

**Health and oral health related knowledge, attitudes and
behaviors- a study of secondary school students in Dar es Salaam,
Tanzania**

A cross sectional study of 16-20 year old students

Kasusu Klint Nyamuryekung'e



Centre for International Health and Department of Community Dentistry

Faculty of Medicine and Dentistry

University of Bergen, Norway

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This thesis is submitted in partial fulfillment of the requirements for the degree of Master of
Philosophy in International Health at the University of Bergen.

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Abstract

Aim: To assess the socio-demographic distribution, relationship and levels of health and oral health related knowledge, attitudes and behaviors among secondary school students in Dar-es-Salaam region, Tanzania.

Methods: A cross-sectional survey by means of a self-administered questionnaire to 1934 secondary school students aged 16-20 (mean age 16.9 years). A one stage, proportionate, cluster sampling technique was used, and covered 18 schools from three districts.

Results: Regular tooth brushing was widely practiced by 78.9% of the students. The hygiene behavior levels were low. Hand washing with soap was the least performed hygiene behavior (21.6%) and its performance was greatly influenced by wealth index, gender and parental education. Levels of physical activities were low overall; females had a higher level of physical inactivity as compared to males. Belonging in the wealthiest quartile was associated with higher frequencies of consumption of sugary foodstuffs and fast foods, although having a parent with a high level of education was associated with an increased consumption of fruits and vegetables. Levels of alcohol use were moderately high (25.5%) whereas those of cigarette consumption were low (6.7%). Usage of both substances was more prevalent in male students. Levels of dental attendance were low (19.0%) and were associated with belonging in the wealthiest quartile and having a parent with a high level of education.

Conclusion: A socio-economic and gender vector was apparent and varied greatly in many of the assessed behaviors. Overall levels of students' health and oral health related knowledge and attitudes were good.

Table of Contents

- Abstract iii
- Table of Contents iv
- Acronyms and Abbreviationsviii
- Acknowledgementsix
- 1 BACKGROUND 1
 - 1.1 Health and oral health status among adolescents in sub Saharan Africa- an overview
1
 - 1.2 Periodontal disease and caries among adolescents in sub Saharan Africa 2
 - 1.3 Oral hygiene and dietary intake among adolescents in sub-Saharan Africa 6
 - 1.4 Alcohol, tobacco and drug use among adolescents in sub-Saharan Africa 8
 - 1.5 Hygiene behavior and physical activities among adolescents in sub-Saharan Africa
13
- 2 Oral health status, oral health related quality of life and use of oral health care services
among adolescents in Tanzania 14
 - 2.1 Justification for studying health and oral health related behavior in adolescents in
Tanzania..... 18
 - 2.2 Aims..... 20
- 3 Methodology 20
 - 3.1 Study area 20

3.2	Target population.....	21
3.3	Study sample	22
3.4	Sample size	23
3.5	Sampling procedure.....	23
3.6	Data collection and measurements.....	24
3.7	Socio-demographic characteristics (see appendix I questionnaire section 1-12)	25
3.8	Alcohol and drug use (see appendix I questionnaire section 21-29).....	26
3.9	Dietary Behavior (see appendix I and questionnaire section 30-40).....	27
3.10	Hygiene behaviors and physical activities (see appendix I and questionnaire section 61-68 and 88-94).....	28
3.11	Tobacco use (see appendix I and questionnaire section 109-115)	29
3.12	Oral health knowledge (see appendix I and questionnaire section 173-182)	30
3.13	Oral health attitudes (see appendix I and questionnaire section 183-187 and 168-172)	
	31	
4	Statistical analysis.....	31
5	Ethical clearance	32
6	Results.....	33
6.1	Sample profile.....	33
6.2	Response Rate	33
6.3	Socio-demographic distribution of hygiene behavior	36

6.4	Socio-demographic distribution of physical, leisure time activities and tooth brushing	38
6.5	Socio-demographic distribution of dietary behaviors	41
6.6	Socio-demographic distribution of tobacco use	45
6.7	Socio-demographic distribution of use of health and dental health care services... ..	48
6.8	Socio-demographic distribution of use of alcohol and drugs	50
6.9	School health education during last year	54
6.10	Oral health related knowledge by socio-demographic factors	57
	Health and oral health behaviors by having received health information at school.....	61
6.11	Oral health related behaviors by knowledge score.....	65
6.12	Oral health related attitudes	66
7	Discussion	71
7.1	Methodological issues	71
7.2	Materials and methods.....	72
7.3	Reliability and Validity	72
7.4	Discussion of Results.....	75
7.4.1	Health and oral health behavior.....	75
7.4.2	Health and oral health knowledge	79
7.4.3	Health and Oral health attitude	81
7.5	Conclusions and recommendations	82

8	References	86
9	Appendix 1	96
	Appendix 2.....	134

Acronyms and Abbreviations

CPI: Community Periodontal Index

DALYs: Disability adjusted life years

DMFT: Decayed, Missing, Filled teeth index

GSHS: Global school based student health survey

OHRQOL: Oral Health related quality of life

OIDP: Oral Impact on daily performance

SD: Standard deviation

SSA: Sub Saharan Africa

Acknowledgements

This work was supported and financed by the Centre for International Health in collaboration with the Faculty of Medicine and Dentistry, University of Bergen, for which I am very grateful. I am indebted to the Norwegian State Education Loan Fund (Statens Lanekassen) for granting me a two year scholarship to pursue my studies at the University of Bergen, without which, the present work would not be possible. I would also like to express my sincere thanks to Dr. Joyce Rose Masalu- a mentor who encouraged me to apply for this scholarship and has been greatly instrumental towards helping me get clearance to conduct this study.

I wish to express my sincere thanks to my supervisors Prof. A.N. Astrom and Prof. B. Robberstad, for professional guidance, encouragement and assistance throughout the entire course of my studies. Prof. Anne Astrom's dedication, constructive criticism and prompt correspondence have truly left an everlasting imprint upon me and will continue to be a source of inspiration for me in this field.

I am grateful to the administration of respective districts for the cooperation extended towards me, and students from all schools who participated in this study, without which, the present work would not have been possible. Special thanks to Mr. Ngisi Masawa; my research assistant, for actively taking part during the implementation of this study and helping me maintain order amidst chaos. Thanks to my data entry team, for the tireless work they put in during a period of electrical uncertainties.

I wish to express my thanks to all students and members of staff at the Center of International Health, who in one way or another, have all contributed towards completion of this work. I would also like to express my thanks to my friends that have been a source of welcomed

respite from the tedious work of coming up with this study; Angela, Bernt Ove, Mosha, Zalila, Samson, Maria (all three of them), Jonas, Violeth and Dennis, to mention but a few.

Finally, I would like to express my great appreciation to my family for all the support and encouragement before and during my stay in Bergen. To my parents: for their constant and continual correspondence and encouragement during my stay here. My brothers and cousins: for simultaneously being sources of delirious laughter and sobering realism. My beloved Adelyne Emilton: for consenting to go through long periods of my absence in order to allow me to pursue my goals and dreams.

Kasusu K.N, Bergen, May 2012

1 BACKGROUND

1.1 Health and oral health status among adolescents in sub Saharan African- an overview

Despite major public health and health services improvement, health-related problems and infectious diseases continue to be serious, especially in sub-Saharan African countries, SSA. There are several factors associated with the control of infections, such as hygiene, sanitation and safe drinking water; and those factors are interlinked (1). In SSA, malnutrition, poor water supply, low levels of sanitation, low levels of hygiene, tobacco and alcohol use are risk factors attributed to 45.8% of disability adjusted life years (DALY's) leading to infectious diseases (2).

Besides the infectious diseases, there has also been an increase in the prevalence of chronic, non-communicable diseases in SSA, leading to a “double burden of disease” (3, 4). The burden and prevalence of non-communicable diseases are particularly high for the socially marginalized, the disadvantaged and poor populations worldwide (5). Further, the socio-behavioral and environmental factors have been shown to play a very important role in non-communicable diseases. A core group of modifiable risk factors is common to many chronic diseases, including the most common oral diseases globally, caries and periodontal disease. The most common non-communicable diseases – cardiovascular diseases, diabetes, cancer, caries and chronic obstructive pulmonary diseases share common risk factors. These are preventable and modifiable risk factors that are related to lifestyle (6). Some of the major risk factors for chronic diseases that are also important for oral diseases, such as caries and

periodontal disease, are : smoking, diets high in saturated fats and sugar and low in fiber, fruits and vegetables, alcohol, environmental hygiene and a sedentary lifestyle (7).

WHO defines “adolescents” as individuals in the age group of 10-19 years and “youth” as the age group of 15-24 years. These two overlapping groups are combined as “young adults” with age range of 15-24 years (8). Adolescence is a period of transition from child to adulthood, characterized by physical, mental, physiological and consequentially, behavioral change. It is a period whereby an individual develops behavioral patterns that might persist into adulthood (9). In the context of oral health and health in general, health behaviors prevalent in childhood are passed on to adulthood. Thus, the eating patterns, hygiene levels and perceived health values obtained at this age have shown a propensity to persist throughout life (10, 11). The present study focuses on adolescents or youth aged 16-20 years in secondary schools in Dar es Salaam, Tanzania.

1.2 Periodontal disease and caries among adolescents in sub Saharan Africa

Periodontal diseases can be defined as a wide spectrum of diseases that affect the gum and the surrounding structures of the teeth. Plaque induced gingivitis is the most common of these diseases, and is prevalent in all age groups. Gingivitis presents with clinical signs of inflammation (swelling, reddening and easy bleeding upon probing) that are confined to the gums, and is not associated with periodontal attachment loss (12, 13). The prevalence, severity and extent of plaque induced gingivitis increases with age, reaching a peak at puberty followed by a limited decline in adolescents (13). Traditionally, it has been considered that periodontal conditions were the predominant oral diseases in developing countries; however, a

recent study (14) has shown that this disease is prevalent across many countries with different levels of development.

Chronic periodontitis is an infectious disease resulting in inflammation within the supporting structure of teeth (periodontium), as well as progressive attachment and bone loss (15). In Africa, the prevalence of chronic periodontitis is estimated to range between 0- 20 percent (14). Further, there are significant differences in the prevalence of periodontitis among the young populations in the world, both across and within countries, also that being of African ethnicity predisposes a person to a higher prevalence of the disease (14, 16). Poor oral hygiene practices leading to inadequate plaque control and calculus formation, infrequent dental attendance, smoking and low socioeconomic position have all been associated with an increased risk to develop chronic periodontitis (16).

A study conducted in Burkina Faso revealed that adolescents aged 18 years who lived in rural areas and were of low socio-economic position had high calculus levels and a higher prevalence of periodontal disease as compared with those of a high socio-economic position. The prevalence rate of CPI score of 0 (healthy periodontium) were 19% and 12% for urban and rural residents, respectively (17). Other studies conducted in Niger and Madagascar have revealed 99% and 91% of 18 year olds with respectively, gingival bleeding and calculus (18, 19). Makoni et al (20) in their study conducted in Zimbabwean secondary school adolescents showed that 89.5% of the students presented with calculus, an indicator of inadequate oral hygiene practices. Another study conducted amongst Tanzanian adolescents aged 7-15 years showed that only 25% of the examined subjects had either gingivitis or calculus, and 69.8% did not have visible plaque (21). The prevalence and the overall presented picture on periodontal conditions is mixed. Suffice to say, the prevalence of periodontal diseases is

highly variable, and spans over a wide range, depending at least partly, on the characteristics and diversity of the populations in question.

