# SOCIAL COGNITIVE DETERMINANTS OF SMOKING BEHAVIOR AMONG JUNIOR SECONDARY SCHOOL STUDENTS, KINONDONI DISTRICT, DAR ES SALAAM, TANZANIA

By

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A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Medicine (Psychiatry) of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

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## CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled *Social Cognitive Determinants of Smoking Behavior among Junior Secondary School Students, Kinondoni District, Dar es Salaam, Tanzania,* in partial fulfilment of the requirements for the degree of Master of Medicine (Psychiatry) of Muhimbili University of Health and Allied Sciences.

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**DECLARATION**

**AND**

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I, **Pamela Allen Kaduri** declare that this dissertation is my 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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## DEDICATION

This work is dedicated to my beloved parents Allen and Anna Kaduri together with my dear husband David Nyanduga and my loving son Madiba Nyanduga. You mean a lot me. I love you more than words can tell.

## ABSTRACT

**Background:** Cigarette smoking is emerging as the world's largest preventable cause of morbidity and mortality with more of these deaths occurring in developing countries. Evidence from research indicates that cigarette smoking is a behavior that starts during adolescence making this group a special focus for intervention. Data on the prevalence of cigarette smoking among in school adolescents is limited including factors associated with intention to smoke. Understanding the factors contributing to this health risk behavior is important in designing possible areas for intervention.

**Objectives:** The study aimed to determine the prevalence of cigarette smoking among adolescents in Kinondoni municipal, Dar es Salaam including social and cognitive factors that may help explain smoking behavior and intention using a theory based approach.

**Materials and Methods:** A cross sectional descriptive quantitative study was conducted among junior secondary school students using a multistage cluster sampling procedure. Data were analyzed to assess if socio cognitive variables were associated with smoking intention and behavior including bivariate and multivariate logistic regression analysis in selected variables of interest.

**Results:** One out of ten of the surveyed adolescents had ever tried smoking a cigarette. Cognitive variables such as attitudes, subjective norm and perceived behavior control were significantly associated with smoking intention in future. Smoking behavior of significant others had influence on intiation of smoking behavior among the students. There were few sociodemographic factors that had effects on cognitive variables.

**Conclusion and Recommendations:** Findings of this study underlie the importance of taking into account social norms and individual understanding of adverse effects of smoking in the design of prevention activities. The study also points out the importance of acquiring social and personal skills necessary for making abiding decision not to smoke. These and other preventive activities need to be introduced in the adolescents life before they enter secondary school as entrants to secondary schools appear to be a risk of contemplating and initiating smoking behavior. Further studies need to be carried out to elucidate operating factors that protect woman from smoking and places males at higher risk of smoking.

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## LIST OF ACRONYMS

| | |
|---|---|
| **AFRO** | African Regional Organization |
| **AIDS** | Acquired Immunodeficiency Syndrome |
| **CDC** | Centre For Disease Control |
| **FAHQ** | Fishbein- Ajzen-Hanson Questionnaire |
| **FAO** | Food And Agriculture Organization |
| **FCTC** | Framework Convention On Tobacco Control |
| **GYTS** | Global Youth Tobacco survey |
| **HIV** | Human Immunodeficiency Virus |
| **MUCHS** | Muhimbili University College of Health Science |
| **MUHAS** | Muhimbili University Health and Allied Sciences |
| **ORCI** | Ocean Road Cancer institute |
| **SPSS** | Statistical Package For Social Scientists |
| **TCC** | Tanzania Cigarette Company |
| **TPB** | Theory Of Planned Behavior |
| **UN** | United Nations |
| **US** | United States |
| **WHO** | World Health Organization |

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# 1.0 REVIEW OF LITERATURE

## 1.1 INTRODUCTION

Inspite of many years of research and public efforts directed towards the use of tobacco and its adverse effects, tobacco use remains a critical health problem. The harmful effect of cigarette smoking and other forms of tobacco use have been well documented for several decades and yet the use of tobacco continues to increase around the world. Cigarette smoking is emerging as the world largest preventable cause of illness and death. It is the second major cause of death in the world after high blood pressure and fourth most common risk factor for disease worldwide.[1] Tobacco is a silent killer that causes large number of deaths nearly as much as HIV AIDS, killing up to 4.9 million people per year (equivalent to 1 in 10 adult deaths worldwide) and by the year 2030, the World Health Organization (WHO) projects this rise to 1 in 6 adult deaths, this being a higher rate of mortality than any other cause of death.[2]

Currently, there are over 1.1 billion smokers in the world representing one third of the global population aged 15 years and over. The majority of the smokers (800 million) live in developing countries and are mostly men (700 million).[3] According to the Population Reference Bureau, more than one fourth of the world's six billion people are between the ages of 10–24, making this group the largest ever to enter adulthood. Eighty six percent of them live in less developed countries.[4] According to the 2002 census, Tanzania has 32.5% of its population between 10-24 years, which is a third of its total population. Worldwide, the World Bank statistics estimates that there are between 82,000 and 99,000 young people who start to smoke everyday and therefore risking rapid addiction to nicotine. Consequently, if there are no new interventions, and if children continue smoking at expected current rates, by 2025 the global numbers of smokers is expected to rise from 1.1 billion to 1.64 billion. The sad news is that three out of five young people who experiment with tobacco will become addicted, and half of them will die prematurely. [5]

The unfortunate trend of the tobacco epidemic is the shift towards the increased use in the developing countries following successful measures of comprehensive tobacco control in many industrialized countries. The multinational tobacco companies are finding new

markets in Africa, Eastern Europe, Asia and Latin America. A statement from one of the multinational tobacco companies states: "we should not be depressed simply because the total free world markets appear to be declining. Within the total market, there are areas of strong growth, particularly in Asia and Africa ...".[6]

WHO reports show that over 91 countries (mostly the industrialized nations) around the world adopted comprehensive tobacco control policies in the last 20 years.[7] As a result tobacco consumption declined between 1981 and 1991 in most high income countries. By contrast, in many developing countries where anti tobacco control policies are weak or non existent, tobacco consumption increased by about 3.4% per annum. Overall, smoking prevalence among men in developing countries is about 48% while in women it is 7% [5]. Emerging evidence that there is an increased proportion of smokers amongst adolescent and women in Africa is also disturbing. [8] During the last few decades, research has shown that advertising campaigns by the tobacco industry have been successful in glamorizing cigarette smoking and recruiting new young smokers especially females. [9] In Tanzania, there have been many advertisements and promotional activities targeting young people. For example Miss Aspen promotions which were popular several years back and in November 2007 the Tanzania Cigarette Company launched a "Global trip complements of Embassy Cigarette Brand" were smokers were required to fill in forms obtained in embassy cigarette brand packets and winners were awarded various prizes including free trips to various destinations worldwide. [10] Several studies have shown that children are aware of cigarette advertisements and remember specific details. For example cigarette advertising in the United Kingdom was found to be more successful in its appeal to children than adults.[11] Also a longitudinal study by Pierce et al [12] found that adolescents between 12-17 years old are very susceptible to tobacco advertising and are more likely to experiment with cigarettes. A study conducted by Nyinondi in Dar es Salaam found that most students who like cigarette adverts think those models are having fun and find the slogans interesting.[13]

Cigarette smoking seriously threatens sustainable development in world's poorest nations through disability and premature death. In Tanzania, for instance, the Ocean Road Cancer Institute (ORCI) estimates that there are over 20,000 new patients diagnosed with cancer

each year and 3 out of the 5 diagnosed cancers are known to be tobacco related.[14] The overall country mortality from such cancers is unknown, but the fact that 60% of cancers are tobacco related raise serious public health and community concerns. To cap it all, the deaths from tobacco use occurs among persons in their most productive years (35-69 age range).

## 1.2 BACKGROUND

### 1.2.1Prevalence of smoking among adolescence

The Global Youth Tobacco Survey (GYTS) in collaboration with WHO and Centre For Disease Control (CDC) surveyed school children aged between 13 – 15 years in various countries worldwide. In developed countries, prevalence was highest in Western Europe, where it was found that 1/3 of boys smoked and the proportion was almost as high for girls. Regular smoking for 13 year olds varied from 3.5 to 12.5% and about 40% of the 15-19 year olds smoked on a daily basis. In African countries high prevalence rates of ever use were found in North, Western and Southern Africa e.g. Burkina Faso 44.9%, Mali 39.8%, Mauritania 31.8%, Togo 24.2%, Senegal 22.3%, SouthAfrica 46.7% while Kenya 14.9%, Uganda 17.5% and Egypt 13.8% had slightly lower rates.[15] The Food and Agriculture Organization (FAO) of the United Nations observes that tobacco consumption in Africa will become among the highest in the world unless new policies are developed to counteract current annual increases in consumption.[16] In Tanzania, there are no national studies that address tobacco use at a national level let alone cigarette use among young people. There are a number of studies that have been done in school populations. Kiangi[17] found the prevalence of current smokers in regions of Morogoro, Kilimanjaro and Dar es Salaam to be 5%, with more boys smoking than girls. In Arusha region, Mokiti[18] reported the lifetime prevalence to be 14%. Nyinondi[13] in a study conducted in Ilala municipality of Dar es Salaam found 22.1% lifetime prevalence and 4.4% current smokers. In 2005, Kaduri did a study in all three municipalities of Dar es Salaam and found prevalence of lifetime tobacco use to be 8.1%.[19] There are wide variations in prevalence of cigarette smoking due to geographical and methodological differences.

In January 2004 Tanzania (as a member of WHO) signed the Framework Convention of Tobacco Control (Tobacco WHO/AFRO), an international treaty which was ratified in February, 2007. This treaty aim at reducing the burden of disease and death caused by tobacco through demand reduction strategies. In line with this treaty, the nation needs to develop comprehensive tobacco control policies and programmes for the prevention and control of tobacco.[20] WHO further emphasize that the policies and programmes to control tobacco use should be supported by reliable and timely information on the subject including its health consequences and the socio- cultural elements which underlie its use.[5] Gathering appropriate information at regular intervals will help monitor, influence and control the tobacco epidemic. Smoking prevention programs should benefit from comprehensive theory based studies of adolescent smoking initiation.[21]

**1.2.2 Predictors of smoking in Adolescence**

Cigarette smoking among adolescents remains one of the most important public health challenges. As with adult smoking, adolescent smoking does not occur in a vacuum, and a variety of individual and situational factors influence their smoking behavior. The predictors of smoking are multifactorial in origin and complex in nature. However they serve as important determinants that can help in making interventions more appropriate and effective.

