	6.5	3.5	2.2
Sex			
Boys	9.0**	5.1**	3.2*
Girls	4.1	1.9	1.1
Total	6.5	3.5	2.2
Type of school			
Public	6.6	3.8	2.4
Private	6.4	2.7	1.7
Total	6.5	3.5	2.2
Year of study			
Form 1	3.6	2.5	2.8
Form 2	4.1	1.2	2.0
Form 3	12***	6.9***	1.7
Total	6.5	3.5	2.2

β: 1055 students responded to this question; ψ: 1056 students responded to this question;

§: 1056 students responded to this question

Chi- square test: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Table 2 shows the proportions of students who have ever heard or seen their fellow students dip and or whether they have ever dipped tobacco snuff by location, sex, type of school and year of study. Overall 6.5%, 3.5% and 2.2% of students reported to have heard, seen their fellow students and have ever dipped tobacco snuff at their schools respectively. Proportionately more students from outskirts schools (8.0%) reported to have heard that their fellow students dip tobacco snuff than 3.7% of students schooling in city centre schools ($p < 0.01$). Also 3.6% of students from city centre reported to have ever dipped compared to 1.4% of students from outskirts schools ($p < 0.05$). There was no statistical significant difference in the proportions of students who had seen their fellow student dip tobacco snuff in their schools between students schooling in city centre or outskirts ($p = 0.860$). Significantly higher proportion of male students reported to have heard, seen their fellow student dip and they have ever dipped tobacco snuff than girls ($p < 0.001$ for heard and seen and $p < 0.05$ for ever dipped).

There was no statistically significant difference in the proportions of students who had heard, seen their fellow student dip or who reported to have ever dipped tobacco snuff by type of schools (; $p = 0.1.0$ for heard, $p = 0.458$ for seen and $p = 0.641$ for ever dipped).

Significantly higher proportion of form 3 students reported to have heard (12.0%) and seen (6.9%) their fellow students dip tobacco snuff compared to form 1 and form 2 students who have heard (3.6%; 4.1%); or seen(2.5%; 1.2%) respectively ($p < 0.001$).

There was no statistically significant difference in the proportions of students between the different years of study who reported to have ever dipped tobacco snuff in their schools ($p = 0.617$).

Table 3: Proportion of students who have ever heard or seen their fellow students chew and or whether they have ever chewed tobacco by location, sex, type of school and year of study

	% students who have ever		
	Heard student chew ^β	Seen student chew ^ψ	Chewed [§]
Location			
City centre	3.9	2.8	4.5
Outskirt	4.1	2.0	4.4
Total	4.1	2.3	4.4
Sex			
Boys	5.5*	3.0	6.4**
Girls	2.6	1.5	2.5
Total	4.1	2.3	4.4
Type of school			
Public	4.6	2.5	4.3
Private	2.7	1.7	4.7
Total	4.1	2.3	4.4
Year of study			
Form 1	3.3	1.6	4.2
Form 2	2.0	1.2	5.0
Form 3	6.9**	4.0*	4.1
Total	4.1	2.3	4.4

β: 1058 students responded to this question; ψ: 1055 students responded to this question;

§: 1041 students responded to this question

Chi- square test: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Presented in Table 3 is the proportion of students who have ever heard or seen their fellow students chew and or whether they have ever chewed tobacco by location, sex, type of school and year of study. Overall 4.1%, 2.3% and 4.4% of students reported to have heard, seen their fellow students and had ever chewed tobacco at their school respectively. The proportion of boys reported to have heard and ever chewed tobacco was statistically significantly higher compared to girls ($p < 0.05$ for heard and $p < 0.01$ for ever chewed). There was no significant difference in the proportions of boys and girls who had seen their fellow students chew tobacco in their schools ($p = 0.102$).

Significantly higher proportion of form 3 students reported to have heard (6.9%) and seen (4.0%) their fellow students chew tobacco compared to students from form 1 (3.3%; 1.6%) and form 2 (2.0%; 1.2%) respectively ($p < 0.01$ for heard and $p < 0.05$ for seen). There was no statistically significant difference between proportions of form 1, 2 and 3 students who reported to have ever chewed tobacco in their schools ($p = 0.835$) or between schools located in city centre and outskirt who had heard, seen their fellow students chew or who reported to have ever chewed tobacco in their schools ($p = 1.0$ for heard, $p = 0.392$ for seen and $p = 0.875$ for ever chewed). Students in public and private schools showed no statistically significant difference in proportions of students who had heard, seen their fellow students chew or who reported to have ever chewed tobacco in their schools ($p = 0.169$ for heard, $p = 0.497$ for seen and $p = 0.868$ for ever chewed).

Table 4: Proportion of students who have ever heard or seen their fellow students smoke and or whether they have ever smoked cigarettes by location, sex, type of school and year of study

	% students who have ever		
	Heard student smoke ^β	Seen student smoke ^ψ	Smoked [§]
Location			
City centre	23.9	14.4	4.5
Outskirt	26.9	15.5	4.4
Total	25.9	15.1	4.4
Sex			
Boys	28.5*	18.3**	6.4**
Girls	23.2	11.9	2.5
Total	25.9	15.1	4.4
Type of school			
Public	29.9***	17.0**	4.3
Private	15.8	10.3	4.7
Total	25.9	15.1	4.4
Year of study			
Form 1	21.4	15.4	4.2
Form 2	25.6	15.2	5.0
Form 3	30.4**	14.6	4.1
Total	25.9	15.1	4.4

β: 1024 students responded to this question; ψ: 1034 students responded to this question;

§: 1041 students responded to this question

Chi- square test: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Table 4 shows the proportion of students who have ever heard or seen their fellow students smoke and or whether they have ever smoked cigarettes by location, sex, type of school and year of study. Overall 25.9%, 15.1% and 4.4% of students reported to have heard, seen their fellow students and have ever smoked cigarettes at their school respectively.

There was a higher proportion of boys compared to girls who reported to have heard, seen their fellow students smoke and they have ever smoked cigarettes ($p < 0.05$ for heard and $p < 0.01$ for seen and ever smoked) and there were more form 3 students who reported to have heard (30.4%) their fellow students smoke cigarettes compared to form 1 (21.4%) and form 2 (25.6%) students respectively ($p < 0.01$). There was no statistically significant difference in proportions of students who reported to have seen and have ever smoked cigarettes in their schools between form 1, 2 and 3 students ($p = 0.953$ for seen and $p = 0.835$ for ever smoked). Proportionately more students from public schools reported to have heard and seen their fellow students smoke cigarettes compared to students schooling in private schools ($p < 0.001$ for heard and $p < 0.01$ for seen). There was no statistically significant difference in proportions of students between public and private schools who reported to have ever smoked cigarettes in their schools ($p = 0.868$). There was no significant difference in proportions of students schooling in city centre and outskirts who have heard, seen their fellow student smoke or who reported to have ever smoked cigarettes in their schools between students ($p = 0.293$ for heard, $p = 0.717$ for seen and $p = 0.875$ for ever smoked).

Proportionately, 96.8% of the students were knowledgeable that cigarette smoking causes various diseases like lung cancer and hypertension.