Dental caries is still considered one of the most prevalent oral diseases in the world. It is estimated to affect about 60-90 percent of children, adolescents and adults in developed countries. It is a less common disease, and with a lower severity in most African countries (22). Dental caries results from interactions between acid producing bacteria, fermentable carbohydrates (sugars) capable of being metabolized by the bacteria, and many other host factors including the saliva and teeth over a period of time (23).

Changing dental caries prevalence patterns in some developing countries are linked to changes in lifestyles (24). It is undeniable that the level of sugar consumption has been increasing overall in developing countries (25). In socioeconomically less developed countries, changing to a western-style diet has been shown to lead to increased frequency of sugar consumption from food, beverages and sweets (25, 26). This dietary transition is associated with a significant increase in non-communicable diseases, with dental caries being one of those diseases (22, 27, 28). The increase in prevalence of dental caries in developing countries has been ascribed to the increase in sugar consumption as well as the questionable amount of fluoride available in commonly used dentifrices (6, 29).

Contrary to the projections, a systematic review of publications from 1967 to 1997 on dental caries' prevalence in Africa has clearly shown that the belief in increased prevalence of caries over time in mainland Africa has not yet been supported. Rather a predominantly downward trend in dental caries has been observed (26). Another systematic review of studies on dental caries in adolescents aged 11-13 years old conducted between 1970 and 2004 in the sub-Saharan Africa, Latin America and the Caribbean has shown that both the prevalence

(DMFT > 0) and the mean DMFT (Decayed, missing and filled teeth) were lowest in SSA adolescents. Again, the proposed increase in dental caries in SSA was not supported (30).

A study conducted amongst 10-14 year old adolescents in Ugandan rural areas reported a mean DMFT of 0.34 (31). Another study also conducted on Zimbabwean secondary school adolescents, with a mean age of 13.9 years showed that 58.7% of the adolescents were caries free and had a mean DMFT of 1.1 (20). Kikwilu et al (21) showed in their study amongst primary school adolescents aged between 8-15 years a prevalence of dental caries (DMFT > 0) of 24% and a low mean DMFT of 0.41. Furthermore, studies have indicated that there is a higher prevalence of caries in urban as compared to rural areas. Okullo et al (32) in their study conducted in Uganda, reported that 85% of the test subject from an urban area had a DMFT > 0 as compared to 76% from a rural area. Mashoto et al (33) in their study conducted in Tanzania had also reported that the prevalence of dental caries was higher in rural areas (20.8%) as compared to urban areas (17.4%). However there are other studies that have reported the opposite (34).

The prevalence of dental caries experience and mean DMFT were reported as being low in SSA. The incidence of caries is reported to be increasing and more common in urban communities, and is reported to be occurring more frequently in females than in males (32, 34-36).

1.3 Oral hygiene and dietary intake among adolescents in sub-Saharan Africa

Studies from developing countries have shown that few adolescents have correct information with regards to oral hygiene methods, and very few have tools for proper and effective oral hygiene practices (37). Tooth brushing is widely known and self-reported as the most frequently performed oral hygiene practice, but the proportion of adolescents doing so vary greatly; depending on socioeconomic status, area of residence, gender or the parental guidance offered (32, 38).

Okemwa et al (39) in Uganda reported that less than half (39.9%) of schoolchildren aged 5-17 years living in rural areas are knowledgeable of the causes and ways of prevention of dental caries, whereas 92% of these students claimed to brush their teeth on a daily basis. These findings are supported by Sofola et al (40) in Nigeria who also reported a poorer oral hygiene in rural school children as compared to their urban counterparts. Oral cleanliness was also associated with socio-economic factors.

The Global School based Student Health Survey (GSHS) conducted among 13-15 year old Tanzanian school children has shown that most (94.6%) reported to brush their teeth at least once per day. It has also been reported that social interactions play a role in determining the frequency and likelihood of tooth brushing, with adolescents reporting a higher frequency of interaction with their peers also concomitantly having a higher frequency of tooth brushing (32, 38, 41). Tooth brushing is practiced very frequently by SSA adolescents, and the prevalence of brushing has been reported to range from 75.1% to 99% depending on the study population (32, 34, 42-44). Studies amongst adolescents in developing countries indicate that

males in general have poorer oral hygiene whilst females have a higher frequency of sugar consumption (35, 38, 39). A study investigating determinants of sugar restriction in Tanzanian students aged 19-51 years (mean age 25) revealed that as a group; the study participants did not only believe that the dentist and doctor wanted them to restrict their sugar intake, but they were also motivated to comply with dentists' and doctors' advice to a greater extent than was the case regarding the other referees (45). In contrast, another study conducted in a younger age group aged 13-22 years (mean 16.2 years) showed that avoiding tooth decay was not the main reason for performing sugar restriction and the intention to avoid sugary foods was mostly associated with peer and family opinion of that behavior (46).

The general sugary foodstuff consumption patterns have been shown to be low in SSA adolescents. It has been suggested, however, that adolescents prefer those kinds of food stuff (46). Increased sugar consumption was associated with having parents with a high level of education, being of urban residence, being young as well as being female (32, 38, 46). This observed low consumption can then be attributed to inaccessibility to these sugary foodstuffs, due to cost or otherwise, and thus in the more affluent group of adolescents it is expected that the sugary foodstuff consumption to be elevated (46).

Mbawalla et al (44) reported that 53.2% of Tanzanian school going children had at least a weekly intake of sugar sweetened soft drinks. Another study also conducted in Tanzanian adolescents reported 7.6% having sugared mineral water and 23.7% eating sweets at least daily (47). Okullo et al (32) from Uganda reported moderately low levels of sugar consumption amongst school going adolescents. The mean sugar frequency obtained from his score was 2.6, from a scale of 0-6, of which 0: no sugar consumed, 6: high level of sugar consumption.

Regular tooth brushing was widely reported to be practiced although knowledge on causes of dental caries was low, especially in rural areas. Females were reported as having a better hygiene as compared to males, although also had higher frequencies of sugary food stuff consumption. Living in urban areas was associated with an increased consumption of sugary foodstuffs as compared to rural areas.

1.4 Alcohol, tobacco and drug use among adolescents in sub-Saharan Africa

Diet, tobacco smoking, alcohol, hygiene, injuries, stress and exercises have been identified as lifestyle risks associated with oral health (7). These risk factors are also shared risk factors for the most prominent non-communicable diseases of our time: cardiovascular diseases, diabetes, cancers and chronic obstructive pulmonary diseases (6). Further, many times these risk factors cluster together in at-risk individuals (7).

A prospective longitudinal study conducted in South African adolescents found that alcohol was the most common first substance initiated among the participants (48). Adolescents tended to use either alcohol or cigarettes, followed by whichever they have not tried, in turn followed by use of cannabis. There was no gender difference in this pattern. The study also showed that adolescents who had tried inhalants had also tried alcohol, cigarettes, and cannabis, which suggest that trying inhalants may be a specific indicator of risk for multidrug experimentation. The group that was most likely to try all substances was comprised of individuals who began substance use by smoking cigarettes. (48). Another study conducted on school going adolescents in Kampala (Uganda) and Lilongwe (Malawi) revealed that less

than 70 percent of the students had either been taught on the dangers of cigarette smoking or had discussions in class about the reasons people smoke (49).

Peltzer et al (50) conducted a cross national study in six countries in SSA (Table 1) to determine the prevalence and correlates of substance use amongst adolescents aged 13-15 years. Overall, the prevalence rate for past month tobacco use was 12.6%. The prevalence rate for tobacco smoking was 11.7%, with 10.5% having tried their first cigarette below 10 years of age. Prevalence rates for risky alcohol use (two per day for at least 20 days in the past month), and illicit drug use (three or more times ever) were 6.6% and 10.5%, respectively in all studied African countries. Being younger and a lower school grade were associated with past month tobacco use. More boys than girls had used tobacco and had used illicit drugs, while boys and girls had a similar prevalence of risky drinking. Further, the study showed peer support to be protective for tobacco use. The study also indicated that substance use risk behaviors tended to cluster together, particularly tobacco use and risky drinking and risky drinking and illicit drug use. Tobacco users were ten times more likely than non-tobacco users to be risky drinkers and five times more likely to use illicit drugs. Risky drinkers were seven times more likely than non-risky drinkers to use tobacco or to use drugs.

Pahl et al (48) conducted a study in South African adolescents which showed that nicotine dependence is associated with elevated levels of deviant behaviors, such as adolescent violence, deviance, binge drinking, cannabis use, and other illicit drug use. A study conducted by Rudatsikira et al (51) from Addis Ababa, showed that having friends who smoke increased the likelihood of the study participants being a smoker and that having a negative perception towards cigarettes conferred protection against smoking. Tobacco smoking prevalence was assessed to be 4.5% in males and 1.3% in females. This increased prevalence of cigarette

smoking among males than females was also reported by Mbawalla et al (44) in a study of school going adolescents in Tanzania. This study reported a slightly higher smoking prevalence of 5.8%, further, students who were confirmed current smokers had a lower chance of having a good oral hygiene (OR 0.5) as compared to non-smokers. In another study conducted in Tanzania, being an older, smoking adolescent male (aged 16-21 years) was associated with having at least one oral impact (47).

Table 1: GSHS data regarding the prevalence of alcohol, tobacco and drug use in 13-15 year olds across SSA countries. Adapted from (52).

Country	Year	Total (N)	Females (%)	Past month smoking cigarettes (%)	Past month use of tobacco products (%)	Past month use of other alcohol (%)	Past month Ever drunk alcohol (%)	Ever drunk alcohol (%)	Ever Illicit drug use (%)
Botswana	2005	1,305	57.6	7.0	11.6	20.6	20.9	7.5	
Kenya	2003	2,758	55.4	13.9	13.1	14.6	19.7	13.2	
Namibia	2004	4,251	56.6	16.1	31.8	32.8	31.8	28.8	
Senegal	2005	2,403	47.2	6.5	6.8	3.2	4.8	0.6	
Swaziland	2004	6,784	65.6	10.4	11.4	16.0	18.6	7.0	
Uganda	2003	1,878	56.8	4.3	5.5	12.8	15.2	8.4	
Zambia	2004	1,241	52.2	10.4	11.4	42.3	42.8	38.1	
Zimbabwe	2003	3,853	61.0	7.9	11.0	17.2	18.8	10.9	

Table 2: GSHS data regarding the prevalence of tooth brushing and general hygiene behaviors in 13-15 year olds in SSA . Adapted from (43).