Tobacco use in adolescence may be described as a transition process involving several stages. One such theory is as follows: The first stage is of non smoking which can be subdivided into two sub stages - no intention to smoke and contemplation/preparation in which adolescent starts to consider smoking. This is followed by the stage(s) of experimenting, regular smoking, daily smoking and ultimately nicotine dependence.[22] A number of factors operating at different levels do influence smoking behavior at various stages. Those operating at individual or personal level include genetic, biological, personality, cognitive and sociodemographic characteristics. Some are fairly specific while others influence at broader environmental and socio cultural levels.

The social/normative stream includes the influence of significant others on smoking behaviors, attitudes and characteristics of important social relationship leading to social normative beliefs. The environment and cultural contexts includes community characteristics, media influences and legislative/policy issues that do eventually shape ones attitude and expectations towards smoking behavior.

There are several theories which attempt to explain health related behaviors and related causative factors. The theories operate at different levels: some focus on individuals, other take cultural and social factors into consideration while a few include the structural and environmental determinants.[23] The theory of planned behavior advanced the most basic individual integrated models of social behaviors.[24] The theory of planned behavior (TPB) is an extension of the theory of reasoned action. Both theories focus primarily on determinants of behavior. According to the theory of planned behavior, intention to perform or not to perform a behavior is the immediate determinant of the behavior. Intention in turn is a direct function of three independent variables – attitude, subjective norm, and perceived behavior control. Perceived behavior control together with the influence of intention, can also directly predict behavior in some cases where behavior is not under an individuals total control. In the case of smoking, individual's intention to smoke is a function of attitude towards smoking, perception of what significant others would think about his or her smoking behavior and perception about ones self- control over smoking behavior.

The Theory of planned behavior has been used extensively to explain smoking behavior. There is sufficient data that supports the predictive validity of the theory of planned behavior. Based on studies in USA, Chassin et al found that "Intentions; were …the most important single predictor of future smoking transition".[21] A longitudinal study done in China by Guo et al found that the theory of planned behavior does predict adolescent smoking.[25] The student's intention towards smoking at baseline significantly predicted smoking behavior one year later. Similar findings were found in a study conducted in Netherlands where intention was the most powerful predictor in explaining adolescent future smoking behavior, and that self efficacy was the best predictor among the smoking related cognitions .[26]

A study done in USA among teenage girls, ages 13 to 19 years comprising of three different ethnicities, Hispanic, Puerto Ricans and African Americans showed direct relationship between attitude and perceived behavior control and smoking intention for the three adolescent ethnic groups. Subjective norm was found not to be significant as an explanation for adolescent smoking intention in two groups (non Hispanics and Puerto Ricans).[27] In a study done by O Callaghan and colleagues found that intentions together with past behavior predicted their actual behavior.[28]

Among African countries, few studies have used the theory of planned behavior to explain smoking behavior. One study from Gambia found that smokers had significantly less confidence than non smokers in their ability to resist smoking when they felt nervous and upset.[29] Non smokers were more definite in their intention not to smoke in the next year than smokers. From the reviews above it is evident that smoking related cognitions are important in explaining smoking behavior. In Tanzania, there are no published data based on theory of planned behavior per se in explaining aspects of smoking behaviors. Cognitive affective theorists have argued that factors beyond the three constructs of the theory of planned behavior may only influence the adolescents' behavior by shaping these constructs indirectly by mediating through cognitive affective processes.[24, 30]

### 1.3 CONCEPTUAL FRAMEWORK FOR THE STUDY

The theory of planned behavior was used as the underlying conceptual framework to examine the effect of various factors to help explain and predict smoking behavior in this study. This theory was developed in 1975 as a framework for explaining behavior. "In Fishbein and Ajzen's model, attitudes and subjective norms combine to influence our behavioral intention ..." An individual chooses voluntarily and 'reasons' whether or not to perform a certain behavior such as smoking. The actual control over a behavior that an individual perceives has a vital impact on behavioral ability and achievement. Intentions are assumed to capture the motivational factors that influence a behavior; ..." .[31] Behavioral intention is, "... the degree to which a person has formulated conscious plans to perform or not perform the behavior". [31] In this study intention was referred to as a degree to which a student has formulated conscious plans to smoke or not smoke.

The study therefore looked at attitudes and various other factors with regard to smoking behavior and smoking intention. The theory distinguishes between direct and indirect measures of predictors in smoking intention. The direct measure is asked by evaluative judgments about smoking behavior. The indirect measure identifies the antecedents of attitude; subjective norm and perceived behavior control which are termed the belief based measures of attitude, subjective norm and perceived behavior control. The direct measure of attitude is a function of the product of ones salient beliefs about the consequences of smoking (behavioral belief) multiplied by evaluation of these (consequences or outcome). Attitude reflects a person's relative and permanent feelings towards smoking behavior. "For me to smoke cigarettes during the next month/ year would be fun" is a direct measure of attitude but the salient belief underlying this general concept is what the person believes about smoking in terms of the advantages or disadvantages and the outcome /consequences of smoking e.g. "If I smoke cigarette I will get cancer" and "getting cancer is bad" influences a person's general attitude towards smoking.

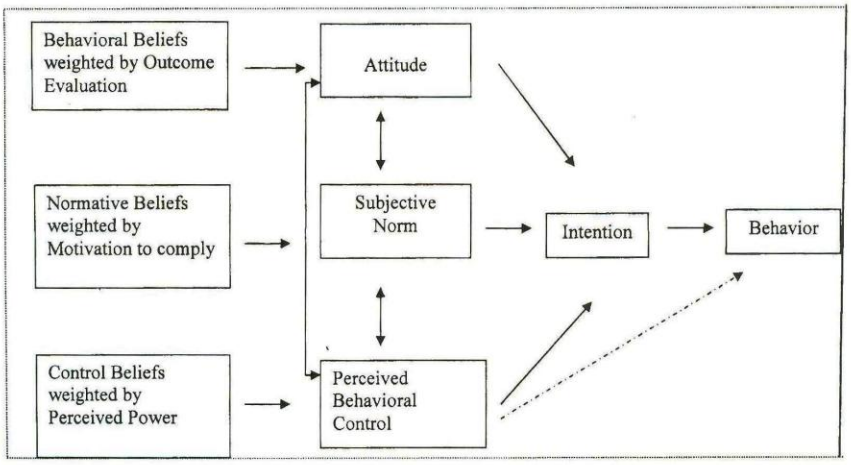
With regards to subjective norm, this is a function of a product of ones perception of approval or disapproval by significant others with regards to smoking multiplied by motivation to comply with significant others. The significant others comprise of people who adolescents perceive as very important to them. They may range from parents, peers to teachers, religious leaders etc. However in this study significant others comprised of parents, best friends, boyfriends/girlfriends. Generally a direct measure of subjective norm would be 'if I smoke most people who are important to me would…..". whereas the underlying (normative belief) would be what the adolescent perceives about specific referents regarding his smoking behavior e.g. if I smoke my mother would…"and the adolescents motivation to comply with the significant others instruction or how much do they care what the significant other thinks he should do" e.g. "most of the time when my mother tells me to do something I go along with it". It is therefore the balance of these social forces that may eventually influence a person's subjective norm in any given context.

The direct measure of perceived behavior control would be 'how easy/ hard is it to smoke cigarettes?" but this is a function of a summed multiplication of control beliefs and power statements e.g. of a control belief is 'how often are you under stress" the corresponding perceived power statement would be "when I am under a lot of stress, I do smoke cigarettes". This perceived behavior control is similar to Bandura's self efficacy. [23] Efficacy beliefs influence how people think, feel, motivate themselves and act". [32] "Self-efficacy beliefs are based on individuals' expectations that one possesses certain knowledge and skills, as well as the capability to take action required to overcome problems and to succeed under the stresses and pressures of life. [33]

The attitudes, subjective norm and perceived behavior control constructs can also be modified by external variables such as demographic characteristics and personality factors.

Below (Figure.1) is a diagrammatic theoretical framework of the theory of planned behavior in an attempt to explain its usefulness in studies on health and risk behaviors.

Figure 1: Theory of Planned Behavior




**Source: Ajzen, I. (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes,* 50, p. 179-211.**

Other constructs drawn to explain social aspect of determining smoking behavior is modeling. Social cognitive theory emphasizes that people can learn new behaviors by simply observing the behavior of others. Bandura, a social cognitive theorist, believes that children learn much of their gender and moral behavior by observing other people, especially people similar to themselves .[32, 34] The concept of modeling is a central part of this learning process. "The impact of modeling on beliefs of personal efficacy is strongly influenced by perceived similarity to the models".[34] As children get older, modeling can be a process whereby new patterns of behavior can be acquired.[32] The models may include parents, siblings, peers etc.

## 1.4 DEFINITION OF TERMS

Adolescent

Adolescence is defined as a period of transition between childhood to adulthood. The literature defines adolescence as the period of approximate ages of 10 years to 21 years of age[35] others have defined it as a period between 10 to 19 years[17] while others define the ages from 12 or 13 to 19 years of age[36]. It includes teenagers (aged 13 to 19 years) overlapping with the period that is defined as youth (aged 15 to 24 years). Since most of the junior secondary school students in Tanzania were assumed to be within the age range (12 to 19 years) that age range was accepted as the adolescent period for the purpose of this study.

Cognitive-Perceptual Variables

Cognitive-perceptual variables are the factors that have been found to motivate people towards health-promoting behaviors and lifestyles. The factors identified for this particular study are Attitude, Subjective Norm, and Perceived Behavioral Control.