Table 5: Proportions of students by level of knowledge on relationship between different forms of tobacco use and occurrence of oral cancer

Level of knowledge on tobacco use and occurrence of oral cancer	Different forms of tobacco use					
	Dipping		Chewing		Smoking	
	Number	(%)	Number	(%)	Number	(%)
Fully knowledgeable	713	(70.6)	708	(70.8)	711	(71.2)
Moderately knowledgeable	170	(16.8)	176	(17.6)	175	(17.5)
Not knowledgeable	127	(12.6)	116	(11.6)	112	(11.2)
Total	1010	(100.0)	1000	(100.0)	998	(100.0)

Proportion of students by their level of knowledge on relationship between tobacco use and occurrence of oral cancer is shown in Table 5. Majority of students (70.6%, 70.8%, and 71.2%) were fully knowledgeable on relationship between dipping tobacco snuff, chewing tobacco and smoking cigarettes and occurrence of oral cancer respectively.

Table 6: Proportions of students by knowledge on relationship between different forms of tobacco use and occurrence of periodontal diseases

Level of knowledge on tobacco use and occurrence of periodontal diseases	Different forms of tobacco use					
	Dipping		Chewing		Smoking	
	Number	(%)	Number	(%)	Number	(%)
Fully knowledgeable	726	(71.6)	693	(69.3)	672	(67.0)
Moderately knowledgeable	162	(16.0)	162	(16.2)	147	(14.7)
Not knowledgeable	126	(12.4)	145	(14.5)	183	(18.3)
Total	1014	(100.0)	1000	(100.0)	1002	(100.0)

Table 6 shows proportions of students by knowledge on relationship between different forms of tobacco use and occurrence of periodontal diseases.

Majority of students (71.6%, 69.3%, and 67.0%) were fully knowledgeable on relationship between dipping tobacco snuff, chewing tobacco and smoking cigarettes and occurrence of periodontal diseases respectively.

Table 7: Distribution of students by study demographic variables by perceived inclinations of parents and teachers towards tobacco use among students

	Perceived inclinations towards tobacco use	
	Parents favours	Teachers favours
Location		
City centre	64 (19.8%)***	56 (17.2%)**
Outskirt	71 (10.7%)	68 (10.3%)
Total	135 (13.7%)	124 (12.6%)
Sex		
Boys	82 (16.6%)**	74 (15.1%)*
Girls	53 (10.7%)	50 (10.1%)
Total	135 (13.7%)	124 (12.6%)
Type of school		
Public	98 (13.9%)	87 (12.3%)
Private	37 (13.2%)	37 (13.2%)
Total	135 (13.7%)	124 (12.6%)
Year of study		
Form 1	40 (11.8%)	42 (12.3%)
Form 2	48 (15.4%)	42 (13.5%)
Form 3	47 (13.9%)	40 (12.0%)
Total	135 (13.7%)	124 (12.6%)

Chi- square test: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Distribution of students by study demographic variables by perceived inclinations of parents and teachers towards tobacco use among students is shown in Table 7.

Significantly higher proportion of boys compared to girls reported that their parents and school teachers respectively would not be concerned if they would use tobacco ($p < 0.01$ for parents favour use of tobacco and $p < 0.05$ for teachers favour use of tobacco). Proportionately more students schooling in schools located in centre reported that their parents and school teachers would not be concerned if they would use tobacco compared to those schooling in outskirts schools respectively ($p < 0.001$ for parents favour use of tobacco and $p < 0.01$ for teachers favour use of tobacco). There was no statistically significant difference in proportions of students between public and private schools ($p = 0.838$ for parents favour and $p = 0.750$ for teachers favour) or between form 1, 2 and 3 students ($p = 0.397$ for parents favour and $p = 0.841$ for teachers favour) who reported that their parents and school teachers would not be concerned if they would have used tobacco.

Table 8: Mean (sd) score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start dipping tobacco snuff (minimum score =1; maximum score = 4)

Perceived factor	Degree of agreement ^b				
	Mean score ^a	Strongly disagree	Disagree	Agree	Strongly agree
- Influence of friends	3.28 (0.98)	104 (10.6)	62 (6.3)	273 (27.9)	541 (55.2)
- Trying or experimenting taste of tobacco snuff	3.08 (1.08)	158 (15.9)	65 (6.6)	309 (31.2)	459 (46.3)
- Not knowing detrimental health effects of using tobacco snuff	2.93 (1.17)	208 (21.2)	78 (8.0)	268 (27.3)	427 (43.5)
- Living with a person like parent and sibling who dip tobacco snuff	2.69 (1.15)	210 (22.2)	186 (19.6)	242 (25.5)	310 (32.7)
- Attitudes that dipping tobacco snuff reduces feelings	2.68 (1.22)	275 (28.1)	110 (11.2)	244 (24.9)	349 (35.7)
- Advertisements by tobacco industries	2.37 (1.23)	346 (36.0)	183 (19.0)	167 (17.4)	266 (27.7)
- Using additives like alcohol	2.36 (1.26)	373 (38.9)	136 (14.2)	177 (18.5)	273 (28.5)

^amean (s.d); ^bNumber(%)

Table 8 shows the mean score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start dipping tobacco snuff. Two thirds or more of the respondents agreed that ‘*Influence of friends*’, ‘*Trying or experimenting taste of tobacco snuff*’ and ‘*Not knowing detrimental health effects of using tobacco snuff*’ were perceived as factors that may influence a person to start dipping tobacco snuff. These factors had highest mean scores of 3.28 (0.98), 3.08 (1.08) and 2.93 (1.17) respectively.

Table 9: Mean (sd) score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start chewing tobacco (minimum score =1; maximum score = 4)

Perceived factor	Degree of agreement ^b				
	Mean score ^a	Strongly disagree	Disagree	Agree	Strongly agree
-Not knowing detrimental health effects of chewing tobacco	3.30 (0.98)	103 (10.7)	57 (5.9)	253 (26.2)	554 (57.3)
-Trying or experimenting taste of tobacco	3.20 (0.99)	114 (11.7)	57 (5.8)	324 (33.2)	480 (49.2)
-Influence of friends	2.97 (1.14)	186 (19.3)	88 (9.1)	261 (27.1)	427 (44.4)
-Living with a person like parent and sibling who chew tobacco	2.87 (1.17)	209 (21.6)	105 (10.9)	254 (26.3)	398 (41.2)
-Using additives like alcohol	2.77 (1.13)	188 (20.0)	171 (18.2)	250 (26.6)	330 (35.1)
-Attitudes that chewing tobacco reduces feelings	2.60 (1.23)	278 (29.6)	144 (15.4)	194 (20.7)	322 (34.3)
-Advertisements by tobacco industries	2.47 (1.22)	296 (31.5)	186 (19.8)	177 (18.8)	280 (29.8)

^amean (s.d); ^bNumber(%)

The mean (sd) score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start chewing tobacco is shown in Table 9. Two thirds or more of the respondents agreed that ‘*Not knowing detrimental health effects of chewing tobacco*’, ‘*Trying or experimenting taste of tobacco*’ and ‘*Influence of friends*’ were perceived as factors that may influence a person to start chewing tobacco. These factors had highest mean scores of 3.30 (0.98), 3.20 (0.99) and 2.97 (1.14) respectively.