Country	Year	Total (N)	Female (%)	Tooth brushing > once a day (%)	Wash hands before eating (always)	Wash hands after toilet (always)	Wash hands with soap (always)
Botswana	2005	1,305	53.4	94.3	61.4	55.1	18.1
Kenya	2004	2,758	52.3	No data	58.8	52.6	29.9
Namibia	2004	4,251	57.3	64.6	49.1	No data	35.4
Senegal	2005	2,403	39.6	84.0	77.4	79.7	60.2
Swaziland	2004	6,784	64.4	71.1	58.5	62.6	19.2
Tanzania	2006	1,217	48.6	No data	52.8	44.7	30.1
Uganda	2003	1,878	52.4	71.1	67.5	62.5	35.6
Zambia	2004	1,241	48.5	71.8	48.8	44.6	26.9
Zimbabwe	2003	3,853	52.8	62.8	64.9	57.5	20.8

1.5 Hygiene behavior and physical activities among adolescents in sub-Saharan Africa

A recent study by Pengpid et al (43) explored hygiene behaviors and correlates of those behaviors among in-school adolescents from nine African countries. This study was a secondary analysis of data from the Global School Based Health Survey (GSHS). Overall, sub-optimal hygiene behavior was reported (Table 2). The average prevalence of hand washing before meals was 62.2%, of hand washing after toileting was 58.4% and of washing hands with soap: 35.0%. Hand washing before meals was found to be more frequent than hand washing after toileting. The study found a strong to moderate positive correlation between hand washing behaviors and tooth brushing mirroring one-dimension of adolescents' hygiene behavior (43). This study and others confirm the low rate of hand washing among SSA adolescents. Implications include the possible contribution to a high rate of diarrheal diseases, helminthic infections and other communicable diseases in African countries. Other implications would be an increase of transmission of infections amongst other children at school and their family members. To control the prevalence of these common infectious diseases in Africa, the promotion of hand-washing with soap should be emphasized. This in turn requires availability of water and reveals the multi-sectoral approach required to effect this positive behavior change.

A study by Peltzer (53) was conducted amongst adolescents in Ghana and Uganda. This study revealed a higher prevalence rate of overweight or obesity in female than male adolescents. The prevalence of overweight was 9.5% among girls and 2.7% among boys. In terms of dietary behavior, most girls as opposed to boys had fruits or vegetables less than once a day, and 17% indicated that they felt hungry most of the time or always.

Another study conducted in the Seychelles (54) showed that the prevalence of overweight was not substantially different between public schools, but the prevalence was markedly higher in private schools than in public schools. Walking less than 10 minutes per day was reported by nearly all the students in private schools but by only one third of the students in public schools. Students were two times more likely to be overweight in private schools as compared to public schools and two times less likely to be underweight. The prevalence of overweight was higher in girls than in boys in public schools, but higher in boys than in girls in private schools. Regular physical activity at leisure time was reported more often by boys than girls (in all schools) and more often by students of private schools than public schools. Multivariate analysis, adjusting for sex and age, showed that overweight and obesity was not associated with walking time and inversely associated with physical activity at leisure time (54).

These studies clearly point to a positive association between social economic positioning, physical inactivity and being overweight, with those adolescents from families of better social economic position having a higher prevalence of overweight.

2 Oral health status, oral health related quality of life and use of oral health care services among adolescents in Tanzania

Very few studies have investigated oral health status of Tanzanian adolescents in general. In Tanzania, the prevalence of dental caries in the adolescent population has remained at low

levels as compared by international standards (55). It has been shown that being a female, living in an urban area and having a high level of dental attendance are all significantly associated with having caries experience (DMFT>0) (34). Periodontal conditions are more prevalent, and some studies have reported almost all individuals of the population studied to be suffering from a periodontal disease (56). Partial knowledge regarding gingivitis; its causes, signs, symptoms and treatment modalities is likely to be a major reason for such a high burden of periodontal disease in Tanzanian adolescents (42).

Studies conducted recently in Tanzania have reported on mean DMFTs that are less than 0.5 from a diverse sample of study subjects (Table 3).

Table 3: Mean DMFT and dental caries prevalence from studies conducted in Tanzania

Reference	Sample size	Region	Age range (years)	Mean DMFT	Prevalence of dental caries (%)
(36)	256	Arusha	9-14	0.22	14
(21)	1297	Morogoro	7-15	0.41	24
(57)	1601	Dar-es-Salaam	12-14	0.38	22.1
(34)	1745	Kilwa	10-19	0.35	20.2

Awadia et al (36) from their study conducted in Arusha, amongst adolescents aged 9-14 years reported that adolescents residing in urban areas were more likely to suffer from dental caries (OR 5.4) as compared to those adolescents from rural areas. Kikwilu et al (21) in their study conducted in Morogoro, Tanzania in primary school adolescents reported the mean number of

sextants with gingivitis, calculus and visible plaque were 0.25, 0.69 and 2.44, respectively. A total of 75% of all the sextants had neither gingivitis, nor calculus. Masanja and Mumghamba (42) also conducted their study in this same region, but in secondary school adolescents aged 13-17 years, and they reported that the participants whilst possessing full knowledge on basic oral hygiene measures, had only partial knowledge on gingivitis. Students from urban areas had significantly better knowledge on signs and treatment of gingivitis and on treatment of gingivitis as compared to students residing in rural areas.

Emergency oral health care is the most utilized and available oral health service in Tanzania, although only a small proportion of those that require the service make use of it. Restorative care is an almost nonexistent treatment modality amongst adolescents (21, 55). The reasons for not seeking emergency care have been cited as: lack of money to pay for treatment (27.9%); self- medication (17.6%); respondents thinking that pain would disappear with time (15.7%); and lack of money to pay for transport to the dental clinic (15.0%) (58).

Mashoto et al (33) considering Tanzanian school going adolescents aged between 10-19 years old revealed that more than half of the subjects (54.1%) reported to have at least one oral problem. Moreover, 36.2% had experienced impaired oral health related quality of life in terms of at least one oral impact on daily performance (OIDP). About one-third (36.4%) reported to experience dental pain. Students with reported dental problems and dental pain were more likely to be living in urban than in rural areas. Students with a perceived treatment need were more likely to be males and to have oral impacts in terms of difficulties with eating and cleaning. Adolescents categorized as the least poor reported perceived need for dental care more frequently than the poorest adolescents.

Another study conducted in adolescents reported on the prevalence of dental attendance as 10.4%. Gender and place of residence were the most significant determinants with respect to

dental attendance. Adolescents belonging to least poor households presented with treatment need and dental attendance more frequently than their counterparts in the poorest households. Rural participants had a higher prevalence of dental caries (21.3% against 17.9%) but were less dissatisfied with their oral health and visited the dentist less frequently than their urban counterparts. Moreover, adolescents who had attended a dentist were those with the most severe caries in terms of moderate to high treatment needs. These findings could be used indirectly to demonstrate the delayed treatment demand and limited access to dental care (34).

Mbawalla et al (47) conducted another study in secondary school in adolescents from northern Tanzania to determine in part, socio demographic and demographic correlates of oral health related quality of life (OHRQOL). Almost half of the students (48.2%) reported to have experienced an OIDP in the last 3 months preceding the study. Older students, those of lower social economic status, those who perceived their parents as being unable to afford dental care and those with parents with a low level of education were more likely to have oral impacts, to have irregular tooth brushing practices and to have a lower frequency of dental attendance as compared to their opposite counterparts.

Adolescents are underserved with regard to preventive care and very few receive recommended checkups (32, 59). Studies reveal that in general, adolescents are less likely to have access to health care than all other age groups, except for young adults. It is thus reasonable to assume that in developing countries, the situation is more dire, due to the weak and overstretched health systems (59, 60). Regarding the utilization of oral health care services; a study conducted amongst adolescents in Tanzania showed that the majority had sought treatment due to pain or for tooth extraction. Perceived needs, dissatisfaction with own oral health status and use of oral health services were slightly more frequent among females. Adolescents staying nearest a treatment facility tended to use the services more often (61).

Studies from Tanzania report low levels of adolescent dental attendance at 10.4% and 12.6%, and almost exclusively, the only reason for attendance is dental pain (34, 47). Similar studies in Uganda show a higher prevalence of dental attendance (44%) and have reported on the impact of cost- sharing with regards to utilization of dental services and delayed treatment demands. Adolescents were more likely to utilize the oral health services if made freely available. However, for the most part, the treatment received was tooth extraction (35).

In Tanzania there are special prepared oral health education manuals which are incorporated into the primary school curriculum supervised by district dental officers. Children are taught on basic oral structures, common oral diseases, their causes and prevention and good oral hygiene practices. No such program is incorporated in the secondary school curriculum with the assumption that the information and knowledge gained in the primary school is sufficient. Van Palenstein (62) conducted a study in Tanzania and showed no significant reduction with respect to clinical parameters between students attending the school receiving the oral education and students attending schools not receiving dental education (controls). This is not to nullify the potential benefits of the preventive approach, but point us to the more important structural variables that might act as a barrier towards optimal oral health behavior performances.

2.1 Justification for studying health and oral health related behavior in adolescents in Tanzania

Oral health is a fundamental component of general health, and there has been evidence of common risk factors for instance links between intake of sugary foodstuffs and systemic diseases, such as obesity and diabetes (27). Poor oral health has detrimental effects on

children's performance in school, not least due to pain and difficulty in communication. Annually, more than 50 million school hours are lost because of oral health problems (63).

A survey considering adolescents' oral health behavior might offer valuable insight into the oral health situation in the adolescent population and into individual determinants of oral health in terms of oral health related knowledge, attitudes and behaviors. Comparing the results obtained in this study pertaining secondary school students in Dar es Salaam with concomitant studies (47) performed among secondary school students in Arusha and in Polokwane in South Africa, will enable cross cultural comparisons of adolescents oral health issues.

The results of the present cross sectional survey among secondary school students in Dar es Salaam will enable an indirect evaluation of the oral health education received by the participating students during their primary school years. By comparing the present results with a comparative study performed in Tanzanian secondary school children in 1996, it will be possible to discern some time trends with respect to oral health related knowledge, attitudes and behaviors in this particular sub group of the population. Thus, dentistry shares an interest with public health in using surveillance data to 1) assess the level and distribution of oral health behaviors and status in adolescent populations, 2) to define public dental health priorities, 3) to evaluate public oral health policies programs, 4) to identify emerging problems and research priorities and 5) to control for risk factors common in both oral diseases and other chronic diseases.

2.2 Aims

Focusing on adolescents attending public secondary schools in Dar es Salaam, Tanzania, this study aimed:

1. To assess the level and socio-demographic distribution of health-and oral health related behaviors.
2. To assess level and socio-demographic distribution of health and oral health knowledge.
3. To assess the level and socio-demographic distribution of health- and oral related attitudes.
4. To investigate the relationship between knowledge, attitudes and behaviors related to health and oral health

3 Methodology

3.1 Study area

The study was conducted in secondary schools in Dar es Salaam region. Dar es Salaam is divided into three districts namely, Ilala, Kinondoni and Temeke. All districts were included as they are all accessible and there is an adequate number of public secondary schools in each district that conform to the present study design. These schools are administratively owned by district councils, which are; Ilala municipal council, Temeke municipal council and Kinondoni municipal council. In these districts, there are both private and public schools, day and boarding schools, mixed and single sex schools. Most of the adolescents, especially those

attending day schools are most likely to be from the local area. Dar es salaam had a population of 2,487,288 (2002 census) and is currently projected to exceed 3 million.