Personal Factors

Personal factors are modifying variables that describe specific demographic data, such as age, gender, education, and stressors[37]. Similar factors listed on the demographic data section of the questionnaire describe the variables for this study. These include age, sex, grade, parental education, who student lives with, religion etc.

Smoking Behavior

Cigarette smoking whether industrial or hand rolled excluding other forms of tobacco use, is defined as the health-risk behavior for the purpose of this study. There are different classes of cigarette smoking behavior status as follows: Ever user included any person reported to have smoked even a few puffs of cigarette in his/her lifetime,[38] current smoker was defined as person who smoked at least once in the past month preceding the survey,[38] regular smoker is any person who smoked at least one cigarette per week[38]. While a non smoker is any person who has never smoked or even tried a few puffs of a cigarette in his life [38].

## 2.0 STATEMENT OF THE PROBLEM

The problem addressed in this research is based on the growing epidemic of tobacco use in developing countries. Tanzania as a developing nation falls in the category. Tobacco is responsible for more deaths worldwide than any other risk factor except for high blood pressure. It is expected to kill nearly as many people as HIV/AIDS does, causing 1 in 10 adult deaths worldwide[2]. The Tobacco control and millennium development goals reports that during the 20th century over a hundred million deaths were attributed to tobacco, mostly in developed countries. However, given the current shift in patterns of consumption from developed to developing, one billion deaths due to tobacco are expected in this 21st century, mostly in developing countries. The Reports from the Tanzania Cigarette Company (TCC) shows that consumption rates has increased with a double digit volume growth across all the cigarettes brands; the sales in volumes have also been growing over the last five years with up to 13% sales gross turnover between 2004 and 2005.[39] It is not known whether the increase in consumption is a result of new uptake of smokers such as adolescents or adults or was due to a mere increase in quantity by the already established smokers. However the notion that the major transnational tobacco companies have expanded their influence and are opening their markets into the developing world is a crucial matter because there are various imported brands already available due to free market economy which is practiced in the country. Of concern was that the targets in developing countries focuses more on adolescents and women[7] meaning smoking prevalence is likely to continue to rise among adolescents making this a serious global and national problem that needs urgent attention.

It has been reported that almost 90 % of adult smokers began at or before age 18 years.[40] This means cigarette smoking is a habit that primarily initiates during adolescent years [21]. This is a statement that should alert all people to support educational and community partnerships that will foster healthy lifestyles for young people. In Tanzania a study done by Mbatia and Kilonzo found that children start to smoke as early as 5 years of age, and by 10 years of age 30 to 50 % of them have experimented with tobacco.[41] Other studies have also shown that the first cigarette may open the gateway to establishing more frequent smoking behavior and experimentation with a wider range of other substance of abuse.[42]

COLLEGE LIBRARY

One WHO official in the African region once pointed out that "it will be a shame if we conquer the current HIV epidemic sweeping Africa, only to see those spared die from a preventable epidemic caused by tobacco use. We must think of the future and improve the health of all citizens".[20] This statement calls for promotion of future health behaviors in adolescence.

The broad question of why Tanzanian adolescents engage themselves in this risky behavior is not clearly understood. Factors operating at an individual level that may determine ones intention to smoke in future have not been studied. The intention to engage in smoking behavior is a an important measure as this represents a persons motivation to smoke in future and persons with strong intentions are likely to exert more effort to achieve the behavior. The proximal determinants of the adolescents smoking intention involves the adolescents attitudes towards smoking behavior , the impact of subjective norm and their own perception of behavior control towards smoking behavior. This relationship between attitudes, subjective norm and perceived behavior control on smoking intention is not known in our context. The interaction of these factors with smoking intentions is necessary to understand in order to broadly identify entry points for advocating behavior change in our context. No studies have looked into the theory of planned behavior per se to explain smoking behavior in Tanzanian adolescence.

## 3.0 RATIONALE

This study, using a theory based model, seeks to contribute to our understanding of the function of certain variables associated with smoking behavior and smoking intention in adolescence. With a better understanding of what combination of factors are associated with the initiation of smoking in adolescence, more effective interventions could be designed to reverse this growing trend. More specifically, the results obtained will provide information on the relationship of adolescents attitudes, subjective norms and perceived behavior control with regards to smoking intention that are predictive of their future behavior. These findings will lead to a better understanding of adolescents' perspectives regarding smoking behavior and form the basis of promoting public health awareness on smoking behavior and planning for intervention.

Tanzania has embarked on concerted efforts to address smoking at legislative and policy level. While this study will identify some of the potential factors at an individual level, it may contribute by providing relevant information on areas of possible intervention in prevention and cessation of smoking among youth. The study will therefore add to the national effort to meet the United Nations Millennium Development Goals and relevance of tobacco control focusing on "Partnering for Health Improvements" and "Increasing quality and Years of Healthy Life ."[43]

# 4.0 STUDY OBJECTIVES

## 4.0 Study objectives

Within the theoretical framework of the theory of planned behavior the objectives were:

## 4.1 Broad Objective

To examine the social cognitive determinants of smoking behavior among junior secondary school students, Kinondoni municipal, Dar es Salaam.

## 4.2 Specific Objectives

1. To determine the prevalence of cigarette smoking among junior secondary school students in Kinondoni municipal, Dar es Salaam region.
2. To compare smoking status with various sociodemographic profile of junior secondary school students in Kinondoni municipal, Dar es Salaam region.
3. To determine the association between attitude of students towards smoking and their intended future smoking behavior.
4. To determine the association between perceived reactions by significant others (subjective norm) with regards to smoking and intended future smoking behavior of students.
5. To determine the association between adolescents self efficacy (perceived behavioral control) and intended future smoking behavior of students.

### 4.3 Research questions

The primary research question for this study was: what factors of the theory of planned behavior influence intention to smoke among the junior secondary school students in Kinondoni district, Dar es Salaam? The secondary research questions included:-

- Is there a relationship between ones attitude towards smoking and smoking behavior?
- Is there a relationship between subjective norm and students smoking behavior? Does the opinion and behavior of significant others impact on the students smoking behavior? And what's the nature of the impact? i.e. (how important are their opinions to the students)
- How does the school adolescents' perception of behavior control towards smoking correlate with their future smoking behavior?
- Is there a relationship between personal factors on cognitive perceptual variables of smoking intention and or behavior?
- Is there a relationship between social demographic characteristics with smoking behavior?

## 5.0 METHODOLOGY

### 5.1 Description of the study area

The study was conducted in Kinondoni municipality of Dar es Salaam City. Dar es Salaam is the largest city in Tanzania with 3 administrative municipalities namely; Kinondoni, Ilala and Temeke. According to the Tanzania Population Census 2002, the city had a total population of 2,487,288 of which 1,254,853 are male and 1,232,435 are female. Kinondoni is one of the three municipalities of Dar es Salaam with the largest number of habitants around 1,083,913.[44] The municipality is bordered by the Indian Ocean to the North East, Ilala municipality to the South, Bagamoyo District to the North, Kibaha District to the West and Kisarawe District to the South West. The municipality is well linked by roads and other communication networks to the rest of the city and other parts of the country. It has both commercial and non commercial centers therefore giving a heterogeneous exposure of its habitants. There were a total of 101 secondary schools at the time of study constituting of 20 government and 81 private schools.

Figure 2: Map of Kinondoni Municipality




**Source: Kinondoni Municipal Records, 2008**

**5.2 Study population**

The study comprised of junior secondary school students in Kinondoni municipality.

**5.3 Study design**

This was a descriptive cross-sectional study design, using a quantitative technique. The study was conducted in Kinondoni municipal, Dar es Salaam city for a two month period (August 2007- September 2007).

**5.4 Sample size estimation**

The estimated sample size N was computed using the formula below,

$$N = \frac{z^2 pq}{d^2}$$

Where;

N = Estimated Sample Size

Z = is the standard normal deviate, which is 1.96 on using the 95% confidence interval.

P= estimated Proportion of student smokers was taken to be 4.4 % [13]

q = (100-P) = proportion of non smokers

d= margin of error= 1.2 %

Therefore;

$$N = \frac{1.96^2 \times 4.4 \times 95.6}{1.2^2}$$

N= 1122

Adjusting for non response, we added 10 % of the estimated sample size. =1122 +112=1234

Therefore, the Estimated Sample Size was about 1300

### 5.5 Sampling procedure

The sampling procedure for generating data for this study was a multistage cluster sampling: From the 101 secondary schools in the municipal, 30 schools were randomly selected using a table of random numbers. From each selected school, a sampling frame consisting of form one to three students was constructed and one form was randomly selected. From the selected form, a sampling frame consisting of all classes in that form was generated from which one class was randomly selected and all students in the selected class were included in the study sample.

### 5.6 Data collection instruments

Data was collected using a self-administered questionnaire comprising of closed questions. The validated instrument Fishbein Ajzen Hanson questionnaire (FAHQ) was used with permission from the author (Appendix No. 11.1). This was adopted with some modifications including using of a likert like scale instead of semantic evaluative scale in an attempt to make the questions more understandable to students. The FAHQ was used for this study to gather information on cognitive - perceptual variables that would help identify and measure smoking behavior and intention to smoke or not to smoke cigarettes. The modified questionnaire had 78 questions, categorized into 6 main sections, namely; demographic characteristics, patterns of smoking, significant others smoking behavior, attitudes, subjective norm and perceived behavior control. The demographic data section had 6 items that reflected the personal variables that may contribute to the smoking behavior and smoking intention of the target population. Permission to use the instrument was granted from the author.

Initially, a questionnaire was prepared in English and translated in Swahili, which in turn was back translated into English. This was done in-order to check for consistency and validity. The reason for using the adopted instrument was to gather data that would allow cross sectional comparison with similar studies done elsewhere. The self administered questionnaire employed was in Kiswahili and time for filling the questionnaire ranged between 30 – 45 minutes.

**5.7 Selection and training of research assistants**

Two research assistants with previous research experience, fluent in English and Kiswahili, familiar with secondary schools and school systems in Kinondoni municipality and willing to work for long hours were recruited. They were familiarized with the study and trained on how to use the instrument and strategies for data quality assurance.