Table 10: Mean (sd) score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start smoking cigarettes (minimum score =1; maximum score = 4)

Perceived factor	Degree of agreement ^b				
	Mean score ^a	Strongly disagree	Disagree	Agree	Strongly agree
-Not knowing detrimental health effects of smoking cigarettes	3.34 (0.97)	90 (9.8)	56 (6.1)	220 (24.0)	552 (60.1)
-Trying or experimenting taste of cigarettes	3.27 (0.96)	96 (10.3)	53 (5.7)	292 (31.2)	494 (52.8)
-Influence of friends	3.05 (1.13)	162 (17.6)	78 (8.5)	237 (25.7)	444 (48.2)
-Living with a person like parent and sibling who smoke cigarettes	2.92 (1.15)	180 (19.5)	115 (12.4)	229 (24.8)	401 (43.4)
-Using additives like alcohol	2.89 (1.11)	151 (16.8)	157 (17.5)	232 (25.9)	357 (39.8)
-Attitudes that smoking cigarettes reduces feelings	2.64 (1.22)	255 (27.8)	149 (16.3)	185 (20.2)	327 (35.7)
-Advertisements by tobacco industries	2.50 (1.21)	273 (30.2)	187 (20.7)	167 (18.5)	277 (30.6)

^amean (s.d); ^bNumber(%)

Table 10 shows the mean (sd) score and distribution of respondents by degree of agreement to 7 factors that were perceived to influence a person to start smoking cigarettes. Two thirds or more of the respondents agreed that '*Not knowing detrimental health effects caused by smoking cigarettes*', '*Trying or experimenting taste of cigarettes*' and '*Influence of friends*' were perceived as factors that may influence a person to start smoking cigarettes. These factors had highest mean scores of 3.34 (0.97), 3.27 (0.96) and 3.05 (1.13) respectively.

Table 11: Mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from dipping tobacco snuff (minimum score =1; maximum score = 4)

Perceived factor	Distribution ^b				
	Agreement score ^a	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
-Knowing detrimental health effects caused by dipping tobacco snuff	3.55 (0.77)	49 (4.9)	25 (2.5)	245 (24.7)	672 (67.8)
-Good guidance from parents and guardians	3.56 (0.76)	44 (4.4)	35 (3.5)	241 (24.1)	682 (68.1)
-Religious teachings	3.44 (0.85)	57 (5.8)	61 (6.2)	258 (26.4)	602 (61.6)
-Living in a society that dislikes dipping tobacco snuff	3.27 (0.944)	79 (8.1)	96 (9.8)	282 (28.8)	522 (53.3)
-Halitosis	2.56 (1.19)	240 (25.5)	243 (25.9)	152 (16.2)	305 (32.4)
-Tobacco snuff being expensive	2.34 (1.19)	317 (33.7)	238 (25.3)	141 (15.0)	246 (26.1)

^amean (s.d); ^bNumber(%)

The mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from dipping tobacco snuff is shown in Table 11. Two thirds or more of the respondents agreed that ‘*Knowing detrimental health effects caused by dipping tobacco snuff*’, ‘*Good guidance from parents and guardians*’ and ‘*Religious teachings*’ were perceived as factors that may inhibit a person to start dipping tobacco snuff. These factors had highest mean scores of 3.55 (0.77), 3.56 (0.76) and 3.44 (0.85) respectively.

Table 12: Mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from chewing tobacco (minimum score =1; maximum score = 4)

Perceived factor	Distribution ^b				
	Agreement score ^a	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
-Knowing detrimental health effects caused by chewing tobacco	3.52 (0.83)	62 (6.4)	23 (2.4)	230 (23.7)	655 (67.5)
-Good guidance from parents and guardians	3.51 (0.79)	47 (4.9)	38 (3.9)	256 (26.5)	624 (64.7)
-Religious teachings	3.45 (0.82)	49 (5.2)	56 (5.9)	257 (27.3)	580 (61.6)
-Living in a society that dislikes chewing tobacco	3.28 (0.93)	73 (7.7)	98 (10.4)	268 (28.3)	507 (53.6)
-Halitosis	2.59 (1.17)	222 (24.1)	238 (25.8)	163 (17.7)	300 (32.5)
-Tobacco being expensive	2.40 (1.20)	291 (31.5)	236 (25.5)	134 (14.5)	264 (28.5)

^amean (s.d); ^bNumber(%)

Table 12 show the mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from chewing tobacco. Two thirds or more of the respondents agreed that '*Knowing detrimental health effects caused by chewing tobacco*', '*Good guidance from parents and guardians*' and '*Religious teachings*' were perceived as factors that may inhibit a person to start chewing tobacco. These factors had highest mean scores of 3.52 (0.83), 3.51 (0.79) and 3.45 (0.82) respectively.

Table 13: Mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from smoking cigarettes (minimum score =1; maximum score = 4)

Perceived factor	Distribution ^b				
	Agreement score ^a	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
-Knowing detrimental health effects caused by smoking cigarettes	3.54 (0.79)	45 (4.8)	37 (3.9)	218 (23.3)	637 (68.0)
-Good guidance from parents and guardians	3.53 (0.76)	38 (4.0)	39 (4.2)	250 (26.6)	612 (65.2)
-Religious teachings	3.45 (0.81)	43 (4.7)	60 (6.6)	253 (27.7)	558 (61.1)
-Living in a society that dislikes smoking cigarettes	3.33 (0.90)	61 (6.5)	93 (10.0)	258 (27.7)	520 (55.8)
-Halitosis	2.62 (1.17)	208 (23.3)	230 (25.7)	154 (17.2)	302 (33.8)
-Cigarettes being expensive	2.41 (1.21)	283 (31.5)	227 (25.3)	125 (13.9)	263 (29.3)

^amean (s.d); ^bNumber(%)

The mean (sd) agreement score and distribution of respondents by level of agreement to 6 factors that were perceived to inhibit a person from smoking cigarettes is shown in Table 13. Two thirds or more of the respondents agreed that '*Knowing detrimental health effects caused by smoking cigarettes*', '*Good guidance from parents and guardians*' and '*Religious teachings*' were perceived as factors that may inhibit a person to start smoking cigarettes. These factors had highest mean scores of 3.54 (0.79), 3.53 (0.76) and 3.45 (0.81) respectively.

9. DISCUSSION

The methodological strength of the present study includes the sample size calculation and application of the stratified random sampling procedure that took into consideration the four demographic variables: location of school, type of school, gender and class of study that have been shown to influence tobacco use. Since the study relied on self reported data, the prevalence of tobacco use may be lower than the actual possibly due to underreporting as some of students might have felt uncomfortable to report that they snuff, chew or smoke tobacco.