Figure 1: A map of Tanzania showing Dar es Salaam region

3.2 Target population

The target population for this study was secondary school students aged 16-20 years who are in forms I - IV of their secondary education attending *public secondary day schools* in Ilala,

Kinondoni and Temeke. Public secondary schools were chosen because of the relatively streamlined bureaucratic procedures towards attainment of ethical clearances. Also, students from public schools represent to a much larger extent the population of adolescents in the general population as compared to private schools in which will almost all of the attendees will belong in the affluent and a much smaller cross section of the population. Boarding schools were excluded due to the fact that dietary behaviors of the students will be solely determined and restricted by the foodstuffs provided in respective schools.

The expected age to attend ordinary-level secondary school which takes four years to completion ranges from 14 to 20 years. Most of the students in forms III and IV are expected to be aged between 16-18 years.

3.3 Study sample

All students aged 16-20 years attending form I - IV in the selected schools were eligible to participate in the study. After random selection of the schools within the districts, all students in the selected schools attending forms I-IV with the required age range were invited to participate in the study. After identification of the classes with the students most likely to be in the required age range, the students were given the instructions that the minimum required age for participation was 16 years. All students aged 16 and above were allowed to participate in the study. The number of students included in the selected schools ranged from 78 to 149 with an average number of students per school amounting to 107.

Inclusion criteria were public secondary schools having both boys and girls or with one sex only and either boarding or day school.

3.4 Sample size

A sample size of 1792 secondary school students was estimated to be satisfactory; assuming that the percentage of students expected to report a prevalence of daily intake of sugared snacks of 30%, using an absolute precision (d) of 0.03, Design effect (DE) of 2 and 95% Confidence Interval. A formula for proportions from www.openepi.com based on a two sided 95% CI was employed. A total of 1934 students participated in the study, with participation rate of 99.9%.

3.5 Sampling procedure

An urban /semi-urban stratified proportional one stage cluster sampling design with public secondary schools as the primary sampling unit was utilized. To obtain a representative sample of secondary school students in Dar es Salaam, schools were selected at random from urban and semi-urban areas in Kinondoni, Ilala and Temeke districts. Overall, Kinondoni had 41 secondary schools fulfilling the inclusion criteria, whereas the corresponding figures in Ilala and Temeke were 39 and 38 schools. This made a total of 118 schools in all 3 districts.

To reach the estimated sample size assuming about 100 students included in each school, the number of schools to be selected were about 20. Using the unified sampling fraction, the number of schools to be selected were 6.2 in Kinondoni, 5.9 in Ilala and 5.8 in Temeke. Thus, 6 schools were randomly selected from each district that, providing sample fractions of 6/41 in Kinondoni, 6/39 in Ilala and 6/38 in Temeke. Thus schools were selected randomly from each district proportionally to the number of eligible schools in the districts. All students from each of the selected schools that fulfilled the inclusion criteria of being in the defined age range of 16–20 years were invited from the accessible classes. Only consenting subjects were included in the study.

3.6 Data collection and measurements

The research instrument was based on an existing survey instrument tested and applied in the East Africa, including the Global school-based student health Survey (GSHS) questionnaire as well as in previous studies conducted in similar age groups in East Africa (33, 47). Data was collected by self-administered questionnaires in school settings (class room settings) and supervised by research staff. Participation was voluntary and informed consents were requested from students. Ethical clearance was obtained from relevant bodies in Norway and Tanzania before starting the study.



Figure 2: Students filling in the questionnaires in a classroom setting

There were several questions pertaining to general health and oral health. Questions relating to knowledge on cause and prevention of caries and gum diseases, oral health behavior such as tooth brushing, use of fluoridated dentifrices, consumption of sugary foods, use of tobacco,

alcohol and substance abuse were asked. Perceived oral health problems like toothache, dental appearance, dental fluorosis as well as gum diseases were also inquired upon. Further, experiences on oral diseases and conditions suffered in the past twelve months were asked for. Participants' sources of information pertaining dental health were asked for, as well as their views and perceptions on the oral health education that they received during their primary education.

3.7 Socio-demographic characteristics (see appendix I questionnaire section 1-12)

Socio-demographic characteristics were assessed in terms of age, gender, parental education and household assets. Age was categorized into (1) 16-17 years and (2) 18-20 years from a continuous scale. A *family wealth index* was constructed as a socio-economic indicator. Assets indicative of family wealth (TV, Electricity, Bicycle, Tap water, Motor car and a flush toilet) were recorded as (1) "available and working condition" or (2) "not available/ not in working condition". Using factor analysis, four approximate quartiles of wealth were constructed with a gradient from the least poor quartile to most poor quartile. Sex remained as two discrete categorical variables (1) male and (2) female. *Father's education* was originally scored from (1) no education to (6) I do not know. For analysis, the variable was recoded into (1) up to primary education (including original categories 1, 2 and 6) and (2) at least secondary education (including original categories 3 and 4). Original category (5) *father died* from Father's education was recoded as "System missing". *Religion* was originally scored from (1) Roman Catholic to (5) others. The variable was recoded into (1) Christian (including original categories 1, 2, 4 and 5) and (2) Muslim (containing original category 3). *Residence*

was dichotomized into (1) Urban and (2) Semi urban from the location of the area of residence filled in.

3.8 Alcohol and drug use (see appendix I questionnaire section 21-29)

Alcohol use was assessed by asking: (i) Have you ever tasted alcohol, (ii) During the past 30 days, on how many days did you have at least one drink containing alcohol, (iii) During the past 30 days, on the days that you drank alcohol, how many drinks did you usually drink per day and (iv) How many of your friends drink alcohol on a regular basis. A dichotomous scale was used during the analysis of all these questions.

Question asking *have you ever tasted alcohol* was scored (1) yes and (2) no. Questions pertaining as to *how many days had alcohol during the past 30 days* and *how many drinks per day in days that you drank alcohol during the past 30 days* were dichotomized into (1) never or (2) one day or more and (1) did not drink alcohol in last 30 days or (2) At least half a drink in a day respectively. Question which was asking as to *how many of your friends drink alcohol on a regular basis* was originally scored from (1) none of them to (5) I don't know. The variable was dichotomized into (1) none/ don't know (containing original variables 1 and 5) and (2) at least some of them (containing original variables 2, 3 and 4).

Drug use was assessed by asking: (i) Have you ever tried to use drugs/substances of abuse such as cannabis or cocaine, (ii) During the past 30 days, how many times have you used drugs/substances of abuse such as cannabis or cocaine, (iii) What types of drugs have you tried most times and (iv) How many of your friends have tried drugs/substances of abuse such as cannabis or cocaine.

Question asking *have you ever tried to use drugs/substances of abuse such as cannabis or cocaine* was scored (1) yes and (2) no. Questions pertaining as to *how many times have you used drugs/substances of abuse during the past 30 days* and *what types of drugs have you tried most times* were dichotomized into (1) never or (2) at least once and (1) never tried a drug or (2) have tried a drug, respectively. Question which was asking as to *how many of your friends have tried drugs/substances of abuse* was originally scored from (1) none of them to (5) I don't know. The variable was dichotomized into (1) none/ don't know (containing original variables 1 and 5) and (2) at least some of them (containing original variables 2, 3 and 4).

3.9 Dietary Behavior (see appendix I and questionnaire section 30-40)

The question “*during the past 30 days, how often did you eat breakfast*” was originally recorded as a continuous variable ranging from 0-30. The variable was recoded from a continuous scale into a categorical bivariate scale. It was dichotomized into (1) 0-15 days and (2) 16-30 days.

There were three questions assessing *general eating patterns and snacking habits*. These questions asking “During the past 30 days how often was: breakfast offered to you at school, snack offered to you at school, had fast foods such as chips, eggs etc.” originally had responses ranging from (1) never to (5) everyday/always. These responses were dichotomized into (1) never and (2) at least once.

There were two questions assessing *fresh fruits and vegetables consumption*. These questions asking “During the past 30 days, how often did you usually eat: fresh fruits, vegetables” had

responses ranging from (1) Never to (2) 5 or more times a day. These responses were dichotomized into (1) never or once a day and (2) more than once a day.

There were two questions assessing *sugary foodstuffs consumption*. These questions asking “During the past 30 days, how often do you: drink sugar sweetened soft drinks, eat sweets like chocolate and candy” had responses ranging from (1) never to (2) always/often per day. These responses were dichotomized into (1) never/ rarely and (2) at least sometimes.

3.10 Hygiene behaviors and physical activities (see appendix I and questionnaire section 61-68 and 88-94)

There were four questions assessing *hygiene behaviors*. “During the past 30 days, how often did you: use the toilets or latrines at school, wash your hands after using the toilet or the latrines, wash your hands before eating and use soap when washing your hands” had responses ranging from (1) never to (5) always. The variables were dichotomized into (1) never and (2) At least seldom; this was done for analysis purposes.

There were two questions assessing *physical activities*. The question asking “During this school year, on how many days did you go to physical education class each week” had original responses ranging from (1) never to (6) 5 or more days. The responses were recoded into (1) never and (2) at least once a week. “Outside of school hours, how often do you usually exercise so much that you get out of breath” had responses ranging from (1) every day to (6) never. These responses were dichotomized into (1) never or once or twice per month (including original categories 5 and 6) and (2) at least once a week (including original categories 1, 2, 3 and 4).

There were two questions used to assess *leisure time activity*. The questions were asking “During a week, how many hours do you spend: watching television or videos/DVDs, on the computer or internet”. The questions had responses ranging from (1) less than half an hour to (6) I don’t watch TV/ never used a computer/internet. The responses were dichotomized into (1) I don’t watch television/ videos or DVDs and Never used a computer or internet and (2) Watch TV/ videos or DVDs at least once and used a computer or internet at least once, respectively.

3.11 Tobacco use (see appendix I and questionnaire section 109-115)

Six questions were used to assess tobacco use. Questions asking “Have you ever tried or experimented with cigarette smoking, even one or two puffs” and “Has a cigarette company representative ever offered you a free cigarette” had two responses, (1) yes and (2) no. Questions asking “During the past 30 days, on how many days did you smoke cigarettes” and “During the past 30 days, on how many days did you use any other form of tobacco” were recorded as continuous variables. The responses were dichotomized into (1) never tried cigarette smoking or using any other form of tobacco, if the frequency of use was “0” and (2) tried smoking cigarettes or used other form of tobacco at least once, if the frequency of usage was at least “1”. The question asking “During the past 30 days, did anyone ever refuse to sell you cigarettes because of your age” had responses ranging from (1) never tried or experimented with cigarette smoking to (4) no, my age did not keep me from buying cigarettes. These responses were dichotomized from the four categories into (1) never experimented cigarette smoking/ did not try to buy cigarettes during the past 30 days and (2) tried to buy cigarettes in the last 30 days. The question asking “how many of your friends

smoke cigarettes on a regular basis” were originally scored from (1) none of them to (4) all of them. The response was dichotomized into (1) none of them (original category 1) and (2) at least some of them (containing original categories 2, 3 and 4).