**5.8. Ethical clearance**

Ethical clearance was sought from the Muhimbili University College of Health Sciences College Research and Publication Committee (Appendix No. 11.3) which has now been upgraded to a fully fledged University (MUHAS), to conduct the study. Permission was also sought from the responsible person at the Ministry of Educational and Vocational Training, Department of Secondary Education who also gave me an introductory letter to Kinondoni Municipal Educational Officer and headmistress/headmaster of each of the selected secondary schools informing them about the purpose of the study and requesting their co-operation and assistance during the study.

**5.9 Informed consent process**

All participants, before responding to the questionnaire were informed about the purpose of the study and requested to participate in the study informing them that it was voluntary to participate. It was made clear that acceptance or refusal to participate in the study had no consequences and that they were free not to participate in the study at that time and that they were free not to answer any question if they felt they would be psychologically affected. Students were also assured of confidentiality as the questionnaire was anonymous. It was also indicated that there were no specific benefits to the individual participants; however the study results would have contributed to the present knowledge about smoking among adolescents students. The students then filled in written informed consent (Appendix No. 11.8)

## 6.0 DATA PROCESSING AND MANAGEMENT

### 6.1 Pilot phase

Prior to the main study, a pilot study was done in mid June 2007 in Ilala area with 50 students in order to assess the applicability of the items and time used to fill in the questionnaire. Most questions were found to be well understood by the students.

### 6.2 Data entry and analysis

Soon after data collection, all questionnaires were checked for completeness and data obtained was stored by the principal investigator in an office in a secure environment. SPSS version 13 template questionnaire was prepared and responses coded (precoding of questionnaire) by the trained research assistants under supervision of the principal investigator. Precoded data was then entered by an experienced data entry clerk. Data cleaning was simultaneously being done during and after data entry. After data cleaning, data analysis was done using SPSS software version 13. The direct measures for cognitive perceptual variables of attitude, subjective norm and perceived behavior control scales were used as per the theory of planned behavior (Table 1). Frequency tables of relevant variables and cross tabulations were prepared to explore the associations between dependent and independent variables. Using chi- square tests, statistical associations involving categorical variables were assessed. A significance level of 0.05 was used to assess statistical significance in differences or associations being examined. Multivariate Logistic regression was also done in selected outcomes of interest.

6.2.1 Outcome measures (dependent variables) included smoking intention and smoking behaviors (ever and current) which were all dichotomous.

6.2.2 Predictors of interest

a) Demographic characteristics

Age in years was grouped into four categories: younger adolescence (12 – 14), mid adolescence (15 – 17), older adolescence (18 + years). Sex was dichotomized as (male and females), grade level (form I, form II and form III), religion as Christians and Muslims whereas mother and fathers education was measured as three categories (primary,

Secondary, University/College education) and who the student lives with was categorized into (parents, single parents, family relatives and other living arrangements) respectively.

b) Social cognitive variables

i) Attitude

The scales for measuring attitude comprised of three items with fair psychometric properties. The three items that respondents were asked to rate were "for me to smoke cigarettes during the next month/ year would be fun", "for me to smoke cigarette during the next month/ year would be nice" and "for me to smoke cigarette during the next month/year would be pleasant". A four point scale – strongly agree, agree, disagree and strongly disagree was used. Higher scores (3 to 4) indicated negative attitudes towards smoking and lower scores (1 to 2) indicated positive attitudes towards smoking. Internal consistency (reliability) using Cronbachs alpha and construct validity using factor analysis was assessed. Factor analysis used principal component analysis to extract components that statistically emerged from the scales with eigen values of more than one. The eigen value obtained was 1.83.The three items explained 60.9% of variance in scores meaning that the three item scale measured a single construct. The mean score for the scale (ranged from 1-4) was 3.71 and standard deviation of 0.48. As the smoking scale was not normally distributed, it was used as a categorical variable. Scores at 33% turtiles and above were categorized as negative attitudes towards smoking behavior while scores less than the 33% turtiles as positive attitudes towards smoking.

ii) Subjective Norm

The single – item direct measure of subjective norm scale measured each respondent's perception of what persons who are important to them would think about them smoking. The analysis revealed that it was important to the respondents what others thought about their smoking. Each respondent was asked to rate, "if I smoke cigarettes, most people who are important to me would..."on a five point scale of approve, strongly approve, uncertain, strongly disapprove and disapprove with a range of 1 to 5. Higher scores (4 to 5) indicated negative responses towards smoking and lower scores (1 to 2) indicated positive responses towards smoking. The responses of strongly approve and approve were further coded as approve as well as responses of strongly disapprove and disapprove were coded as disapprove.

iii) Perceived behavior control

The scale for measuring perceived behavior control had three item that measured confidence and the perception of self control for each respondent over their own smoking behavior. The three items that comprised of the perceived behavioral scale that respondents were asked to rate included, "how much control do you think you have over whether you smoke cigarettes", "if I wanted I could easily not smoke cigarettes in future" and "do you think it would be easy for you not to smoke cigarettes in future?". A five point scale – extremely no control at all, no control at all, neither, some control, extremely complete control or extremely easy, quite easy, neither, difficult, extremely difficult and strongly agree, agree, neither, disagree and strongly disagree were used with a range of scores from 1 to 5 for each scale. The scale psychometrics were poor as Cronbachs alpha for internal consistency (reliability) was very low 0.45. Only one item was extracted that had the highest correlation (0.183) with others. "How much control do you think you have over whether you smoke cigarettes?" was the single item selected for reflecting direct measure of perceived behavior control. Higher scores (4 to 5) indicated strong sense of perceived behavior control and lower scores (1 to 2) indicated less confidence and belief in self – control over their own smoking behavior. Those who responded "some complete control" or "extremely complete control" were coded as having complete control while those who responded "extremely no control at all" and "no control at all" were coded as having no control at all.

iv) Intention

The psychometrics properties of the intention scale were good. The respondents were asked to rate their intention by answering four questions. "At any time during the next year I will smoke cigarettes." or "I intend to smoke a cigarette in future" on a four five point likert evaluative scales – extremely true, quite true, neither, quite false, extremely false or extremely likely, quite likely, uncertain, extremely unlikely and quite unlikely with a range of scores from 1 to 5 for each scale. Higher scores (4 to 5) indicated intent non smokers and lower scores (1 to 2) indicated intent smokers while (3) were the intent uncertain. Factor analysis demonstrated that the four items on the scale explained 57.1% of variance in scores, meaning it is measuring a single construct. The eigen value was 2.28 .The scale

mean score was 3.74 (range from 1- 4) and standard deviation of 0.44 with an acceptable internal consistency as evidenced by Cronbachs alpha of 0.74. The intention scale was not normally distributed, thus non parametric variables were used. Scores at 33% turtiles and above were categorized as having lower intentions to smoke and those less than the 33% turtiles as having higher intentions to smoke in future.

**Table 1 provides an overview of the scales used to assess the cognitive perceptual variables that were considered as predictors of smoking intention.**

| Variable | Items | Sample questions | Response format | Alpha[1] |
|---|---|---|---|---|
| Attitude variables | 3 | For me to smoke cigarette in the next month /year would be fun | 4 - point scale[2] | 0.67 |
| Subjective norm | 1 | If I smoke cigarettes, most people who are important to me would… | 5 - point scale[3] | - |
| Perceived behavior control variables | 3 | How much control do you think you have over whether you smoke cigarettes? | 5- point scale[4] | 0.43 |
| Intention variables | 4 | At any time during the next year I will smoke cigarettes | 5- point scale[5] | 0.74 |

[1] To assess internal validity of the scale, Cronbachs coefficient alpha was estimated

[2] 1=strongly agree, 2= agree, 3=disagree, 4=strongly disagree

[3] 1=strongly approve, 2= approve, 3= uncertain, 4= disapprove, 5=strongly disapprove

[4] 1= extremely no control at all, 2= no control at all, 3= neither, 4= some control, 5= extremely complete control

[5] 1= extremely true, 2= quite true 3=neither, 4= quite false, 5= extremely false

c) Significant others smoking behavior

The variables for father, mother, sister, brother and friends smoking behavior were dichotomized into yes or no.

## 7.0 RESULTS

A total of 1500 respondents participated in the study. Three respondents handed in their questionnaires with many missing items and were thus excluded from analysis. 1497 questionnaire were available for statistical analysis. Out of these, 47.8% were males. The participant's age ranged from twelve to twenty two years with a mean age of 16.2 years ±1.64 years. Generally there was no difference in age between males (mean 16.4 ±1.7 years) and females (mean 16 ±1.5 years). Almost a third of the study participants (31.7%) were in their third year of study (form threes) and nearly 39% were in their second year (form two), the rest were in form one. About one third (66.9%) of the study participants reported to be Christians and the rest were Muslims. Over (66%) of the students reported their fathers had post primary education and about (11.2%) reported their fathers to be absent. Mothers were generally less educated than the fathers; almost (39%) had primary education and only (20.2%) with post secondary education. Nearly (59%) of the respondents resided with both parents and (18.3%) with single parents, the rest either lived with other relatives or had other living arrangements as summarized in table 2.