9.1 Prevalence of tobacco use

Dipping tobacco snuff

The low proportions of students who had either ever heard that their fellow students dipped (6.5%), or who had ever seen their fellow students dip (3.5%) and those who have ever dipped (2.2%) indicate that dipping tobacco snuff is rare among secondary school students. The prevalence of students ever dipped tobacco snuff reported in the current study is similar to that previously reported by Kaduri et al (2008) among adolescents in Dar es Salaam (3.65%) and Mnyika et al (2006) among young adults aged 15-36 years in Moshi (1.9%). Much higher prevalences of dipping tobacco snuff have been reported in Kenya by Ogwel et al (2003), Republic of Congo by Rudatsikira et al (2010) and in Sudan by El- Amin et al (2011) whereby the prevalence of smokeless tobacco use among 12 -17 years school students were 9%, 18% and 8.1% respectively.

The results from the current study indicate that proportionately more students in urban schools (3.6%) dipped snuff than their counter parts in outskirts schools (1.4%). The reason for the noted difference could be tobacco snuff availability and its easy accessibility or the students had enough pocket money to buy it. These findings differ to that reported in Nairobi, Kenya by Ogwel et al (2003) where a higher proportion of suburban pupils (12%) dipped snuff than their counterparts in urban schools (8%).

Proportionately more male (3.2%) than female students (1.1%) reported to have ever dipped tobacco snuff in the current study. The sex pattern of tobacco dipping is similar to that which

has been reported in Nigeria and Seychelles, although higher prevalence were reported in Nigeria (18.6% and 9.4%) and the Seychelles (13% and 5.5%) among males and females respectively (WHO/CDC 2003). However, more female than male young adults in Moshi, Tanzania (3.0% and 0.5%) and students in South Africa (8.4% and 3.9%) reported to have dipped tobacco snuff (Mnyika et al 2006, Peltzer 2003).

Tobacco chewing

Small proportions of students who had ever heard that their fellow students chewed (4.1%), ever seen their fellow students chewing (2.3%) and those who had ever chewed (4.4%) indicate that chewing tobacco is uncommon among secondary school students. These results are lower than those reported among students in United States of America, France, India and Nepal where the prevalence of chewing tobacco ranged from 6.5% to 39% (Salehi and Elder 1995, Sreeramareddy et al 2008, Slama et al 2009, Joshi et al 2010). However a prevalence of 17.5% was reported among subjects aged 15 years or more in a literate rural community in Southern India (Daniel et al 2008).

A significantly high proportion of males (6.5%) than females (2.5%) reported to have ever chewed tobacco, which is an indication that chewing tobacco is more common in males than in females. The gender difference in tobacco chewing reported in the current study is lower than that reported in Nepal, Nigeria and Seychelles in which the prevalence of current tobacco chewing ranged from 9.3% to 18.6% and 1.9% to 13% among males and females respectively (WHO/CDC 2003, Sreeramareddy et al 2008). The gender difference may be related to the societal tolerance of chewing tobacco and use of other forms of tobacco among males compared to females. The low prevalence of chewing tobacco among female students could also be attributed by underreporting as they would not like to be known as tobacco users in a society with norms that forbid female to use tobacco.

Tobacco smoking

The proportions of students who have ever heard their fellow students smoke cigarettes (25.9%), ever seen their fellow students smoke cigarettes (15.1%) and those who have ever

smoked (4.4%) indicate that smoking cigarettes is practiced by some of the secondary school students. The reported prevalence of ever smoked (4.4%) in the current study is higher than that reported by Kaaya et al 1991 (1.0%) but similar to the reported prevalence of 5.9% by Kaduri et al (2008). These findings indicate an upward trend of smoking habit among adolescents in Dar es Salaam. The proportion of students who have ever smoked cigarettes in the present study is lower than that reported in Kenya, Uganda and Ivory Coast where the prevalence were 31.0%, 17.5% and 15.3% respectively (Ogwell et al 2003, Mpabulungi and Muula 2004, Siziya et al 2007c).

The prevalence of 2.2% for students who ever dipped and 4.4% for students who ever chewed or smoked is not to be ignored first because these percentages would translate to big numbers given the fact that there were 157764 ordinary level secondary school students in Dar es Salaam at the time of the study. Secondly these students are likely to influence others to dip, chew or smoke tobacco (Kwamanga et al 2003, Islam and Johnson 2005, Siziya et al 2007b, Rudatsikira et al 2007, Muula et al 2008, Odeyemi et al 2009). Thirdly they have an increased risk of about 4 times of developing oral cancer and periodontal disease (Blot et al 1988, Tomar and Asma 2000). Therefore intervention against this habit at an early age is essential to prevent the potential of influencing others to start smoking and to reduce the risk of acquiring oral cancer and periodontal disease.

9.2 Knowledge on detrimental effects of tobacco use on health

Majority of students who participated in this study (96.8%) were knowledgeable on the relationship between smoking cigarettes as cause of systemic diseases. This is encouraging because knowledge of detrimental effects of tobacco use has been shown to be a deterrent for tobacco use (Nourjal et al 1994). Therefore, this higher level of knowledge on adverse effects of cigarettes smoking on systemic diseases may be one of the reasons for low prevalence of tobacco use in the current study.

The findings of the present study are similar to that reported in the United States (Siahpush et al 2006), Great Britain (Terrades et al 2009) and Australia (Rikard-Bell et al 2003) among adults where the proportion of respondents knowledgeable on cigarettes smoking as cause of

heart diseases and lung cancer were (85.8%, 94.4%); (92.3%, 98.2%) and (94%, 91%) respectively. However the proportion of adolescents in Denmark (Jensen and Overgaard (1993) who were knowledgeable on lung and heart diseases was lower (46.3% and 49.3% respectively).

About three quarters of respondents in the current study (70.6% - 71.2%) were respectively on the relationship between tobacco use and the occurrence of oral cancer. This indicates that majority of respondents in the present study had adequate level of knowledge that dipping tobacco snuff, chewing tobacco and smoking cigarettes causes oral cancer. The findings of the current study are similar to those reported by researchers in Great Britain (Terrades et al 2009, West et al 2006), India (Elango et al 2009), Australia (Rikard-Bell et 2003), and Kuwait (Al – Shammari et al 2006), where the proportion of respondents who were knowledgeable on the adverse relationship between smoking and occurrence of oral cancer varied from 62.6% to 85.5%. The results of the present study are different from that reported in Sri Lanka and Nigeria where 47% and 11% of respondents respectively knew that cigarette smoking causes oral cancer (Ariyawardana and Vithanaarachchi 2005, Nwhator et al 2010). The proportion of respondents in India and Sri Lanka who were knowledgeable on relationship between pan and betel chewing and occurrence of oral cancer were 79% and 80.1% respectively (Elango et al 2009, Ariyawardana and Vithanaarachchi 2005).

A good proportion of respondents in the present study (67.0%- 71.6%) were respectively fully knowledgeable on relationship between dipping tobacco snuff, chewing tobacco and smoking cigarettes on the occurrence of periodontal diseases. This indicated that a greater part of secondary school students were knowledgeable on tobacco use as a cause of periodontal diseases. The findings of the present study are similar to those reported in United Kingdom and Kuwait where the proportion of adult periodontal patients knowledgeable were 80.4% and 76.2% respectively (Terrades et al 2009, Al-Shammari et al 2006). The proportion of students reported to be knowledgeable in the present study is much higher than those reported by Nwhator et al (2010), in Nigeria (2.2%) and by Lung et al (2005) in United Kingdom (6%).