3.12 Oral health knowledge (see appendix I and questionnaire section 173-182)

There were ten questions used to assess *oral health knowledge*. These questions were: Gum disease might lead to bone erosion, Gum disease is not caused by a virus, Slight bleeding is a first sign of gum disease, Light and vitamins do not prevent gum disease, Bacterial plaque causes gum disease, A cause of tooth decay is mainly irregular tooth brushing, Tooth decay is caused by sugary foods, A dentist should be visited only when in severe toothache, Fluoride can prevent tooth decay, A dentist should be visited regularly once a year. Responses to all these questions were (1) correct or (2) incorrect. There was one negatively worded question which had its values reversed and all the correct answers were given a value of “1”, and the incorrect answers a value “2”. All the scores were then summed up. The lower the total score was, the better the oral health knowledge was. The sum score for oral health knowledge was then dichotomized at the median (50%) with the lower mean scores from the median termed as “Good knowledge” and the higher mean scores from the median termed as “Bad knowledge”. In the present study, the alpha coefficient for oral health knowledge scale was low, at .483.

3.13 Oral health attitudes (see appendix I and questionnaire section 183-187 and 168-172)

The questions used to assess *oral health attitudes* were stated: what's your opinion about oral health education in primary school, providing oral health education is a waste of time, students have the right to get primary school oral health education, oral health information should be taken individually and providing oral health education in primary school is important to prevent oral disease. The responses to these questions were originally on a five point Likert scale ranging from (1) totally agree to (5) totally disagree. The responses were dichotomized such that (1) Good attitude (containing original categories 1, 2 and 3) and (2) Bad attitude (containing original categories 4 and 5). The question "providing oral health information is a waste of time" was negatively worded, and its scores were thus reversed. All the scores were then summed up. The lower the total score was, the better the oral health attitude was. The sum score for oral health attitude was then dichotomized at the median (50%) with the lower mean scores from the median termed as "Good attitude" and the higher mean scores from the median termed as "Bad attitude". In the present study, the alpha coefficient for oral health attitude scale was low, at .482.

4 Statistical analysis

Data was entered in the computer by the principal investigator and trained data entrants, and subsequently checked for irregularities and cleaned by the principal investigator. Descriptive analyses in terms of frequencies of distributions were conducted for all variables. Statistical analysis was done in order to evaluate statistically significant differences, strengths of

association and trends in occurrence of each of the studied features. Further, prevalence of behaviors and their correlates were assessed. Data management and analysis was conducted using SPSS version 19.0 (SPSS Inc., Chicago IL). Bivariate analyses were conducted using Pearson Chi-Square test, Mann Whitney U test and Kruskal Wallis for two and several independent samples. Multivariate analyses were conducted using one-way between-groups analysis of variance (ANOVA). Level of significance was set at 5%.

5 Ethical clearance

The project protocol was submitted for ethical clearance to Muhimbili University of Health and Allied Sciences ethical clearance committee, Ministry of Education and Vocational Training through its respective district education officers in Tanzania, and REK VEST Norway (Appendix 2). Permission to implement the study was sought from Temeke, Ilala and Kinondoni districts' education authorities as well as the school heads from the participating schools.

Each participant was asked for individual informed and written consent prior to participation, and they were allowed to drop at any time during the study.

6 Results

6.1 Sample profile

A total of 1934 young adults from 18 different schools, in three districts, aged 16-20 years, mean age of 16.9 (SD = 1.005) were invited and consented to participate in the questionnaire survey. The age distribution of the participants was skewed to the left; almost three quarters of the students were of the ages 16-17 years (Figure 3).

A total of 56.0% were females. As shown in Table 4, there was no statistically significant difference in the distribution of student's wealth by sex. There were significantly more younger (16-17 years) female students were as compared to males ($p < 0.01$). The proportion of students reporting to have parents with either high or low levels of education was almost split evenly (49.9% versus 50.1%). The majority of the students (65.2%) lived in urban areas whereas the remainder resided in semi urban areas.

6.2 Response Rate

The response rate of the students was as high as 99.9%. None of the students that were approached, and explained the aim of the study to, refused to participate in the study. One (1) student however pulled out in the middle of the study because he was not feeling well.

Table 4: Frequency of students' distribution of household wealth (wealth index), age, father's education, place of residence and religious affiliation by sex.

Socio-demographic variables	Sex		Total % (n)
	Male % (n)	Female % (n)	
Wealth Index			
1 st quartile (Least poor)	22.4 (187)	21.7 (231)	22.0 (418)
2 nd quartile	26.3 (219)	29.0 (309)	27.8 (528)
3 rd quartile	27.8 (232)	25.0 (267)	26.3 (499)
4 th quartile (Most poor)	23.5 (196)	24.3 (259)	23.9 (455)
Age			
16-17 years	66.1 (562)	81.4 (882)	74.7 (1444)
18-20 years	33.9 (288)	18.6 (202)**	25.3 (490)
Father's education			
Up to primary level	52.4 (378)	48.3 (457)	50.1 (835)
At least secondary level	47.6 (343)	51.7 (490)	49.9 (833)
Religion			
Christian	47.9 (406)	47.7 (515)	47.8 (921)
Muslim	52.1 (441)	52.3 (565)	52.2 (1006)
Residence			
Urban	64.1 (476)	66.1 (624)	65.2 (1160)
Semi urban	35.9 (267)	33.9 (320)	34.8 (587)

**** $p < 0.01$, * $p < 0.05$**

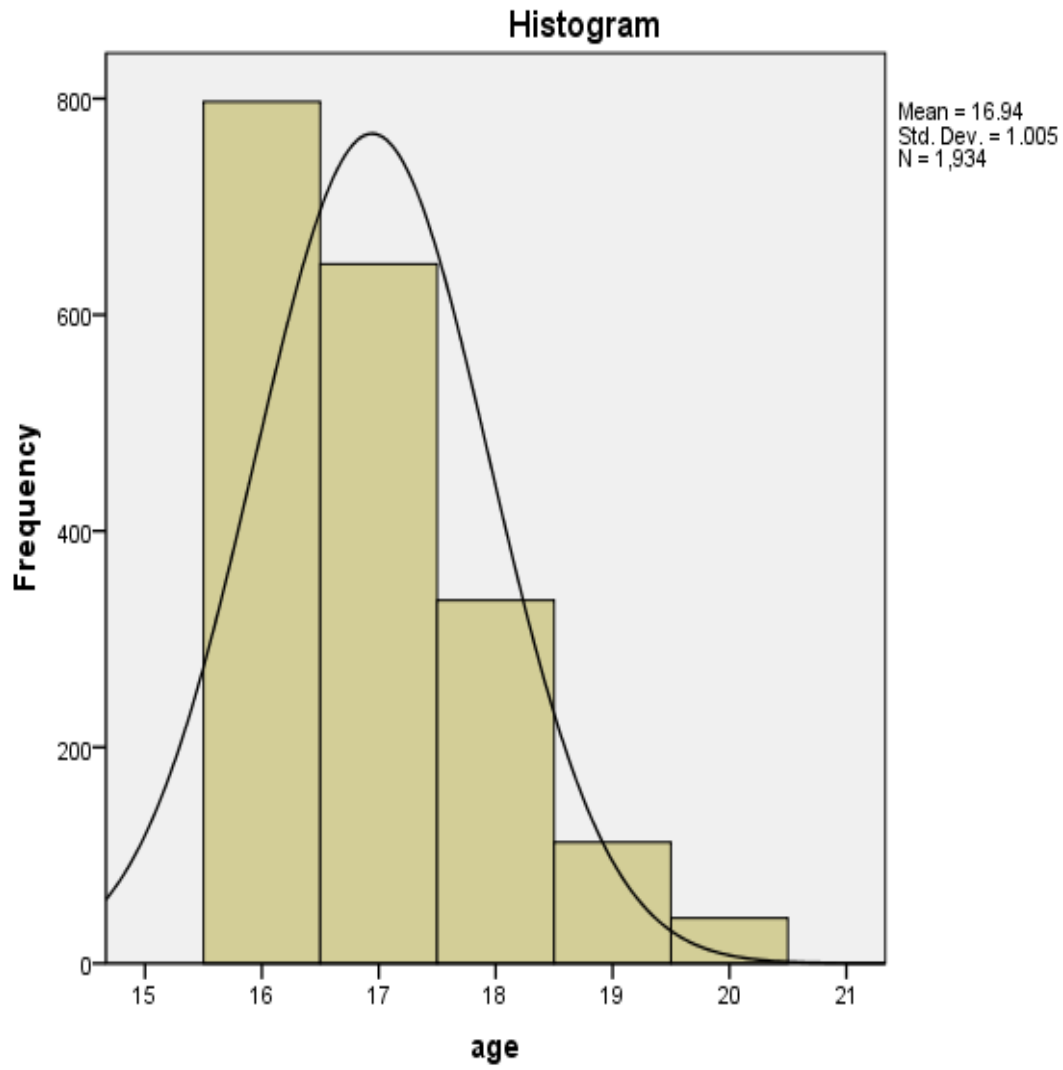


Figure 3: Age distribution of interviewed students showing left sided skew.

6.3 Socio-demographic distribution of hygiene behavior

Table 5 depicts percentage of students who reported to *always* perform hygiene behaviors. Tooth brushing was the most frequently reported hygiene behavior. Students reported hand washing before eating more frequently than hand washing after latrine/toilet usage. The least commonly performed hygiene behavior was hand washing with soap. There were no differences in tooth brushing behavior by socio demographic variables.

Table 5: Distribution of students by performance of hygiene behaviors

Hygiene Behavior	% (n)
Wash hands after latrine/toilet usage- always	45.0 (865)
Wash hands before eating- always	58.0 (1115)
Wash hands with soap – always	21.6 (415)
Brush teeth – everyday	78.9 (1518)

Table 6 depicts the percentages of those who *during the last 30 days* performed the hygiene behaviors more than rarely. There were statistically significant differences in wealth index, sex, age and parent’s education towards washing of hands with soap. Students that were of the wealthiest quartile, females, younger (16-17 years) and with parents of a high education level reported this behavior more frequently as compared to their counterparts.

A higher proportion male students reported to have used the school toilet (more than rarely) in the last 30 days as compared to female students ($p < 0.01$). There were no other statistically

significant differences by socio-demographic variables towards the performance of this behavior.