**Table 2 Frequency distribution table of sociodemographic characteristics of study participants**

| Sociodemographic characteristics | Totals n | Percentage % |
|---|---|---|
| Age | | |
| 12 – 14 years | 210 | 14.1 |
| 15 – 17 years | 982 | 66 |
| 18 + | 297 | 19.9 |
| Gender | | |
| Male | 715 | 47.8 |
| Female | 781 | 52.2 |
| Grade level (duration by years in school) | | |
| Form I | 439 | 29.4 |
| Form II | 581 | 38.9 |
| Form III | 474 | 31.7 |
| Religion | | |
| ▪ Christians | 999 | 66.9 |
| ▪ Muslims | 495 | 33.1 |
| Fathers education | | |
| ▪ Primary education | 296 | 22.6 |
| ▪ Secondary education | 418 | 31.9 |
| ▪ University/College | 450 | 34.3 |
| ▪ Father absent | 147 | 11.2 |
| Mothers education | | |
| ▪ Primary education | 534 | 38.9 |
| ▪ Secondary education | 481 | 35.0 |
| ▪ University/College | 278 | 20.2 |
| ▪ Mother absent | 80 | 5.8 |
| Who student lives with | | |
| ▪ Both parents | 878 | 58.7 |
| ▪ Single parents | 274 | 18.3 |
| ▪ Family relatives | 295 | 19.7 |
| ▪ Other arrangements | 50 | 3.3 |

**7.2 Prevalence of cigarette smoking**

The proportion of students who had ever smoked cigarettes was 10.3 percent and 3.4% were current smokers. Recent use, within past week preceding the survey was 2.1%. Smoking on daily basis was reported by 1.2% of the surveyed students and majority in this group (89%) smoked one to three sticks per day. About 6% of the daily smokers smoked between ten and twenty cigarettes per day.

Table 3 compares the sociodemographic characteristics with cigarette smoking. Among the ever smokers, difference between various age groups was statistically significant ($p<0.01$), a higher proportion of students between age 12- 14 years and those 18 years or older were more likely to have been ever users. Males were significantly more likely to have ever smoked a cigarette (16.1%) than females (4.9%), ($p<0.001$). Ever smoking increased with time study participants had been in the school environment ranging from less than 9% among those with less than a year exposure to over 13% among participants with 3 years exposure in the school. Students who indicated that they had other living arrangements other than living with parents or family relatives were significantly more likely to have ever smoked a cigarette ($p<0.05$).

In the experimenters group (students who reported ever use and have not smoked in the past 30 days) males were significantly more likely to have experimented with cigarettes than females ($p<0.001$). There were no significant statistical difference between experimenters and age, form, religion, parental education or who student lives with ($p>0.05$).

Current use was significantly seen in older adolescents aged 18 years and above than the younger age groups, ($p<0.001$). Males were significantly more likely to have been current smokers than females ($p<0.001$). Living without a parent or family relative was also significantly more likely to have been a current smoker ($p<0.05$).

**Table 3 Sociodemographic characteristics of study participants by smoking status**

| Sociodemographic variable | Percentage of students who | | | |
|---|---|---|---|---|
| | Ever smoked Yes N=154 % | Experimented N= 103 % | Smoked in last 30 days N= 51 % | Never Smoked N= 1342 % |
| Age | | | | |
| 12 – 14 years | 10.5** | 8.1 | 2.4*** | 89.5 |
| 15 – 17 years | 8.5 | 6.1 | 2.3 | 91.5 |
| 18 + | 15.8 | 8.4 | 7.4 | 84.2 |
| Gender | | | | |
| Male | 16.1*** | 10.1*** | 6.0*** | 83.9 |
| Female | 4.9 | 3.8 | 1.0 | 95.1 |
| Grade level (duration by years in school) | | | | |
| Form I | 8.7* | 3.0 | 5.7 | 91.3 |
| Form II | 9.3 | 3.6 | 5.7 | 90.7 |
| Form III | 13.1 | 3.6 | 9.5 | 86.9 |
| Religion | | | | |
| ▪ Christians | 10.1 | 6.7 | 3.4 | 89.9 |
| ▪ Muslims | 10.7 | 7.3 | 3.4 | 89.3 |
| Fathers education | | | | |
| ▪ Primary education | 9.1 | 6.8 | 2.4 | 90.9 |
| ▪ Secondary education | 10.8 | 6.7 | 4.1 | 89.2 |
| ▪ University/College | 10 | 6.9 | 3.1 | 90.0 |
| ▪ Father absent | 9.5 | 5.4 | 4.1 | 90.5 |
| Mothers education | | | | |
| ▪ Primary education | 8.6 | 6.2 | 2.4 | 91.4 |
| ▪ Secondary education | 11.0 | 6.7 | 4.4 | 89.0 |
| ▪ University/College | 11.6 | 8.7 | 2.9 | 88.4 |
| ▪ Mother absent | 10.0 | 5.0 | 5.0 | 90.0 |
| Who student lives with | | | | |
| ▪ Both parents | 9.6* | 7.0 | 2.6* | 90.4 |
| ▪ Single parents | 10.2 | 6.6 | 3.6 | 89.8 |
| ▪ Family relatives | 10.5 | 6.4 | 4.1 | 89.5 |
| ▪ Other arrangements | 22.0 | 10 | 12.0 | 78.0 |

*P < 0.05 **P < 0.01 ***P<0.001

### 7.3 Cognitive Perceptual Variables

Table 4 summarizes the frequencies of the students' responses to the cognitive perceptual variables. Of the 1493 students who responded to the attitude towards ones own cigarette smoking behavior, a total of four hundred and ninety - nine (33.4%) had generally a positive attitude towards smoking. With regards to subjective norm, it was important to the respondents what others thought about their smoking. Most respondents (85.5%) reported disapproval of smoking by their significant others. About a third (30.9%) felt that they had no control over whether they will smoke cigarettes in future and (28%) reported higher intentions to smoke in future.

**Table 4: Frequency table for direct measures of cognitive perceptual variable of smoking intention**

| Cognitive Perceptual Factors | Frequency n | Percentage % | Total N |
|---|---|---|---|
| **Attitude towards smoking behavior** | | | |
| positive attitudes | 499 | 33.4 | |
| negative attitudes | 994 | 66.6 | 1493 |
| **Subjective Norm** | | | |
| If I smoke cigarettes, most people who are important to me would? | | | |
| Approve | 217 | 14.5 | |
| Disapprove | 1275 | 85.5 | 1492 |
| **Perceived Behavior Control** | | | |
| How much control do you think you have over whether you smoke cigarettes? | | | |
| No control at all | 462 | 30.9 | |
| Complete control | 1031 | 69.1 | 1493 |
| **Intention to smoke in future** | | | |
| High | 403 | 27.9 | |
| Low | 1040 | 72.1 | 1443 |

### 7.5 Bivariate analysis of Main Predictors of Smoking Intention

Table 5 summarizes the results of the bivariate model using chi squared statistical test for examining associations between independent variables of cognitive perceptual towards smoking and smoking intention. Those respondents who expressed more favorable attitude towards smoking were more likely to report higher intentions (56.2%) to smoke than those who had negative attitudes (14.3%) towards smoking, ($p<0.001$, 7.71 (5.97 – 9.97). Students who perceived approval for smoking among their significant referents were almost two times more likely to report stronger intentions to smoke (44.6%) in the following month or year than those who perceived disapproval (25.4%) by significant others, ($p<0.001$, 1.76 (1.46 – 2.11). Students who felt that they had no control on whether or not to smoke were also more likely to indicate higher intentions (32.6%) to smoke in the future when compared with student who felt that they had control over whether they smoked or not (26%). The difference reached significant levels at ($p<0.001$, 1.26 (1.06 – 1.50).

**Table 5: Associations between cognitive perceptual variables and smoking intentions**

| Cognitive perceptual variable | Intention to smoke variable | | | |
|---|---|---|---|---|
| | High n (%) | low n (%) | OR (95% CI) | Total N |
| **Attitude** | | | | |
| Positive attitudes | 262 (56.2)*** | 204 (43.8) | 7.71 | |
| Negative attitudes | 139 (14.3) | 835 (85.7) | (5.97 – 9.97) | 1440 |
| **Subjective Norm** If I smoke cigarettes, most people who are important to me would? | | | | |
| Approve | 87 (44.6)*** | 108 (55.4) | 1.76 | |
| Disapprove | 316 (25.4) | 928 (74.6) | (1.46 – 2.11) | 1439 |
| **Perceived Behavior Control** How much control do you think you have over whether you smoke cigarettes? | | | | |
| No control at all | 142 (32.6)** | 293 (67.4) | 1.26 | |
| Complete control | 261 (26) | 744 (74 ) | (1.06 – 1.50) | 1440 |

***P<0.001, ** P<0.01

Opinions of parents, close friends, boyfriends/girlfriends or sexual partner on decisions of whether to smoke cigarettes or not were found not to be statistically significance with any of the students smoking status ($p>0.005$).

### 7.6 The effects of various sociodemographic characteristics on cognitive perceptual variables and smoking intention

Table 6 summarizes the effects of sociodemographic factors on attitudes, perceived behavior control and intention to smoke in future. Males (37.6%) were more likely to have more positive attitudes towards smoking than females (29.6%), (odds ratio 1.2; CI: 1.07 – 1.33 $p<0.001$). Duration of years spent in school influenced the student's perceptions of control over whether to smoke cigarette. The percentages of students who reported having no control decreased with increasing number of years spent in school. Those who had been in school a year (Form ones) were more likely to report that they had no control over whether they can smoke cigarettes than those with longer years in school (38.2% versus 19.6%), ($X^2$ 43, $p <0.001$). Duration of years spent in school had no statistical significant effects on attitude, subjective norm and intention to smoke. Form ones were also more likely to have more positive attitudes towards smoking than form threes (35.6% versus 28.9%), $X^2$ 6.57, $p <0.05$).

Age, religion, parental education and living circumstances were not significantly related to attitudes, subjective norm (not on table), perceived behavior control and intentions to smoke ($P>0.0.5$).