9.3 Perceptions on factors that may influence people to start using tobacco

Only a small proportion of secondary school students perceived that their parents (13.7%) and school teachers (12.6%) would show no concern if they saw them using tobacco at home or at school premises. This indicated that tobacco use is not accepted by majority of parents and teachers. This acts as a deterrent to start tobacco use by secondary school students at home as well as at school. The findings of the present study are similar to that reported in the United States of America where 5.4% and 6.6% of adolescents reported to have been influenced to start using smokeless tobacco by their parents and teachers respectively (Marty et al 1986). As has been shown by different researchers, when a parent or school teacher uses tobacco the adolescents in their vicinity tend to use tobacco as well (Kwamanga et al 2003, Siziya et al 2007a, Rudatsikira et al 2007, Osungbade and Oshimane 2008, O'Loughlin et al 2009, Joshi et al 2010, El-Amin et al 2011). The factors involved in parents and school teachers influencing students to use tobacco may be explained by their permissiveness, availability of cigarettes and other forms of tobacco at home and school premises and the role modeling played by either parent or a school teacher. Likewise having a parent or teacher who do not use tobacco is associated with a likelihood of an adolescent being a non tobacco user (Siziya et al 2008). This is in agreement with the findings that a school with strong measures on drug use has statistically significantly a lower number of drug user (Evan-Whipp et al 2007). There is a need to educate parents and teachers on the harmful effects of tobacco on health. This will ensure that all parents and teachers become active participants in the campaigns against tobacco use.

Majority of the respondents perceived that '*Not knowing detrimental health effects of using tobacco*', '*Influence of friends*' and '*Trying or experimenting taste of tobacco*' as important factors that lead someone to start dipping, chewing or smoking tobacco. This shows that education on detrimental effects of tobacco use on health, as well as bans of smoking in public places are essential components in discouraging youths from starting to use tobacco. Likewise parents/guardians and other family members should avoid asking children to light a cigarette for them because it may lead to trying or experimenting taste of tobacco. These perceived factors that influence secondary school students to start using tobacco have also been reported by Kurtz et al (2001), Kwamanga et al (2003), Christophi et al (2006), Rudatsikira et al (2007)

and Adebeyi et al (2010). Therefore tobacco control measures should target these perceived factors.

A greater part of the respondents perceived that '*Knowing detrimental health effects caused by using tobacco*', '*Good guidance from parents and guardians*' and '*Religious teachings*' as important factors that may prevent someone from starting dipping, chewing or smoking tobacco. This means that if knowledge on detrimental effects of dipping, chewing or smoking tobacco on health is given to people they are most likely not to dip, chew or smoke tobacco. Likewise if parents and religious leaders would repeatedly tell young people not to dip, chew or smoke tobacco would prevent them from dipping, chewing or smoking tobacco. The findings of the current study are similar to other reported studies (Kurtz et al 2001, Peltzer 2003, Evan-Whipp et al 2007, Dunn et al 2008, Muula et al 2008, Pampel 2008, Joshi et al 2010). Therefore tobacco control intervention should capitalize on these most perceived factors.

10. CONCLUSIONS

The prevalence of tobacco dipping (2.2%), chewing (4.4%) and smoking (4.4%) among secondary school students in Dar es Salaam appear to be low. Majority of students had adequate knowledge on the detrimental effects of tobacco dipping, chewing and smoking on systemic and oral health. Majority of secondary school students perceived that their parents and teachers would be annoyed if they discovered that they (students) were dipping, chewing and smoking tobacco. Factors that were perceived by majority of students as important in promoting secondary school students to start dipping, chewing and smoking tobacco were: *‘Not knowing detrimental health effects caused by using tobacco’*, *‘Trying or experimenting taste of tobacco’* and *‘Influence of friends’*. Factors that were perceived by majority of students as inhibitors for secondary school students to start dipping, chewing and smoking tobacco use were: *“Knowing detrimental health effects caused by tobacco use”*, *“Good guidance from parents and guardians”*, *“Religious teachings”* and *“Living in a society that dislikes tobacco use”*.

11. RECOMMENDATIONS

Although the prevalence of tobacco use appears to be low there is need for intervention among secondary school students so as to prevent possible continued trend of tobacco use. Essential components of such a programme should include raising awareness on the detrimental effects of tobacco dipping, chewing and smoking on health among secondary school students in Dar es Salaam; demoting factors that have been identified as potential for stimulating students to start dipping, chewing and smoking tobacco; promoting factors that have been identified as potential inhibitors for dipping, chewing and smoking tobacco; and involving parents, teachers and religious leaders in the programme. Parents/guardians and other family members should not ask children light, buy cigarettes for them or smoke in front of them so as to protect and reduce their likelihood of smoking cigarettes and using tobacco products.

There is a need for large countrywide study that would identify the magnitude of dipping, chewing and smoking tobacco in the other regions.

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13. APPENDICES

13.1: Appendix 1: Responses of the first stage of questionnaire development

Factors that may attract a person to use tobacco

1. An entertainment of low cost
2. Body stimulation
3. Being influenced by friends
4. Not knowing effects caused by tobacco use
5. Using addictives like alcohol
6. Living with people like (parents, relatives) who uses tobacco
7. Belief that tobacco uses reduces feelings
8. Being attracted by tobacco smell
9. Having a habit of experimenting or tasting tobacco
10. Having enough money
11. Advertisements by tobacco industry
12. Peer groups

Factors that may inhibit them from using tobacco

1. Knowing detrimental health effects caused by tobacco use.
2. Living in a society which dislikes tobacco use.
3. Tobacco being expensive
4. Religious teachings
5. Good guidance from parents/guardians
6. Knowing that when you start using tobacco you can not stop
7. Different fire accidents caused by tobacco use

8. Bad smell from clothing of a tobacco user
9. Bad smell from mouth

13.2. Appendix 2: English Questionnaire

Student general information

1. Age.....
2. Sex (i) Boys, (ii) Girl
3. Name of school.....
4. Location of your school
 - a) City centre
 - b) Outskirt
5. Type of your school
 - a) Government
 - b) Private
6. Year of study
 - a. Form one
 - b. Form two
 - c. Form three

Self reported use of tobacco

7. Have you ever heard a student dipping tobacco in this school?
 - a) Yes
 - b) No
8. Have you ever seen a student dipping tobacco in this school?
 - a) Yes
 - b) No
9. Which description fits you best on tobacco dipping?
 - a. I have never dipped tobacco, not even a pinch
 - b. I have never really dipped tobacco, but I have tried dipping a little

- c. I used to dip tobacco, but now I have stopped
 - d. I do not dip every day but every week
 - e. I dip every day
10. If you dip tobacco snuff every day, how many times a day?
- a) Once a day
 - b) Twice a day
 - c) More than three
11. If you had enough tobacco snuff to dip as much as you wish, how many times a day would you dip per day?
- a) Once a day
 - b) Twice a day
 - c) More than three
12. Have you ever heard a student chewing tobacco in this school?
- a) Yes
 - b) No
13. Have you ever seen a student chewing tobacco in this school?
- a) Yes
 - b) No
14. Which description fits you best on tobacco chewing practice?
- a. I have never chewed tobacco, not even a few particles
 - b. I have never really chewed tobacco, but I have tried chewing a little
 - c. I used to chew tobacco, but now I have stopped
 - d. I do not chew every day but every week
 - e. I chew every day
15. If you chew tobacco every day, how many times a day?
- a) Once a day
 - b) Twice a day
 - c) More than three
16. If you had enough tobacco to chew as much as you wish, how many times a day would you chew per day?