Table 6: Frequency of students' hygiene behaviors by household wealth, age, sex, father's education and religion

Independents	Used school toilet % (n)	Washed hands after using toilet % (n)	Washed hands before eating % (n)	Used soap to wash hands % (n)
Wealth index				
1st quartile (least poor)	40.3 (168)	77.9 (325)	90.2 (376)	76.6 (320)
2nd quartile	46.7 (245)	77.6 (408)	91.4 (481)	68.7 (360)
3rd quartile	44.8 (222)	71.4 (354)	89.9 (447)	62.3 (309)
4th quartile (most poor)	45.1 (204)	75.4 (341)	91.6 (413)	61.0 (275)**
Sex				
Boys	50.8 (428)	73.7 (623)	90.7 (766)	63.1 (531)
Girls	39.5 (427)**	77.2 (833)	91.1 (983)	70.0 (756)**
Age				
16-17 yrs.	43.6 (627)	76.2 (1096)	90.5 (1303)	68.7 (987)
18-20 yrs.	47.1 (228)	74.2 (360)	92.1 (446)	61.7 (300)*
Father's education				
At least primary /I do not know	44.6 (369)	74.8 (620)	90.4 (751)	63.0 (523)
Secondary and above	44.9 (373)	77.1 (639)	91.7 (759)	73.0 (604)**
Religion				
Christian	47.1 (431)	75.9 (695)	90.3 (827)	69.1 (633)
Muslim	41.9 (419)	75.5 (756)	91.6 (917)	65.2 (651)
Residence				
Urban	43.0 (471)	76.3 (834)	90.2 (985)	67.7 (739)
Semi urban	47.3 (375)	77.1 (452)	92.0 (539)	68.5 (400)

** $p < 0.01$, * $p < 0.05$

6.4 Socio-demographic distribution of physical, leisure time activities and tooth brushing

Table 7 depicts the percentages of attendance of physical education in a week by sex. Totals of 64.4% of the students reported to never have attended physical education class in school, whereas 6.9% reported to have attended a physical education class 5 or more days in a week.

This study did not enquire for the reason of non-attendance of the physical education class, although the response of “never” can be taken to infer to non-existence of such sessions in schools. The distribution of frequencies of attendance of physical education classes was similar by sex.

Table 7: Frequency of students’ attendance of physical education class by sex

Statement	Sex		Total
	Male % (n)	Female % (n)	% (n)
<i>In this school, how many days have you attended physical education class in a week?</i>			
Never	62.7 (527)	65.7 (708)	64.4 (1235)
1 day	21.4 (180)	22.6 (244)	22.1 (424)
2 days	3.7 (31)	3.2 (35)	3.4 (66)
3 days	2.5 (21)	1.7 (18)	2.0 (39)
4 days	1.1 (9)	1.2 (13)	1.1 (132)
5 or more days	8.6 (72)	5.6 (60)	6.9 (132)

Table 8 depicts the percentages of those who went to physical education class and who exercised vigorously outside school hours at least once per week. Totals of 35.6% and 55.5% reported to go to physical education and exercised once a week respectively. Students with parents with a high level of education and Muslim students reported attendance of physical education class more frequently than their counterparts ($p < 0.05$).

Male students reported to exercise vigorously outside school hours at least once in a week more frequently as compared to female students ($p < 0.01$). Further, being older (18-20 years) and Muslim was associated with an increased frequency of reporting physical activities outside school hours ($p < 0.05$).

Table 8: Frequency of students' physical activities by household wealth, age, sex, father's education, religion and place of residence

Independents	Physical education class % (n)	Exercise outside school hours % (n)
<i>Wealth index</i>		
1st quartile (least poor)	33.3 (139)	60.7 (253)
2nd quartile	38.2 (200)	54.7 (287)
3rd quartile	32.3 (160)	53.4 (265)
4th quartile (most poor)	38.1 (171)	54.3 (244)
<i>Sex</i>		
Boys	37.3 (313)	73.9 (622)
Girls	34.3 (370)	41.2 (444)**
<i>Age</i>		
16-17 yrs.	35.7 (511)	53.8 (771)
18-20 yrs.	35.4 (172)	60.6 (295)*
<i>Father's education</i>		
At least primary /I do not know	33.9 (280)	53.3 (440)
Secondary and above	38.7 (321)*	58.3 (483)
<i>Religion</i>		
Christian	32.0 (293)	52.9 (484)
Muslim	38.7 (385)*	58.0 (578)*
<i>Region</i>		
Urban	34.8 (380)	55.7 (608)
Semi urban	36.4 (212)	54.1 (316)

** $p < 0.01$ * $p < 0.05$

6.5 Socio-demographic distribution of dietary behaviors

Table 9 depicts the percentages of those who *during the last 30 days* had breakfast more than 15 days and had fried foods at least once during the past 7 days. Totals of 62.3% of the students reported to have breakfast and 57.2% had fried foods.

The frequencies of eating breakfast and that of eating fried foods varied considerably and significantly with respect to the wealth index scale and father's level of education. When comparing the wealth index against frequency of having breakfast and fried foods, the proportions were 72.0% and 67.9% for the wealthiest quartile and 51.2% and 47.0% for the least wealthy quartile, respectively. In both of these instances, the wealthiest quartile had the highest proportions reporting regular breakfasting and consumption of fried foods (fast foods) whereas consistently down the gradient, the poorest quartile also had the lowest proportions reporting these dietary behaviors ($p < 0.01$).

Students who had fathers with a high level of education also had higher proportions reporting regular breakfasting and consumption of fried foods as compared to those students with fathers with a lower level of education ($p < 0.01$).

Table 9: Frequency of students breakfasting for more than 15 days and eating fried foods at least once during the last 30 days by socio-demographic variables.

Socio-demographic variables	Eating breakfast % (n)	Fried foods % (n)
<i>Wealth index</i>		
1st quartile (least poor)	72.0 (299)	67.9 (283)
2nd quartile	65.7 (343)	59.2 (310)
3rd quartile	60.1 (297)	55.4 (276)
4th quartile (most poor)	51.2 (230)**	47.0 (214)**
<i>Sex</i>		
Boys	62.4 (527)	54.8 (463)
Girls	62.2 (664)	59.0 (638)
<i>Age</i>		
16-17 yrs.	62.3 (889)	56.9 (819)
18-20 yrs.	62.4 (302)	57.9 (282)
<i>Father's education</i>		
At least primary /I do not know	56.9 (467)	54.1 (451)
Secondary and above	68.4 (564)**	64.3 (534)**
<i>Religion</i>		
Christian	64.9 (589)	56.3 (516)
Muslim	60.0 (598)	58.0 (582)
<i>Residence</i>		
Urban	64.1 (691)	58.5 (641)
Semi urban	60.4 (350)	54.1 (316)

****p<0.001**

Table 10 depicts percentages of students who *during the last 30 days* had fruits more than once a day, had vegetables more than once a day, had a soda at least once per week and sweets more than seldom. Totals of 45.0%, 61.3%, 47.8% and 33.2% reported that they had fruits more than once a day, vegetables, a soda at least once weekly and sweets.

The frequency of eating fruits, of drinking soda and that of eating sweets and chocolates varied considerably and significantly across the wealth index scale. In all these instances, the wealthiest quartile had the highest proportions reporting consumption of the aforementioned foodstuffs, whereas consistently down the gradient, the poorest quartile had the lowest proportions ($p < 0.01$).

Students whose fathers have at least secondary level of education had higher proportions reporting to eat fruits, to have vegetables, soda and to have sweets and chocolates as compared to those students whose fathers' highest level of education was primary school ($p < 0.01$).

Female and younger (16-17 years) students reported consumption of sugary foodstuffs i.e. to drink sodas at least once in a week and to eat sweets and chocolates more than seldom, in higher frequencies as compared to male and older students. While younger students had higher proportions reporting to eat fruits, female students had higher proportions reporting regular vegetable consumption as compared to their opposite counterparts.

Table 10: Frequency of students' consumption of fruits, vegetables and sugary foodstuffs during the last 30 days by socio-demographic variables.

Independents	Have fruits % (n)	Have vegetables % (n)	Have soda % (n)	Have sweets % (n)
Wealth index				
1st quartile (least poor)	52.9 (221)	60.3 (252)	65.3 (273)	40.0 (167)
2nd quartile	50.3 (263)	62.1 (325)	51.8 (272)	37.0 (194)
3rd quartile	41.6 (207)	61.2 (304)	40.9 (204)	30.5 (152)
4th quartile (most poor)	36.3 (165)**	61.5 (279)	35.7 (162)**	26.2 (119)**
Sex				
Boys	43.7 (368)	56.4 (475)	39.8 (336)	25.4 (214)
Girls	46.1 (499)	65.2 (705)**	54.1 (586)**	39.3 (426)**
Age				
16-17 yrs.	47.7 (687)	62.9 (905)	50.3 (725)	35.0 (504)
18-20 yrs.	37.1 (180)**	56.7 (275)	40.5 (197)**	28.0 (136)*
Father's education				
At least primary /I do not know	42.4 (352)	58.8 (490)	42.6 (355)	28.3 (236)
Secondary and above	51.7 (429)**	65.4 (541)*	54.1 (449)**	39.4 (327)**
Religion				
Christian	42.3 (388)	63.3 (579)	49.8 (457)	32.6 (299)
Muslim	47.6 (476)	59.3 (595)	46.1 (462)	34.0 (341)
Region				
Urban	44.7 (490)	61.7 (678)	49.4 (542)	34.4 (378)
Semi urban	45.4 (265)	61.8 (359)	45.2 (264)	31.6 (184)

* $p < 0.05$, ** $p < 0.001$

6.6 Socio-demographic distribution of tobacco use

Table 11 depicts the percentages of those who have ever tried cigarette smoking, who in the *last 30 days* smoked at least one cigarette and have been given free cigarettes by a cigarette company representative. Totals of 14.1% and 6.7% and reported to have ever tried cigarette smoking and to have smoked at least one cigarette recently (in the *last 30 days*), respectively.

Male students reported to have ever smoked cigarettes and to have smoked a cigarette recently more frequently as compared to female students ($p < 0.01$). Older (18-20 years) and Muslim students had higher proportions (18.3% and 15.8%) reporting to have ever tried to smoke cigarettes than younger and non-Muslim students ($p < 0.05$).

Table 12 depicts the percentages of those who *in the last 30 days* have used other forms of tobacco at least once, who have tried to buy cigarettes and who have at least some of their friends who smoke cigarettes regularly. Totals of 1.9%, 7.7% and 22.5% reported to have used other forms of tobacco at least once, to have tried to buy cigarettes and to have at least some of their friends who smoke cigarettes regularly, respectively.

Male students had a consistently higher proportions reporting to have used other forms of tobacco, to have tried to buy cigarettes recently and to have at least *some* friends who smoke cigarettes on a regular basis as compared to females whose proportions were much lower for each respective behavior ($p < 0.01$).

Older students (18-20 years) had higher proportions reporting to use other forms of tobacco and to have friends who are regular cigarette smokers as compared to younger students (16-17 years).

Table 11: Frequency of students' tobacco use by household wealth, age, sex, father's education, religion

Independents	Have tried to smoke a cigarette % (n)	Have smoked cigarettes at least once in last 30 days % (n)
Wealth Index		
1 st quartile (Least poor)	15.1 (63)	8.7 (36)
2 nd quartile	13.6 (71)	5.4 (28)
3 rd quartile	13.7 (68)	6.6 (33)
4 th quartile (Most poor)	14.4 (65)	6.2 (28)
Sex		
Male	21.9 (184)	10.5 (88)
Female	8.0 (87)**	3.7 (40)**
Age		
16-17 years	12.7 (182)	6.1 (87)
18-20 years	18.3 (89)*	8.4 (41)
Father's education		
Up to primary level	15.8 (131)	7.6 (63)
At least secondary level	12.5 (104)	6.2 (51)
Religion		
Christian	12.3 (113)	6.6 (60)
Muslim	15.8 (158)*	6.8 (68)
Residence		
Urban	12.6 (138)	6.3 (69)
Semi urban	15.2 (89)	6.8 (40)

**** $p < 0.01$, * $p < 0.05$**

Table 12: Frequency of students' tobacco use by household wealth, age, sex, father's education, religion. .