**Table 6: Bivariate analysis of sociodemographic characteristics and cognitive perceptual variables of smoking behavior and intention to smoke**

| Sociodemographic variables (Personal factors) | Attitudes/ positive<br>N=499<br>n (%) | High intentions to smoke<br>N= 403<br>n (%) | Perceived Behavior No control<br>N =462<br>n (%) |
|---|---|---|---|
| Age | | | |
| 12 – 14 years | 74 (35.4) | 57 (27.9) | 72 (34.6) |
| 15 – 17 years | 319 (32.6) | 257 (27.2) | 310 (31.6) |
| 18 + | 101 (34.0) | 86 (30.1) | 79 (26.6) |
| Gender | | | |
| Male | 267 (37.6)*** | 223 (32.7)*** | 219 (30.7) |
| Female | 231 (29.6) | 179 (23.6) | 242 (31.1) |
| School /grade (duration by years in school) | | | |
| Form I | 155 (35.6)* | 126 (30.1) | 167 (38.2)*** |
| Form II | 207 (35.7) | 160 (28.6) | 204 (34.7) |
| Form III | 137 (28.9) | 116 (25.1) | 93 (19.6) |
| Religion | | | |
| ▪ Christians | 330 (33.1) | 261(27.1) | 309 (31) |
| ▪ Muslims | 168 (34.1) | 142(29.8) | 152 (30.8) |
| Fathers education | | | |
| ▪ Primary education | 92 (31.1) | 73 (25.8) | 94 (31.8) |
| ▪ Secondary education | 142 (34.1) | 114 (28.4) | 127 (30.5) |
| ▪ University/College | 158 (35.3) | 123 (28.2) | 125 (27.9) |
| ▪ Father absent | 39 (26.5) | 35 (24.8) | 45 (30.8) |
| Mothers education | | | |
| ▪ Primary education | 167 (31.3) | 145 (28.2) | 162 (30.3) |
| ▪ Secondary education | 166 (34.7) | 133 (28.6) | 160 (33.4) |
| ▪ University/College | 99 (35.9) | 73 (27.1) | 71 (25.7) |
| ▪ Mother absent | 22 (27.5) | 18 (23.4) | 23 (28.8) |
| Who student lives with | | | |
| ▪ Both parents | 304 (34.7) | 226 (26.6) | 265 (30.3) |
| ▪ Single parents | 88 (32.2) | 82 (30.8) | 88 (32.2) |
| ▪ Family relatives | 90 (30.5) | 79 (27.8) | 96 (32.5) |
| ▪ Other arrangements | 17 (34.0) | 16 (37.2) | 13 (26.0) |

*P < 0.05 **P < 0.01 ***P<0.001

### 7.6 Multivariate Analysis of the Main Predictors of Interest

On the basis of the bivariate analysis results, all the risk factors of interest were included in a multivariate logistic regression model at binary and multinomial level. The main outcome variables were current smoking and intention to smoke in future. Social demographic and cognitive perceptual variables that were significantly associated with the dependent variables at p value 0.05 were entered for the regression analysis. Odds ratio derived from the regression coefficients of > 1 were interpreted to suggest the respective covariate being a risk factor while odds ratio of < 1 suggested a covariate to have a protective factor.

Table 7 summarizes the results of two logistic regression models for the intention to smoke and current smoking outcome variables with the predictor variables of interest. The influence of risk factors of interest on smoking intention remained the same direction as noted in the bivariate analysis. Being a male increased the risk of reporting higher intentions to smoke to nearly one and a half fold (OR 1.44, 95% CI: 1.11 – 1.86); $p<0.01$). For cognitive perceptual variables, having a positive attitude towards smoking increased the risk of having higher intentions to smoke in future to about seven and a half times (OR 7.38, 95% CI: 5.68 – 9.57; $p<0.001$), while having approval to smoke by a significant other increased the likelihood of having higher intention to smoke in future to more than two times (OR 2.12, 95% CI: 1.49 – 3.01). Perceived behavioral control, however, was not significantly associated with intention to smoke $p>0.05$.

With regard to current use, the full effect model was done on intentions and cognitive perceptual variables; adjusting for age, gender and who student lives with. Being male increased risk of being a current user more than four times (OR 4.82, 95% CI: 2.08 – 11.19), $p<0.001$, whereas being between 15 – 17 years was relatively protective $p<0.01$(0R 0.36, 95% CI: 0.18 – 0.71) from being a current smoker. Living with both parents was also protective from being a current smoker (OR 0.28, 95% CI: 0.08 – 0.98), $p<0.05$. Attitude was the only cognitive perceptual variable that was significantly associated with current smoking behavior.

Those students who had positive attitudes towards smoking were almost two times more likely to have been current smokers (OR 2.4, 95% CI: 1.13 – 5.11), $p<0.05$. Current smoking was also considered as an independent predictor for intention to smoke. Students who had higher intentions to smoke in future were over five times more likely to have been current smokers (OR 5.2, 95%CI:2.39 – 11.51), $p<0.001$.

**Table 7 Multivariate logistic regression for smoking variables on risk factors of interest adjusting for socio demographic characteristics**

| Variables in model | Current use OR (95% CI) N = 51 | Intention to smoke OR (95% CI) N= 403 |
|---|---|---|
| **Predictor categories** | **Yes** | **High** |
| Age | | |
| 12 – 14 | 0.48 (0.17 – 1.40) | + |
| 15 – 17 | 0.36 (0.18- 0.71)** | |
| 18+ | 1.00 | |
| Gender | | |
| Male | 4.82 (2.08 – 11.19)*** | 1.44 (1.11 – 1.86)** |
| Female | 1.00 | 1.00 |
| Who student lives with | | |
| Both parents | 0.28 (0.08 – 0.98)* | + |
| Single parents | 0.41 (0.11 – 1.58) | |
| Family relatives | 0.37 (0.09 – 1.42) | |
| Living alone | 1.00 | |
| Attitude | | |
| Positive | 2.4 (1.13 – 5.11)* | 7.38 (5.68 – 9.57)*** |
| Negative | 1.00 | 1.00 |
| Subjective Norm | | |
| If I smoke cigarettes, most people who are important to me would? | + | |
| Approve | | 2.12 (1.49 – 3.01)*** |
| Disapprove | | 1.00 |
| Perceived Behavior Control | | |
| How much control do you think you have over whether you smoke cigarettes? | | |
| No control at all | + | 1.17 (0.88 – 1.54) |
| Complete control | | 1.0 |
| Intention to smoke in future | | |
| High | 5.2 (2.39 – 11.51)*** | - |
| Low | 1.00 | |

*P<0.05 **P<0.01 ***P<0.001

CI = Confidence interval

+ = explanatory variable not considered in the logistic regression model since it was not found to be statistically significant in the bivariate analysis using a significance level of 0.05

- = Not applicable

Table 8 summarizes the associations between perceived smoking behavior of significant others and initiation to smoke. Univariate analysis revealed that a quarter of the students (25.2%) reported having a friend who smokes, whereas 13.2% reported having a brother who smokes and 11.2% had fathers who smoke. Only 1.2% had sisters who smoke and very few (0.8%) had mothers who smoke. Bivariate analysis between student ever use and significant others smoking behavior showed that students who reported having a father who smokes were significantly more likely to have ever smoked than those who had no smoking fathers (15.6% versus 9.8%), $p<0.001$ (OR 1.6 (1.05 – 2.44). Having a sister who smokes was significantly associated with ever smoking (37.5% versus 9.8%), $p<0.001$ (OR 3.81 (1.98 – 7.34). Students who reported having a brother who smokes was statistically significantly associated with ever smoking (24.5% versus 8.3%), $p<0.001$ (OR 2.96 (2.11- 4.15) and having a friend who smokes was significantly associated with ever smoking (29.8% versus 3.9%), $p<0.001$ (OR 7.69 (5.51- 10.72) whereas having a mother who smokes was marginally significantly associated with ever smoking behavior (27.3% versus 10.1%), $p=0.06$ (OR 2.7 (1.01 – 7.18). The finding of the mother being marginally significant may be due to the smaller numbers of mothers who are smoking.

Logistic regression model was used between the independent variables of significant smoking behavior and ever smoking as the outcome variable was done. The analysis revealed that two independent variables to be strong predictors of ever smoking. Having a brother who smokes increases the likelihood of being a smoker by almost three times than having a brother who does not smoke (OR 2.95 (1.71 – 5.10) while having a friend increases the risk to about ten times for a student to become an ever smoker (OR 9.2 (5.69 – 14.87). Parental influence had low predictive value on ever use where having a father who smokes was not statistically significantly associated (OR 1.89 (0.96 – 3.76) $p>0.05$. Mother's smoking behavior was not a predictor at binary logistic level $p=0.64$.

**Table 8 Associations between perceived smoking behavior of significant others and initiation to smoke**

| Variables in model<br><br>Predictor categories | Univariate analysis of ever smoked<br>N = 1485<br>% | Bivariate analysis of ever smoked<br><br>N = 154<br>% OR (95% CI) | Multivariate analysis Binary logistic regression modal<br><br>OR (95% CI) |
|---|---|---|---|
| Mother smokes | | | |
| Yes | 0.8 | 27.3 2.7 (1.01 – 7.18) | 0.49 (0.02 -9.91) |
| No | 99.2 | 10.1 | 1.0 |
| Father smokes | | | |
| Yes | 11.2 | 15.6 1.6 (1.05 – 2.44)*** | 1.897 (0.96 – 3.76) |
| No | 88.8 | 9.8 | 1.0 |
| Sister smokes | | | |
| Yes | 1.2 | 37.5 3.81 (1.98 – 7.34)*** | 0.218 (0.54 – 14.70) |
| No | 98.8 | 9.8 | 1.0 |
| Brother smokes | | | |
| Yes | 13.2 | 24.5 2.96 (2.11 – 4.15)*** | 2.95 (1.71 – 5.10)*** |
| No | 86.8 | 8.3 | 1.0 |
| Friend smokes | | | |
| Yes | 25.2 | 29.8 7.69 (5.51 – 10.72)*** | 9.2 (5.69 – 14.87)*** |
| No | 74.8 | 3.9 | 1.0 |

***P <0.001

# 8.0 DISCUSSION

## 8.1 General: Sociodemographic profile

The demographic characteristics of the surveyed sample revealed that there were slightly more females than males, with a mean age of 16.5. This may be somewhat a true reflection of Kinondoni age and sex distribution in the adolescent age range, where females between ages 10- 24 appears to be more than males.[47] In terms of religion, Mainland Tanzania is dominated (60%) by Christians.[48] This has also been evident in many of the school based studies reporting Christianity as the dominant religion.[17, 18] Majority of the students reported that they follow the Christian faith mainly the Catholic denomination while about a third comprised of Muslims. With regard to education level of parents, more fathers attained university/college level of education compared to mothers. This is in agreement with the findings from Tanzania Demographic and Health Survey 2004/2005, showing more fathers than mothers had attained secondary and post secondary education (33.3% versus 23.6%).[49]