- a) Once a day
 - b) Twice a day
 - c) More than three
17. Have you ever heard a student smoking cigarette in this school?
- a) Yes
 - b) No
18. Have you ever seen a student smoking cigarette in this school?
- a) Yes
 - b) No
19. Which description fits you best on cigarette smoking?
- a. I have never smoked, not even a puff
 - b. I have never really smoked, but I have tried few puffs
 - c. I used to smoke, but now I have stopped
 - d. I do not smoke every day but every week
 - e. I smoke every day
20. If you smoke everyday, how many cigarettes do you smoke a day?
- a) 1-5 cigarettes a day
 - b) 6-10 cigarettes a day
 - c) 11 and above cigarettes a day
21. If you had enough money to buy as many cigarettes as you wish, how many cigarettes you would smoke per day?.....

Knowledge on detrimental effects of using tobacco products on health.

22. Smokers are more likely to develop various diseases like lung cancer and hypertension than non smokers.
- a. True
 - b. False
23. Smokers are more likely to develop oral cancer than non smokers.
- a. True
 - b. False

24. A person who has smoked for many years is more likely to develop oral cancer than a person who smoked for a short duration.

a. True

b. False

25. Chain (heavy) smokers are more likely to develop oral cancer than sporadic (light) smokers.

a. True

b. False

26. Smokers are more likely to develop periodontal diseases than non smokers.

a. True

b. False

27. A person who has smoked for many years is more likely to develop periodontal diseases than a person who smoked for a short duration.

a. True

b. False

28. Chain (heavy) smokers are more likely to develop periodontal diseases than sporadic (light) smokers.

a. True

b. False

29. People who dip tobacco snuff in their oral cavity are more likely to develop oral cancer than non tobacco snuff users

a. True

b. False

30. A person who has dipped tobacco snuff for many years is more likely to develop oral cancer than a person who dipped for a short duration.

a. True

b. False

31. Heavy tobacco snuff users are more likely to develop oral cancer than sporadic (light) tobacco snuff users

a. True

- b. False
32. People who dip tobacco snuff in their oral cavity are more likely to develop periodontal diseases than non tobacco snuff users.
- a. True
- b. False
33. A person who has dipped tobacco snuff for many years is more likely to develop periodontal diseases than a person who dipped it for a short duration.
- a. True
- b. False
34. Heavy users of tobacco snuff in the oral cavity are more likely to develop periodontal diseases than light tobacco snuff users.
- a. True
- b. False
35. Tobacco chewers are more likely to develop oral cancer than non tobacco chewers
- a. True
- b. False
36. A person who has chewed tobacco for many years is more likely to develop oral cancer than a person who chewed for a short duration.
- a. True
- b. False
37. Heavy tobacco chewers are more likely to develop oral cancer than light tobacco chewers
- a. True
- b. False
38. Tobacco chewers are more likely to develop periodontal diseases than non tobacco chewers.
- a. True
- b. False
39. A person who has chewed tobacco for many years is more likely to develop periodontal diseases than a person who chewed tobacco for a short duration.
- a. True

b. False

40. Heavy tobacco chewers are more likely to develop periodontal diseases than light tobacco chewers.

a. True

b. False

Inclination of society towards smoking:

41. If my parents discover that I dip tobacco snuff they would be disappointed

a) Strongly disagree

b) Disagree

c) Agree

d) Strongly agree

42. I will get into trouble if my school teachers found me dipping tobacco snuff in school compounds

a) Strongly disagree

b) Disagree

c) Agree

d) Strongly agree

43. If my parents discover that I chew tobacco they would be disappointed

a) Strongly disagree

b) Disagree

c) Agree

d) Strongly agree

44. I will get into trouble if my school teachers found me chewing tobacco in school compounds

a) Strongly disagree

b) Disagree

c) Agree

d) Strongly agree

45. If my parents discover that I smoke cigarettes they would be disappointed

- a) Strongly disagree
- b) Disagree
- c) Agree
- d) Strongly agree

46. I will get into trouble if my school teachers found me smoking cigarettes in school compounds

- a) Strongly disagree
- b) Disagree
- c) Agree
- d) Strongly agree

Factors influencing tobacco smoking

47. Secondary school students listed items which they believed that may attract a person to start dipping tobacco snuff. To what degree do you agree that the following factors attract a person to start dipping tobacco snuff? (Put V on your right answer on each factor)

S/NO	FACTOR	Strongly disagree	Disagree	Agree	Strongly agree
i.	Influence of friends				
ii.	Trying or experimenting taste of tobacco snuff				
iii.	Not knowing detrimental health effects of dipping tobacco snuff				
iv.	Using addictives like alcohol				
v.	Attitudes that dipping tobacco snuff reduces feelings				
vi.	Living with a person like parent and sibling who dip tobacco snuff				
vii.	Advertisements by tobacco industries				

48. Secondary school students listed factors which they believed that may inhibit a person from dipping tobacco snuff. To what degree do you think that the following factors may inhibit a person from dipping tobacco snuff? (Put V on your right answer on each factor)

S/NO	FACTOR	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
i.	Knowing detrimental health effects caused by dipping tobacco snuff				
ii.	Good guidance from parents and guardians				
iii.	Living in a society that dislikes dipping tobacco snuff				
iv.	Religious teachings				
v.	Halitosis				
vi.	Tobacco snuff being expensive				

49. Secondary school students listed items which they believed that may attract a person to start chewing tobacco. To what degree do you agree that the following factors attract a person to start chewing tobacco? (Put V on your right answer on each factor)

S/NO	FACTOR	Strongly disagree	Disagree	Agree	Strongly agree
i.	Influence of friends				
ii.	Trying or experimenting taste of tobacco				
iii.	Not knowing detrimental health effects of chewing tobacco				
iv.	Using additives like alcohol				
v.	Attitudes that chewing tobacco reduces feelings				
vi.	Living with a person like parents and siblings who chew tobacco				
vii.	Advertisements by tobacco industries				

50. Secondary school students listed factors which they believed that may inhibit a person from chewing tobacco. To what degree do you think that the following factors may inhibit a person from chewing tobacco? (Put V on your right answer on each factor)

S/NO	FACTOR	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
i.	Knowing detrimental health effects caused by chewing tobacco				
ii.	Good guidance from parents and guardians				
iii.	Living in a society that dislikes chewing tobacco				
iv.	Religious teachings				
v.	Halitosis				
vi.	Tobacco being expensive				

51. Secondary school students listed items which they believed that may attract a person to start smoking cigarettes. To what degree do you agree that the following factors attract a person to start smoking cigarettes? (Put V on your right answer on each factor)