Independents	Used other forms of tobacco % (n)	Tried to buy cigarettes in the last 30 days % (n)	Have at least <i>some</i> friends who smoke cigarettes regularly % (n)
Wealth Index			
1 st quartile (Least poor)	2.2 (9)	9.1 (38)	24.3 (101)
2 nd quartile	1.1 (6)	6.3 (33)	23.9 (125)
3 rd quartile	2.4 (12)	7.5 (37)	20.4 (101)
4 th quartile (Most poor)	2.0 (9)	7.9 (36)	21.9 (99)
Sex			
Male	3.2 (27)	10.6 (89)	38.4 (324)
Female	0.8 (9)**	5.5 (59)**	10.1 (109)**
Age			
16-17 years	1.4 (20)	7.0 (101)	20.4 (292)
18-20 years	3.3 (16)*	9.7 (47)	28.9 (141)**
Father's education			
Up to primary level	2.4 (20)	8.6 (71)	23.8 (197)
At least secondary level	1.6 (13)	7.4 (61)	21.0 (174)
Religion			
Christian	1.7 (16)	7.6 (70)	22.6 (207)
Muslim	2.0 (20)	7.8 (78)	22.7 (226)
Residence			
Urban	1.6 (17)	7.7 (84)	22.7 (248)
Semi urban	2.1 (12)	7.4 (43)	22.0 (128)

** $p < 0.001$ * $p < 0.05$

6.7 Socio-demographic distribution of use of health and dental health care services

Table 13 depicts the percentage of those who have attended a dental clinic in the *past 2 years* to receive treatment and those who during the *past 12 months* have consulted someone with an issue regarding their health. Totals of 19.0% and 56.7% reported to have attended a dental clinic and to have consulted someone with an issue regarding their health, respectively.

Across the household wealth index, a higher proportion of students categorized as least poor reported to have attended a dental clinic as compared to their poorer counterparts ($p < 0.05$). Students with parents with a high level of education, as compared to those whose fathers had primary school level of education had a higher proportion reporting to have attended a dental clinic (22.7% against 15.8%) as well as having consulted someone with regards to their health (61.3% against 53.2%). This difference in proportion was highly statistically significant ($p < 0.001$)

Table 13: Frequency distribution of students' dental attendance patterns and health services use by household wealth, age, sex, father's education, residence and religion

Independents	Have attended dental clinic % (n)	Have consulted someone about my health % (n)
Wealth Index		
1 st quartile (Least poor)	22.1 (90)	60.7 (246)
2 nd quartile	22.1 (115)	57.5 (295)
3 rd quartile	16.9 (82)	53.3 (255)
4 th quartile (Most poor)	13.8 (61)*	55.5 (242)
Sex		
Male	17.8 (148)	55.4 (454)
Female	20.0 (211)	57.7 (603)
Age		
16-17 years	19.1 (271)	56.0 (738)
18-20 years	18.6 (88)	58.7 (274)
Father's education		
Up to primary level	15.8 (129)	53.2 (428)
At least secondary level	22.7 (184)**	61.3 (492)**
Religion		
Christian	19.4 (174)	55.9 (495)
Muslim	18.7 (184)	57.3 (558)
Residence		
Urban	19.4 (209)	57.3 (609)
Semi urban	18.3 (104)	56.9 (322)

6.8 Socio-demographic distribution of use of alcohol and drugs

Table 14 depicts percentage of students who have ever tasted alcohol, who *in the last 30 days*; have drunk alcohol on at least one day and who have at least some of their friends drinking alcohol on a regular basis. Totals of 9.0%, 25.5% and 30.3% reported to have: ever tasted alcohol, drunken alcohol and have at least some of their friends drinking alcohol on a regular basis, respectively.

A higher proportion of students reported to have had consumed alcohol in the last 30 days, as compared to report to have *ever* tasted alcohol in their lives. More male students reported to have ever tasted alcohol and to have at least *some* friends who drink alcohol on a regular basis as compared to their female counterparts.

Older students (18-20 years) report to have ever tasted alcohol and to have at *least* some friends who drink alcohol on a regular basis in higher proportions as compared to younger students aged (16-17 years). Conversely, younger students had higher proportions reporting to have had a recent alcoholic drink (at least one alcoholic drink in the last 30 days) as compared to the older students ($p < 0.01$).

Muslim students had consistently lower proportions reporting on alcoholic consumption behaviors i.e. to have ever tasted alcohol, to have had a recent alcoholic drink and to have at least some of their friends who drink alcohol regularly as compared to non-Muslim students. Across all these behaviors, the differences in proportion were highly statistically significant ($p < 0.01$).

Students living in urban areas reported recent alcohol consumption more frequently, than students living in semi urban areas ($p < 0.05$).

Table 14: Frequency of distribution of students' alcohol use by household wealth, age, sex, father's education, residence and religion.

Independents	Have tasted alcohol % (n)	Drank alcohol in at least one day % (n)	At least some of my friends drink alcohol % (n)
Wealth Index			
1 st quartile (Least poor)	10.7 (44)	27.2 (113)	33.1 (138)
2 nd quartile	8.2 (42)	25.9 (134)	30.1 (158)
3 rd quartile	8.4 (40)	23.9 (118)	29.6 (146)
4 th quartile (Most poor)	8.6 (38)	24.1 (109)	27.6 (125)
Sex			
Male	11.2 (92)	24.1 (203)	40.9 (344)
Female	7.4 (78) *	26.5 (284)	22.0 (237)**
Age			
16-17 years	7.9 (110)	28.3 (404)	28.0 (400)
18-20 years	12.6 (60)*	17.1 (83)**	37.0 (181)**
Father's education			
Up to primary level	9.6 (77)	26.1 (215)	31.0 (256)
At least secondary level	8.5 (69)	25.6 (211)	30.3 (259)
Religion			
Christian	12.6 (112)	32.6 (297)	34.6 (316)
Muslim	5.9 (58)**	19.1 (190)**	26.5 (265)**
Residence			
Urban	9.8 (104)	28.1 (306)	31.7 (346)
Semi urban	8.0 (46)	22.9 (133)*	27.6 (161)

** $p < 0.01$, * $p < 0.05$

Table 15 depicts percentage of students who have ever tried to use drugs, who have used drugs at least once during the past 30 days and who have friends that have tried to use drugs. Totals of 2.0%, 3.4% and 16.9% reported to have ever tried to use drugs, to have used drugs recently and to have friends that have tried to use drugs, respectively.

Older and male students reported to associate themselves with people who have experimented with drugs (at least some of my friends have tried drugs) in higher proportions as compared to younger and female students ($p < 0.01$). Additionally, male students reported to have ever experimented with drugs (have ever tried to use drugs) more frequently than female students ($p < 0.05$).

Table 15: Frequency distribution of students' drug use by household wealth, age, sex, father's education, residence and religion.

Independents	Have tried to use drugs % (n)	Used drugs on at least one day % (n)	At least some of my friends have tried to use drugs % (n)
Wealth Index			
1 st quartile (Least poor)	2.5 (10)	4.1 (17)	16.3 (68)
2 nd quartile	1.0 (5)	3.2 (17)	16.3 (86)
3 rd quartile	1.7 (8)	2.6 (13)	17.1 (85)
4 th quartile (Most poor)	2.7 (12)	3.5 (16)	18.3 (83)
Sex			
Male	2.8 (23)	2.5 (21)	28.5 (241)
Female	1.3 (14)*	4.1 (44)	8.0 (86)**
Age			
16-17 years	1.8 (25)	3.5 (51)	15.3 (220)
18-20 years	2.5 (12)	2.9 (14)	21.9 (107)**
Father's education			
Up to primary level	2.0 (16)	4.1 (34)	17.1 (142)
At least secondary level	1.7 (14)	2.9 (24)	16.3 (135)
Religion			
Christian	1.6 (14)	3.8 (35)	17.5 (160)
Muslim	2.4 (23)	3.0 (30)	16.6 (167)
Residence			
Urban	1.4 (15)	3.6 (40)	17.4 (191)
Semi urban	2.8 (16)	2.7 (16)	17.3 (101)

6.9 School health education during last year

Table 16 depicts the percentage of students who *during this school year* have been taught on the dangers of drugs, importance of balanced diet, hand washing and physical exercises and on the dangers of cigarettes. Totals of 79.9%, 63.8%, 76.5%, 52.7% and 66.7% reported to have been taught on the dangers of drugs, cigarettes; importance of balanced diet, hand washing and physical exercises.

More female students than males reported to have been taught on the dangers of drugs and on the importance of physical exercises. Further, a higher proportion of older students (18-20 years) reported to have been taught on dangers of drugs and cigarettes as compared to younger students. All these differences were significant ($p < 0.05$).

Table 17 depicts the percentage of students who recall having received oral health education, oral hygiene instructions and dietary counseling when in primary school. Totals of 74.1%, 82.3% and 85.6% reported to recall receiving oral health education, oral hygiene instructions and dietary counseling, respectively.

The students with a father with a high level of education had a higher proportion (77.1%) reporting of recollection of having received oral health education as compared to 71.5% of those whose father's highest level of education was primary school ($p < 0.05$). There were no other differences by socio-demographic variables of recollection of any other subject matter from primary school.