A little over half of the sample reported to be residing with both parents, representing the more nuclear family structure. It was noted that a small proportion of students lived alone in hostels or rented accommodation. These findings are not surprising because according to the TDHS, 2004/2005, about 61% of children less than 18 years live with both parents, 19% live with their mothers, 5% live with their fathers alone and 15% do live with relatives.[49]

## 8.2 Prevalence of smoking

Objective one of the study was to determine the proportion of the secondary school students expressed as percentage of the population who are smokers (ever, experimenting, regular and daily smokers) at a point in time in Kinondoni municipal. The WHO recognizes the need for countries to establish surveillance efforts which will help in knowing the magnitude, patterns, determinants and consequences of tobacco consumption.[5]

The overall prevalence rate of students who ever smoked a cigarette was 10.3 percent. Although there are no known comparable studies that have looked into smoking prevalence among secondary school students in Kinondoni municipal alone, these rates are slightly higher than the (8.1%) found in a study conducted in selected schools involving all three municipals in Dar es Salaam .[19] It is not possible to determine whether this is an indicator of increasing rates of use in adolescence over time or due to mere difference in geographical localities and variations of sample participants. In terms of sex distribution, more males in the surveyed population had ever smoked compared to females including having a higher proportion of current smokers. The proportion of students who were daily smokers was only 1.2 %, but a number of them (6%) were smoking heavily between 10 and 20 cigarettes per day. Studies among Nigerian Secondary School students have found higher prevalence rates of daily smoking ranging from 4 to 59% .[49] In Europe, reported rates of daily smoking are 5.5% in Sweden, 20.1% in Latvia, 8.9% in Poland and 24.7% in Austria.[50] The rates of daily smokers in this study were lower than those indicated in Europe and in other parts of Africa. This likely indicates that the school youth in Tanzania are relatively protected from smoking. It may also reflect wide variations in age groups in school based studies conducted in different parts of the world. According to the Global Youth Tobacco survey 2007 the trends between 2000 and 2007 have shown that current smoking rates among the 13- 15 year olds are greater in Europe as a continent 19.2% although different regions have different prevalences with lower rates seen in some parts of Africa regions and Eastern Mediterranean regions [51]. The prevalence of current smoking in different parts of Tanzania has been almost similar over recent years. Siziya et at., in 2007 reported the prevalence of current smoking in Kilimanjaro, Tanzania to be 4.4 % .[52] A similar prevalence has been reported among school children in Ilala Municipality.[13] This may mean that many students do experiment with cigarette but few take up the smoking habit.

### 8.3 Sociodemographic characteristics and smoking status

Age difference between various groups was statistically significant with ever smoking. Although a number of studies have shown the prevalence of ever smoking to be increasing with age and grade,[18,50] the analysis in this survey showed ever smoking to be more marked on the extreme ages of younger adolescents (12- 14) and older ones (18+) suggesting that experimentation with cigarette smoking may occur at all ages. This finding is consistent with the result of a study done in Zambia [53] among in school adolescents where extremes of the age group of 12 years and 17+ years had the highest prevalence of ever smoking (37.2% and 36.8%).

With regard to current use in this study, higher rates were significantly seen in older adolescents (≥18 years) than the younger ones. This finding may reflect increased exposure to smoking influence with increased age. Students with more years in school (form three) were more likely to have ever smoked than those in lower grades. This finding is consistent with older age of higher school grades.

Higher prevalence of smoking behavior among males in this study is consistent with findings from many other school based studies performed in Africa .[54, 55, 29, 17, 18, 19] Both ever and current smoking is strongly associated with males. The lower smoking prevalence among females may be due to traditional Tanzanian values which do not tolerate females smoking in the communities, but other unknown factors may also be operating. Living without a parent or family relative is a risk factor for adolescent smoking behavior. The idea of a student having other living arrangements other than parental or family relative was strongly associated with being an ever and current smoker. These findings are supported by a review done by Hausten et al[56] on smoking and poverty and found that living alone was associated with increased likelihood of cigarette smoking. Good parental care, supervision and monitoring have been shown to be protective from substance use behaviors including living with two parent families. [57] Similar to findings from other studies in Tanzania[18] religion was not significantly associated with any of the students smoking behavior (ever, current, experimenter, non smoker status). In other parts of Africa, followers of Islam were twice as likely to smoke as orthodox and other Christians.[58]

Although the prevalence of smoking behavior appeared to increase with parental education in this study, this did not reach statistical significance. Several studies which have examined maternal education alone has reported non significant effects on adolescent smoking[58] while others have found paternal education but not maternal education to be significant .[59] Since this present study was done in an urban setting where both parents may have had a more balanced educational profile, and couples marrying within same educational level, the effect of parental education was thus minimized.

### 8.4 Predictors of smoking behavior

**Social cognitive variables of smoking behavior**

One of the objectives of this study was to explore the factors that may foster the underlying reasons for smoking behavior and smoking intention among the junior secondary school students in Kinondoni Municipality. The application of similar concepts from Banduras, [32, 34] social cognitive theory, and Ajzens[31] theory of planned behavior were integrated to provide the underlying conceptual framework for this study. The validity of direct measures of attitude, subjective norm and perceived behavior control scales is supported by Godin et al., [60]

#### 8.4.1 Attitude towards smoking

In general, about three quarters of the surveyed students indicated negative attitudes towards smoking. This study provided evidence that respondents who expressed more favorable attitudes towards smoking were statistically significantly more likely to report higher intentions to smoke in future than their counterparts. Supporting this finding is a study by Engels et al.,[61] in Netherlands using both a crossectional and longitudinal study design among secondary school children n=1063 ,where he found that students who displayed positive attitudes towards smoking and had higher intentions to smoke were more likely to initiate smoking in future.

According to the theory of planned behavior, personal factors may act as external variables that may influence a person's attitude towards a given behavior. In this study personal factors such as gender and duration of years in school seem to have effects on attitudes. Males were significantly more likely to have more positive attitudes on smoking behavior

than females. Those students who were in form one had more positive attitudes towards smoking than the upper forms. This may be explained by the fact that form ones (lower form) may be more vulnerable to internal and external factors that influence their attitudes as they were also more likely to perceive themselves to have had no control over smoking behavior. This is also supported by Wakefield et al who found that advertizing seemed to influence preadolescents and those in early adolescents than those in mid to later adolescence to smoking behavior.[62]

Factors such as age, religion, grade and who student lives with had no effects on attitude in this study. This suggests that future studies should look at the salient beliefs underlying the attitudes towards the smoking behaviour concept in our local context because attitudes towards smoking behavior is not just determined by objective facts but also by the subjective beliefs about what the behavior like smoking will lead to and an evaluation of those outcomes.[63]

8.4.2 Subjective Norm

The surveyed students revealed that it was important to the respondents what others thought about their smoking. People will exhibit behavior if they feel themselves that it is good and if they think that important others also want them to behave that way. In this study students who perceived approval for smoking by significant referents were statistically significant to have reported higher intentions to smoke next month or year than those who perceived disapproval by their significant others. A longitudinal study done by Harakeh et al[64] on adolescents found that positive attitude towards smoking, low self efficacy and perceiving a high prosmoking norm was related to higher intention to smoke. There was no statistical significant effect demonstrated by any personal factor on this cognitive perceptual variable. The data suggests that in the Tanzanian context, the culture of smoking among adolescents is a socially undesired behavior and thus considered inappropriate, as evident by the fact that over eighty percent of students perceived disapproval of smoking behavior by their significant others. Other research have shown the impact of different significant referents on shaping smoking behavior such as boyfriends, and not mothers or friends being important predictors in the subjective norm belief based measures of smoking behavior.[65] Understanding the students own moral

norms i.e. "the individuals perception of the moral correctness or incorrectness of performing the behavior, the personal feelings of....responsibilities to perform, or refuse to perform, a certain behavior"[31] was not taken into account. In this study, the question of how important are parents, close friends, boyfriends/ girlfriends or sexual partner opinions on decisions of whether to smoke cigarettes or not were found not to be statistically significant with any of the students smoking status .

8.4.3 Perceived behavior control

This perceived behavior control variable indicated that the students had a strong sense of confidence and perception of self-control over their own smoking behavior. Students who felt that they had control on whether or not to smoke were also more likely to indicate that they had lower intention to smoke in the future when compared with student who felt that they had no control. Several studies[26, 29, 61, 66] have demonstrated that youngsters who experienced difficulties with refraining from smoking were more likely to start smoking. This suggests that refusal skills training may prevent initiation and maintaining of cigarette smoking behavior.

With regards to personal factors such as age, gender, religion, education or living circumstances there were no differences with self efficacy. However, those with least experience in the school environment were more likely to report that they had no control over whether they can smoke cigarettes than those who had been in school longer. This may be so because Form I students in our context refers to the entry level for secondary education and it is at this stage where these individuals are exposed to a new environment and may therefore lack confidence in executing decisions on various matters .

Attitude and Subjective norm variable models emerged as main independent predictors for Intention after adjusting for the sociodemographic variables. Tanzanians as most African countries are known for their strong kinship bonds with extended families and significant others, therefore the influence of subjective norm on smoking behavior may have

ultimately influenced respondent's attitude about smoking in this study. This should underline the importance of targeting community norms in prevention efforts.

8.4.4 Intention

One third of the surveyed students reported higher intentions to smoke in future. Majority had lower intentions to smoke in future. The risk of having this smoking related cognition was more in males. Being a male increase the likelihood to two fold of being an intent smoker which may perhaps be explained by male gender consistently having increased risk to smoking behavior in our context. The reason for this gender propensity needs further research.