S/NO	FACTOR	Strongly disagree	Disagree	Agree	Strongly agree
i.	Influence of friends				
ii.	Trying or experimenting taste of cigarettes				
iii.	Not knowing detrimental health effects of smoking				
iv.	Using addictives like alcohol				
v.	Attitudes that smoking cigarettes reduces feelings				
vi.	Living with a smoking person like parents and siblings				
vii.	Advertisements by cigarette industries				

53. Secondary school students listed factors which they believed that may inhibit a person from smoking cigarettes. To what degree do you think that the following factors may inhibit a person from smoking cigarettes? (Put V on your right answer on each factor)

S/NO	FACTOR	Extremely do not inhibit	Do not inhibit	Inhibits	Inhibits extremely
i.	Knowing detrimental health effects caused by cigarettes				
ii.	Good guidance from parents and guardians				
iii.	Living in a society that dislikes smoking				
iv.	Religious teachings				
v.	Halitosis				
vi.	Cigarettes being expensive				

13.3. Appendix 3: Swahili Questionnaire

Taarifa za mwanafunzi

1. Umri
2. Jinsia:.....
3. Jina la shule
4. Mahali shule yako unayosoma ilipo
 - a) Katikati ya jiji
 - b) Nje ya jiji

5. Aina ya shule yako unayosoma

- a) Ni ya serikali
- b) Si ya serikali

6. Kidato unachosoma

- a. Cha kwanza
- b. Cha pili
- c. Cha tatu

Kiwango cha utumiaji wa tumbaku

7. Je, ulishawahi kusikia mwanafunzi wa shule hii anabwia ugoro?

- a) Ndiyo
- b) Hapana

8. Je, ulishawahi kuona mwanafunzi wa shule hii anabwia ugoro

- a) Ndiyo
- b) Hapana

9. Ni maelezo yapi ambayo yanakufaa wewe dhidi ya matumizi ya ugoro?

- a. Sijawahi kubwia ugoro hata kidogo
- b. Nilishawahi kujaribu kubwia ugoro
- c. Nilikuwa nabwia ugoro zamani lakini sasa nimeacha
- d. Nabwia ugoro kwa kila juma
- e. Nabwia ugoro kila siku

10. Kama unabwia ugoro kila siku, je ni mara ngapi kwa siku?

- a) Mara moja
- b) Mara mbili
- c) Zaidi ya mara tatu

11. Kama ungekuwa na ugoro wa kutosha kwa siku, je ungebwia mara ngapi kwa siku?

- a) Mara moja
- b) Mara mbili
- c) Zaidi ya mara tatu

12. Je, ulishawahi kusikia mwanafunzi wa shule hii anatafuna tumbaku?

- a) Ndiyo
- b) Hapana

13. Je, ulishawahi kuona mwanafunzi wa shule hii anatafuna tumbaku?

- a) Ndiyo
- b) Hapana

14. Ni maelezo yapi ambayo yanakufaa wewe dhidi ya utafunaji wa tumbaku?

- a. Sijawahi kutafuna tumbaku hata kidogo
- b. Nilishawahi kujaribu kutafuna tumbaku
- c. Nilikuwa natafuna tumbaku zamani lakini sasa nimeacha
- d. Natafuna tumbaku kwa kila juma

- e. Natafuna tumbaku kila siku
15. Kama unatafuna tumbaku kila siku, je ni mara ngapi kwa siku?
- Mara moja
 - Mara mbili
 - Zaidi ya mara tatu
16. Kama ungekuwa na tumbaku ya kutosha kwa siku, je ungeitafuna mara ngapi kwa siku?
- Mara moja
 - Mara mbili
 - Zaidi ya mara tatu
17. Je, ulishawahi kusikia mwanafunzi wa shule hii anavuta sigara?
- Ndiyo
 - Hapana
18. Je, ulishawahi kuona mwanafunzi wa shule hii anavuta sigara?
- Ndiyo
 - Hapana
19. Ni maelezo yapi ambayo yanakufaa wewe dhidi ya uvutaji wa sigara?
- Sijawahi kuvuta sigara hata kidogo
 - Nilishawahi kujaribu kuvuta sigara kidogo
 - Nilikuwa navuta sigara zamani lakini sasa nimeacha
 - Navuta sigara kwa kila juma
 - Navuta sigara kila siku
20. Kama unavuta sigara kila siku, je ni sigara ngapi unazovuta kwa siku?.....
- Sigara 1-5 kwa siku
 - Sigara 6-10 kwa siku
 - Sigara 11 ama zaidi kwa siku
21. Kama ungekuwa na fedha za kutosha kununua sigara kama unavyohitaji, je ungevuta sigara ngapi kwa siku?.....

Kiwango cha uelewa juu ya madhara ya kiafya yatokanayo na matumizi ya tumbaku

22. Mvutaji wa sigara ana uwezekano mkubwa kupata magonjwa mbalimbali kama vile kansa ya mapafu na shinikizo la damu kuliko asiyevuta sigara
- Kweli
 - Si kweli
23. Mvutaji wa sigara ana uwezekano mkubwa kupata kansa ya kinywa kuliko asiyevuta sigara
- Kweli
 - Si kweli

24. Mtu aliyevuta sigara kwa miaka mingi ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko aliyevuta sigara kwa muda mfupi
- Kweli
 - Si kweli
25. Mtu anayevuta sigara mfululizo ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko anayevuta kwa kiasi
- Kweli
 - Si kweli
26. Mvutaji wa sigara ana uwezekano mkubwa kupata magonjwa ya fizi kuliko asiyevuta sigara
- Kweli
 - Si kweli
27. Mtu aliyevuta sigara kwa miaka mingi ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko aliyevuta sigara kwa muda mfupi
- Kweli
 - Si kweli
28. Mtu anayevuta sigara mfululizo ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko anayevuta kwa kiasi
- Kweli
 - Si kweli
29. Mtu anayebwia ugoro ana uwezekano mkubwa kupata kansa ya kinywa kuliko asiyebwia ugoro
- Kweli
 - Si kweli
30. Mtu aliyebwia ugoro kwa miaka mingi ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko aliyebwia ugoro kwa muda mfupi
- Kweli
 - Si kweli
31. Mtu anayebwia ugoro mfululizo ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko anayebwia kwa kiasi
- Kweli
 - Si kweli
32. Mtu anayebwia ugoro ana uwezekano mkubwa kupata kansa ya kinywa kuliko asiyebwia ugoro
- Kweli
 - Si kweli

33. Mtu aliyebwia ugoro kwa miaka mingi ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko aliyebwia ugoro kwa muda mfupi

- a. Kweli
- b. Si kweli

34. Mtu anayebwia ugoro mfululizo ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko anayebwia kwa kiasi

- a. Kweli
- b. Si kweli

35. Mtu anayetafuna tumbaku ana uwezekano mkubwa kupata kansa ya kinywa kuliko asiyetafuna tumbaku

- a. Kweli
- b. Si kweli

36. Mtu aliyetafuna tumbaku kwa miaka mingi ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko aliyetafuna tumbaku kwa muda mfupi

- a. Kweli
- b. Si kweli

37. Mtu anayetafuna tumbaku mfululizo ana uwezekano mkubwa wa kupata kansa ya kinywa kuliko anayetafuna tumbaku kwa kiasi