**8.5 Smoking behavior of significant others**

Having a friend who smokes increases the risk to more than nine times of becoming an ever smoker. Having a sibling smoker increased the likelihood of being an ever smoker by almost three times compared to parental use in a multivariate model. Several studies have also shown that family and peer influences are strong predictors of adolescent smoking onset.[17, 20, 67, 68, 69] The demonstration of friends smoking as a better predictor of adolescent smoking than is parental smoking has also been shown by other authors that exposure to smoking friends directly triggered initiation of cigarette smoking via an effect of friend's approval of smoking .[70] Conrad et al.,[66] reviewed this subject and observed that friends approval of smoking as well as attitudes towards smoking were predictive of onset. The importance of friends in influencing adolescent behavior is based on the fact that adolescent period is a time of increasing social bonds with peers and possibly having poor social bonds with parents, therefore increasing peer influence is more likely to produce direct effects between friends smoking and adolescent smoking than is parental smoking. However further research needs to be done to explore the influences of parents, friends and siblings on other different stages of smoking behavior including the role of other significant others such as teachers and other significant role models in the communities.

### 8.6 Actual Smoking behavior

Intention to smoke was significantly associated with current smoking, because students who had higher intentions to smoke were more than five times more likely to have been current smokers. It was also established that student with positive attitude towards smoking were also about two and a half times more likely to be current smokers. The observation that students who were currently smoking and having higher intention to smoke in future is an important finding, given that other studies have shown that level of smoking consumption in the previous 30 days predicted level of 30 day smoking consumption at 5/6 year follow up.[71] This means that current smokers in this study with higher intentions to smoke are likely to have become addicted to nicotine and therefore become future established smokers. The finding that being age 15 – 17 was relatively a protective factor from current use needs further exploration. There appears to be no adequate explanation for this except that Zambia study found the same[53].

### 8.7 Study Limitations

There are several limitations to this study. First of all, the study relied on self completion of the questionnaire in which the accuracy of reporting in the study is not known because there may be underreporting for various reasons or exaggerations. For instance the researcher did not survey the parents/significant others for verification of information as there was no direct information on them. Although the adolescents' perceptions of parental disapproval may not have accurately reflected parental response to their smoking, Brenner et al[45] has reported high reliability of results on teenage smoking when questionnaires are administered and self completed.

Secondly, biological markers for assessment of nicotine metabolites/exhaled carbon monoxide as a way of verification current smoking status were not available due to lack of reagents. This validation tool is important as reported by Jagoe et al.,[46] who did a study on 973 respondents aged 15 to over 55 years in an urban area of Dar es Salaam and found smoking prevalence to have been underestimated in self report questionnaire as opposed to exhaled carbon monoxide especially among women.

Lastly, the perceived behavior control variable measure had relatively very low Cronbachs alpha meaning the reliability of that scale was somewhat limited on the FAHQ research tool in this context. The selected single item from the scale measure may have low reliabities as the item response may have been influenced by the person's mood, context, order of preceding items or other extraneous factors. This means that further qualitative research should be done to understand what perceived behavior control in our context really means and how best it can be measured. This will also provide clues on to the extent to which self concept phenomena, individual attributes in decision making or having ones own control in mastering life do actually exists in our cultural context or whether people tend to generally rely on what others think they should do.

Despite these limitations important conclusions can be drawn from these findings and provide recommendations for avenues of possible future research and areas for intervention.

## 9.0 CONCLUSION AND RECOMMENDATIONS

The findings from this study add to the current body of knowledge on cigarette smoking behavior among in school adolescents in Tanzania. Data indicates that at least one in every ten students (10.3%) had tried smoking and some are ongoing regular users with few being daily heavy smokers. The rates of ever use are slightly higher than the study done in all three municipals in Dar es Salaam. This cannot exclude the possibility of the anticipated increasing trend over time. There is evidence that experimentation with cigarettes does occur along a continuum of various age range within the adolescent phase. However this is more marked with the younger age while current /regular use is seen among older adolescents who may at this time become addicted and thus established smokers in adulthood. Gender differences in smoking are clearly demonstrated with more males being smokers than females. This means that there are various factors that influence gender differences in our setup including having more positive attitudes and intentions to smoke in males. This needs to be further addressed by future studies to explore what increases male risk and what are the protective factors in females so that smoking intervention should be tailored to meet gender specific needs. Living alone other than parents or family relatives poses a risk towards smoking behavior. This needs a careful evaluation because with the HIV AIDS pandemic, the growing number of adolescent orphans who have no protective effect of parental care and living alone may be at an increased risk of smoking and drug use behavior. Measures aimed at promoting integrity of the family, that discourage separation of students from their parents and marital breakdown could contribute towards reduced initiation of smoking among adolescents.

With regards to predictors of smoking behavior and intention among the junior secondary school students in Kinondoni municipal, the study findings do explain the determinants using the model of theory of planned behavior that attitudes towards smoking, subjective norm and perceived behavior control predicted smoking intention. Although majority of students had clear negative attitudes and intention not to smoke in future, a proportion of students had higher intention to smoke in future. Students with positive attitudes towards smoking, those perceiving approval of smoking behavior by significant others as well as having low perceived behavior control were significantly more likely to report smoking intention in future than their counterparts. Intentions are viewed as behavioral plans that in

conjunction with appropriate opportunities and resources enable attainment of a behavioral goal .[63] If this is the case, a need for longitudinal or follow up studies in future is needed from these baseline datas, given that many studies have shown adolescents intention to smoke cigarettes reported as the best predictor of their actual smoking status few years later.[72, 25] Peer and sibling smoking behavior are stronger predictors than parental smoking in influencing adolescent smoking initiation.

**9.1 Implications for future research.**

Based on these findings, qualitative studies can be done to elicit specific information on the salient beliefs underlying the attitudes to smoking habits among adolescents so that an insight as to what specific beliefs do smokers have and what beliefs non smokers have inorder to understand the differences is crucial. Understanding these salient features is important because changing attitudes and subjective norm needs tackling the behavioral and normative beliefs about smoking that may help change the overall behavioral intentions and smoking behavior. The notable gender differences in smoking should also be identified as what increases risks in males and what are the protective factors in females. This would provide a broader view of how to approach gender specific smoking and tobacco education and intervention.

It is also recommended that this study be replicated in another municipal or setting to see whether these socio cognitive variables operate in other contexts as well or do they apply to students in Kinondoni municipal alone and whether they give similar findings with other types of tobacco use taken into consideration.

It was also noted that majority of current smokers compared to nonsmokers reported higher intentions to smoke in future maybe due to the nicotine addiction but what then could explain the motives at social cognitive and affective level that makes a non smoker with intention to smoke, start smoking in future?

**9.2 Implications for intervention**

This study was conducted about six months after Tanzania committed itself to the WHO FCTC in order to galvanize action at the global and country level against the tobacco epidemic. It is important for the government to recognize the ongoing epidemic of tobacco use targeting adolescents and women in developing world. Therefore this study makes an important contribution in our understanding of the multiple determinants of smoking behavior that may help in the tobacco control programs. The social, environmental and individual factors need to work hand in hand. The broad social measures that move social norms are needed to lay the foundation for and facilitate individual change in our societies.

Theory based prevention programmes such as the theory of planned behavior for adolescents can be applied with relevant antecedents to intentions taken into account in tobacco control. A change in intentions may be the necessary early step of eventual behavioral change among other factors. A call for smoking prevention programmes should be effected taking into account that adolescent nonsmokers, ever smokers, experimenters and regular smokers have different smoking attitudes, perceive different norms and differ in the control they have over not smoking behavior.

Awareness of the law on smoking in public places should be increased through education and legal enforcement. Promotion of smoking through advertisements and tobacco industry sponsorship of sports and other social activities should be discouraged as they contribute in shaping ones attitude and community norms. Considerations for possibilities of increasing prices of cigarettes as a measure that may prevent current smokers from continuing purchasing cigarettes may be helpful. Provision of smoking cessation programs and clinics will help nicotine addicts to quit. Enforcing bans on smoking at school may be a useful modality as most peers are school mates.

Programmes focusing on peer and parental influences should also be initiated. Parental education should be directed to good parenting skills including openness, caring, trust and acceptance as well as support for behavioral change. The parental disapproval statements should work in conjunction with the modeling of appropriate health promoting behaviors to their children inorder to strengthen the social norms because by observing other people,

an individual learns that some behavior is reinforced and other behavior is not. Positive peer relationship should be encouraged including good communication skills and social skill training, refraining skills can be taught in schools so that adolescents build resistance from motivation to comply with engaging in risky behaviors. This should be coupled with other school and community based prevention programmes that convey community concerns or demands including the social norms.

Measures aimed on changing attitudes and overall community norms towards a no smoke environment can be usefully employed. These social cognitive factors may be necessary in designing antismoking programmes but may not be sufficient on their own to prevent smoking behavior among students in Kinondoni municipal as there may be other factors operating beyond these levels.

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# 11 APPENDICES

## APPENDIX 11.1 ENGLISH VERSION

### RESEARCH ON STUDENTS HEALTH RELATED BEHAVIOUR IN SCHOOLS
### RESEARCH QUESTIONNAIRE

I wish to thank you for your agreeing to participate in this research exercise.

These questions are meant to assist in the research on students' health related behavior.

In order for this research bears fruitful results, it is important that you read the questions carefully and answer them honestly. Your answers to these questions will be kept confidential and that is why we don't ask your name. Our experience has shown that many people enjoy answering these questions and it is my hope that you will also enjoy this exercise. Please read the following explanation carefully before you embark on answering these questions.

Explanation on how to tackle these questions:

This is not an exam. There are no right/wrong answers but they need to be your own answers. So all we expect from you is that you will give answers according to your understanding of these questions and your personal experience (knowledge/belief). Please do not talk to your neighbors.

For every question, choose one answer which you think is correct and mark x in the box placed after the question i.e.[X]

Choose one answer for every question and/or a section of the question for example:

Have you taken soda in the past 30 days?
[ ] A. False
[ X] B. True

The chosen answer is "B" meaning that you have taken soda in the past 30 days.

Please attempt all questions with care and honesty.

**REMEMBER: WE ARE INTERESTED IN <u>YOUR</u> EXPERIENCE**