- a. Kweli
- b. Si kweli

38. Mtu anayetafuna tumbaku ana uwezekano mkubwa kupata magonjwa ya fizi kuliko asiyetafuna tumbaku

- a. Kweli
- b. Si kweli

39. Mtu aliyetafuna tumbaku kwa miaka mingi ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko aliyetafuna tumbaku kwa muda mfupi

- a. Kweli
- b. Si kweli

40. Mtu anayetafuna tumbaku mfululizo ana uwezekano mkubwa wa kupata magonjwa ya fizi kuliko anayetafuna tumbaku kwa kiasi

- a. Kweli
- b. Si kweli

Mwelekeo wa jamii dhidi ya uvutaji wa sigara

41. Wazazi wangu watakata tamaa wakigundua kuwa nabwia ugoro

- a) Sikubaliani kabisa

- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

42. Nitapata hatia kama waalimu wa shule yangu wakinikuta nabwia ugoro katika mazingira ya shule

- a) Sikubaliani kabisa
- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

43. Wazazi wangu watakata tamaa wakigundua kuwa natafuna tumbaku

- a) Sikubaliani kabisa
- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

44. Nitapata hatia kama waalimu wa shule yangu wakinikuta natafuna tumbaku katika mazingira ya shule

- a) Sikubaliani kabisa
- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

45. Wazazi wangu watakata tamaa wakigundua kuwa navuta sigara

- a) Sikubaliani kabisa
- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

46. Nitapata hatia kama waalimu wa shule yangu wakinikuta navuta sigara katika mazingira ya shule

- a) Sikubaliani kabisa
- b) Sikubaliani
- c) Nakubaliana
- d) Nakubaliana kabisa

Vitu vinavyomvutia mtu kuvuta sigara

47. Wanafunzi wa shule za sekondari walioorodhesha vitu walivyoamini humvutia mtu kuanza kutumia ugoro. Ni kwa kiasi gani unakubali kuwa vitu hivi humvutia mtu kuanza kutumia ugoro Weka alama V kwenye jibu lako sahihi).

S/NO	Vitu vilivyoorodheshwa	Sikubaliani kabisa	Sikubaliani	Nakubali ana	Nakubaliana kabisa
i.	Mvuto wa marafiki				

ii.	Kujaribu au kuonja radha ya ugoro				
iii.	Kutokuelewa madhara ya kiafya yatokanayo na kubwia ugoro				
iv.	Kutumia kilevi kama vile pombe				
v.	Mtazamo kuwa kubwia ugoro huondoa mawazo				
vi.	Kuishi na watu ambao ni watumiaji wa ugoro kama vile wazazi na ndugu				
vii.	Matangazo yatolewayo na viwanda vya tumbaku				

48. Wanafunzi wa shule za sekondari walioorodhesha vitu ambavyo waliamini vinaweza kumzuia mtu asibwie ugoro. Ni kwa kiasi gani unafikiri vitu vifuatavyo vinaweza kumzuia mtu asibwie ugoro? (Weka alama V kwa kila jibu lako sahihi)

S/NO	Vitu vilivyoorodheshwa	Haizuii kabisa	Haizuii	Inazuia	Inazuia kabisa
i.	Kuelewa madhara yatokanayo na ubwiaji wa ugoro.				
ii.	Malezi mazuri kutoka kwa wazazi na walezi				
iii.	Kuishi katika jamii isiyopenda kubwia ugoro				
iv.	Mafundisho ya kidini				
v.	Harufu mbaya kutoka mdomoni				
vi.	Ugoro kuuzwa kwa bei ghali				

49. Wanafunzi wa shule za sekondari walioorodhesha vitu walivyoamini humvutia mtu kuanza kutafuna tumbaku. Ni kwa kiasi gani unakubali kuwa vitu hivi humvutia mtu kuanza kutafuna tumbaku Weka alama V kwenye jibu lako sahihi).

S/NO	Vitu vilivyoorodheshwa	Sikubaliani kabisa	Sikubaliani	Nakubali ana	Nakubaliana kabisa
i.	Mvuto wa marafiki				
ii.	Kujaribu au kuonja radha ya tumbaku				
iii.	Kutokuelewa madhara ya kiafya yatokanayo na utafunaji wa tumbaku				
iv.	Kutumia kilevi kama vile pombe				
v.	Mtazamo kuwa utafunaji wa tumbaku huondoa mawazo				
vi.	Kuishi na watu ambao ni watafunaji wa tumbaku kama vile wazazi na ndugu				
vii.	Matangazo yatolewayo na viwanda vya tumbaku				

50. Wanafunzi wa shule za sekondari walioorodhesha vitu ambavyo waliamini vinaweza kumzuia mtu asitafune tumbaku. Ni kwa kiasi gani unafikiri vitu vifuatavyo vinaweza kumzuia mtu asitafune tumbaku? (Weka alama V kwa kila jibu lako sahihi).

S/NO	Vitu vilivyoorodheshwa	Haizuii kabisa	Haizuii	Inazuia	Inazuia kabisa
i.	Kuelewa madhara yatokanayo na utafunaji wa tumbaku				
ii.	Malezi mazuri kutoka kwa wazazi na walezi				
iii.	Kuishi katika jamii isiyopenda kutafuna tumbaku				
iv.	Mafundisho ya kidini				
v.	Harufu mbaya kutoka mdomoni				
vi.	Tumbaku kuuzwa kwa bei ghali				

51. Wanafunzi wa shule za sekondari walioorodhesha vitu walivyoamini humvutia mtu kuanza kuvuta sigara. Ni kwa kiasi gani unakubali kuwa vitu hivi humvutia mtu kuanza kuvuta sigara Weka alama V kwenye jibu lako sahihi).

S/NO	Vitu vilivyoorodheshwa	Sikubaliani kabisa	Sikubaliani	Nakubalian a	Nakubaliana kabisa
i.	Mvuto wa marafiki				
ii.	Kujaribu au kuonja radha ya sigara				
iii.	Kutokuelewa madhara ya kiafya yatokanayo na uvutaji wa sigara				
iv.	Kutumia kilevi kama vile pombe				
v.	Mtazamo kuwa uvutaji wa sigara huondoa mawazo				
vi.	Kuishi na watu ambao ni wavutaji wa sigara kama vile wazazi na ndugu				
vii.	Matangazo yatolewayo na viwanda vya sigara				

52. Wanafunzi wa shule za sekondari walioorodhesha vitu vinane (8) ambavyo waliamini vinaweza kumzuia mtu asivute sigara. Ni kwa kiasi gani unafikiri vitu vifuatavyo vinaweza kumzuia mtu asivute sigara? (Weka alama V kwa kila jibu lako sahihi)

S/NO	Vitu vilivyoorodheshwa	Haizuii kabisa	Haizuii	Inazuia	Inazuia kabisa
i.	Kuelewa madhara yatokanayo na uvutaji wa sigara				
ii.	Malezi mazuri kutoka kwa wazazi na walezi				
iii.	Kuishi katika jamii isiyopenda uvutaji wa sigara				
iv.	Mafundisho ya kidini				
v.	Harufu mbaya kutoka mdomoni				
vi.	Sigara kuuzwa kwa bei ghali				