Table 16: Percentage of students who have this year been taught on dangers of drugs, importance of balanced diet, of hand washing, of physical exercises and on dangers of drugs

Independents	Dangers of drugs % (n)	Importance of balanced diet % (n)	Importance of hand washing % (n)	Importance of physical exercises % (n)	Dangers of cigarettes % (n)
Wealth Index					
1 st quartile (Least poor)	81.9 (340)	76.1 (315)	48.4 (202)	66.1 (271)	63.9 (265)
2 nd quartile	79.2 (414)	78.9 (408)	54.9 (289)	69.9 (362)	62.7 (326)
3 rd quartile	79.3 (301)	72.9 (360)	52.4 (260)	62.7 (307)	63.1 (311)
4 th quartile (Most poor)	79.5 (360)	78.2 (355)	53.4 (241)	66.8 (294)	64.6 (292)
Sex					
Male	77.6 (656)	75.1 (629)	51.4 (433)	62.9 (522)	62.2 (524)
Female	81.7 (876)*	77.6 (834)	53.7 (581)	69.6 (736)*	65.1 (698)
Age					
16-17 years	78.7 (1124)	76.1 (1091)	53.8 (773)	67.3 (946)	62.0 (885)
18-20 years	83.4 (408)*	77.5 (372)	49.7 (241)	64.9 (312)	69.2 (337)*
Father's education					
Up to primary level	79.2 (655)	75.7 (625)	53.4 (443)	65.3 (528)	62.7 (516)
At least secondary level	81.8 (676)	77.1 (636)	54.0 (447)	69.7 (567)	65.2 (539)
Religion					
Christian	80.0 (730)	76.7 (697)	52.0 (475)	64.4 (579)	63.6 (579)
Muslim	79.9 (799)	76.2 (760)	53.4 (535)	68.8 (675)*	64.1 (638)
Residence					
Urban	80.2 (874)	76.2 (829)	51.3 (559)	65.5 (701)	62.1 (676)
Semi urban	80.2 (466)	77.6 (450)	55.5 (325)	68.2 (394)	67.1 (390)*

* $p < 0.05$

Table 17: Frequency of distribution of students recall having received oral health education, oral hygiene instructions and dietary counseling by household wealth, age, sex, father's education, residence and religion

Independents	Recall oral education % (n)	receiving health	Recall oral instructions % (n)	receiving hygiene	Recall dietary % (n)	receiving counseling
Wealth Index						
1 st quartile (Least poor)	77.4 (315)		84.8 (346)		87.7 (356)	
2 nd quartile	74.4 (386)		83.6 (434)		86.7 (449)	
3 rd quartile	73.7 (358)		81.0 (393)		84.1 (408)	
4 th quartile (Most poor)	71.4 (317)		80.6 (358)		84.0 (372)	
Sex						
Male	72.5 (601)		80.6 (668)		84.3 (698)	
Female	75.4 (799)		83.7 (887)		86.6 (915)	
Age						
16-17 years	73.9 (1046)		82.5 (1169)		85.7 (1213)	
18-20 years	74.8 (354)		81.8 (386)		85.1 (400)	
Father's education						
Up to primary level	71.5 (583)		80.7 (657)		84.3 (686)	
At least secondary level	77.1 (628)*		85.5 (697)		88.7 (719)	
Religion						
Christian	74.2 (668)		82.1 (738)		85.2 (767)	
Muslim	74.0 (727)		82.5 (812)		85.8 (840)	
Residence						
Urban	75.3 (811)		83.3 (897)		86.4 (929)	
Semi urban	72.4 (412)		80.7 (459)		84.8 (481)	

**** $p < 0.01$, * $p < 0.05$**

6.10 Oral health related knowledge by socio-demographic factors

Table 18 depicts the percentage of students' that responded *true* to the knowledge statements. Overall, the level of knowledge was fairly good. The worst performance was on the question asking on the role of lights and vitamins in the prevention of gum disease. Less than half (49.1%) responded correctly. A total of 83.4% of the students also reported that they were supposed to go to the dentist *only* if they have a severe toothache.

Table 19 depicts the percentage of students' oral health knowledge by sex. A total of 80.3% of males responded "true" to the statement asking as to whether *The cause of dental caries is infrequent tooth brushing* as opposed to 70.4% of the females. Conversely, a larger proportion of females (79.4%) responded "true" to the statement you are supposed to see the dentist at least once annually as compared to 71.2% of males. Both of these differences in proportions are statistically significant ($p < 0.01$).

Table 20 depicts the percentages of students having good oral health knowledge by household wealth, age, sex, father's education and religion. A total of 55.1% were categorized as having good oral health related knowledge.

The level of oral health knowledge did not vary significantly throughout the household wealth index and was almost the same for males and females (55.2% and 55.0% respectively). There was no statistically significant difference in the level of oral health knowledge by father's education, religion or residence. A higher proportion of older students (18-20 years) were categorized as having good oral health knowledge as compared to their younger counterparts ($p < 0.05$).

Table 18: Student's knowledge related to oral health. Percentages of those who answered *true* to the following statements

Statement	True % (n)
Gum disease can lead to bone erosion	72.2 (1346)
Gum disease is not caused by a virus	49.1 (922)
Slight bleeding from gum is first sign of gum disease	70.0 (1312)
Light and vitamins do not prevent gum disease	42.8 (800)
Plaque causes gum disease	75.6 (1418)
The cause of dental caries is infrequent tooth brushing	74.7 (1408)
Dental caries is caused by sugary foodstuffs	94.1 (1773)
You are only supposed to go to the dentist only if you have severe toothache	83.4 (1572)
Fluoride can prevent dental caries	78.1 (1459)
You are supposed to see the dentist at least once annually	75.8 (1426)

Table 19: Percentage distribution of students' oral health related knowledge by gender of proportions of students who indicated *true* to the following statements.

Statement	Male	Female
	% (n)	% (n)
Gum disease can lead to bone erosion	70.2 (576)	73.8 (770)
Gum disease is not caused by a virus	51.1 (423)	47.4 (499)
Slight bleeding from gum is first sign of gum disease	70.5 (579)	69.7 (733)
Light and vitamins do not prevent gum disease	41.9 (344)	43.5 (456)
Plaque causes gum disease	74.5 (615)	76.5 (803)
The cause of dental caries is infrequent tooth brushing	80.3 (661)	70.4 (747)**
Dental caries is caused by sugary foodstuffs	93.0 (765)	94.9 (1008)
You are only supposed to go to the dentist if you have severe toothache	84.6 (697)	82.5 (875)
Fluoride can prevent dental caries	79.3 (649)	77.1 (810)
You are supposed to see the dentist at least once annually	71.2 (584)	79.4 (842)**

**** $p < 0.001$ * $p < 0.05$**

Table 20: Frequency of students having good total oral health knowledge by household wealth, age, sex, father's education and religion

Independents	Good total oral health knowledge % (n)
Wealth Index	
1 st quartile (Least poor)	55.4 (217)
2 nd quartile	54.7 (273)
3 rd quartile	54.8 (251)
4 th quartile (Most poor)	54.4 (224)
Sex	
Male	55.2 (432)
Female	55.0 (556)
Age	
16-17 years	53.1 (718)
18-20 years	61.2 (270)*
Father's education	
Up to primary level	55.6 (429)
At least secondary level	55.2 (427)
Religion	
Christian	56.0 (480)
Muslim	54.4 (506)
Residence	
Urban	55.6 (571)
Semi urban	54.4 (292)

**p<0.05*

Health and oral health behaviors by having received health information at school

Table 21 depicts percentages of those students who have ever used a drug, who have used a drug at least once *in the last 30 days* and who have at least *some* friends that use drugs according to having received health education regarding use of drugs or not.

A total of 1.9%, 2.8% and 17.0% of the students investigated reported to have used drugs at some time in their lives, at least once in the last 30 days and had at least some friends that used drugs, respectively. Students that disconfirmed to have been taught on the dangers of drugs had higher proportions reporting to have friends that have experimented with drugs as compared to those that confirmed to have received such education ($p < 0.01$).

Table 21: Use of drugs by having received information about the dangers of drugs

Ever been taught on the dangers of drugs?	I have used drugs in my life	Used a drug at least once in the last 30 days	At least some of my friends tried to use drugs
	% (n)	% (n)	% (n)
Yes	1.7 (25)	2.5 (38)	15.2 (233)
No	3.0 (11)	4.2 (16)	24.2 (92)**
Total	1.9 (36)	2.8 (54)	17.0 (325)

** $p < 0.01$, * $p < 0.05$

Table 22 depicts percentages of those who had fried foods (fast foods) at least once in the last 7 days, who had fruits more than once in a day, who had vegetables more than once a day, who had a soda at least once in the last 30 days, who had sweets/chocolates more than seldom in the last 30 days by having been taught about the importance of a balanced diet.

More than half (57.0%) of all students reported to have had fried foods and 47.6% reported to have had a soda at least once in the last 7 days. A higher proportion of students who received dietary education also had higher proportions confirming intake of sweets /chocolate ($p < 0.01$). Alternately, a higher proportion of students who reported to have received counseling regarding a balanced diet (64.3%) confirmed vegetable consumption compared to 51.6% of their counterparts who reported not to have received dietary counseling ($p < 0.01$).

Table 22: Percentage of students who had fried foods, fruits, vegetables, soda and sweets/chocolates by having been taught about the importance of a balanced diet

Ever been taught on importance of a balanced diet?	Had fried foods % (n)	Had fruits % (n)	Had vegetables % (n)	Had a soda % (n)	Had sweets/chocolates % (n)
Yes	56.0 (817)	46.2 (674)	64.3 (938)	48.5 (709)	35.4 (518)
No	60.3 (270)	41.2 (185)	51.6 (231)**	44.8 (201)	26.8 (120)**
Total	57.0 (1087)	45.0 (859)	61.3 (1169)	47.6 (910)	33.4 (638)

** $p < 0.01$, * $p < 0.05$

Table 23 depicts percentage of students' hygiene behavior according to having received education regarding the importance of hand washing. Students who reported to have been taught on the importance of hand washing had a higher proportion who reported to wash their hands with soap at least sometimes as well as washing hands after toilet usage at least sometimes, whereas those that reported not to have been taught on the importance of this hygiene behavior had a lower proportions reporting the associated hygiene behaviors ($p < 0.01$). Further, a higher proportion of students who reported to have been taught the importance of hand washing reported to have used the toilets at school *at least sometimes* more frequently than the students reporting not to have been taught of the importance of hand washing ($p < 0.05$).

Table 23: Proportion of students who used school toilets/latrines, washed hands after toilet usage, washed hands before eating and washed hands with soap by having been taught about the importance of hand washing.

Ever been taught importance of hand washing?	Usage of toilets at school at least sometimes % (n)	Hand washing after toilet usage at least sometimes % (n)	Hand wash before eating at least sometimes % (n)	Hand wash with soap at least sometimes % (n)
Yes	46.9 (474)	80.7 (816)	91.6 (927)	70.8 (717)
No	41.8 (379)*	70.0 (636)**	90.1 (819)	62.5 (567)**
Total	44.4 (853)	75.4 (1452)	90.9 (1746)	67.0 (1284)

**** $p < 0.01$, * $p < 0.05$**

Table 24 depicts percentage of those who *in the last 30 days* attended a physical education class in school at least once in a week and those who exercised vigorously outside school hours at least once in a week by having been taught about the importance of physical activities. Students who reported to have been taught on the importance of physical activities had a significantly higher proportion reporting to attend physical education class (42.8%) as well as exercising outside school hours (59.6%) as compared to students who reported not to have been taught the importance of physical activities whose proportions were 19.6% and 45.9% for respective behaviors ($p < 0.01$).

Table 24: Percentage of those who attended a physical education class, who exercised vigorously outside school hours by ever having been taught about the importance of physical activities

Ever been taught importance of physical activities?	Attended physical education class % (n)	Exercises outside school hours % (n)
Yes	42.8 (538)	59.6 (749)
No	19.6 (123)**	45.9 (288)**
Total	31.2 (661)	52.8 (1037)

**** $p < 0.01$**

6.11 Oral health related behaviors by knowledge score

Table 25 depicts the frequency of students who reported to have had sweets/chocolates, soda, have smoked a cigarette at least once, who brush their teeth every day, who have gone to a dental clinic for treatment/advice at least once in last 2 years by level of oral health knowledge. Students who were categorized as having bad total oral health knowledge had a higher proportion (50.9%) reporting to have drunk sodas (sugared soft drinks) at least once in the last week as compared to 45.8% of students categorized as having Good total oral health knowledge ($p < 0.05$).

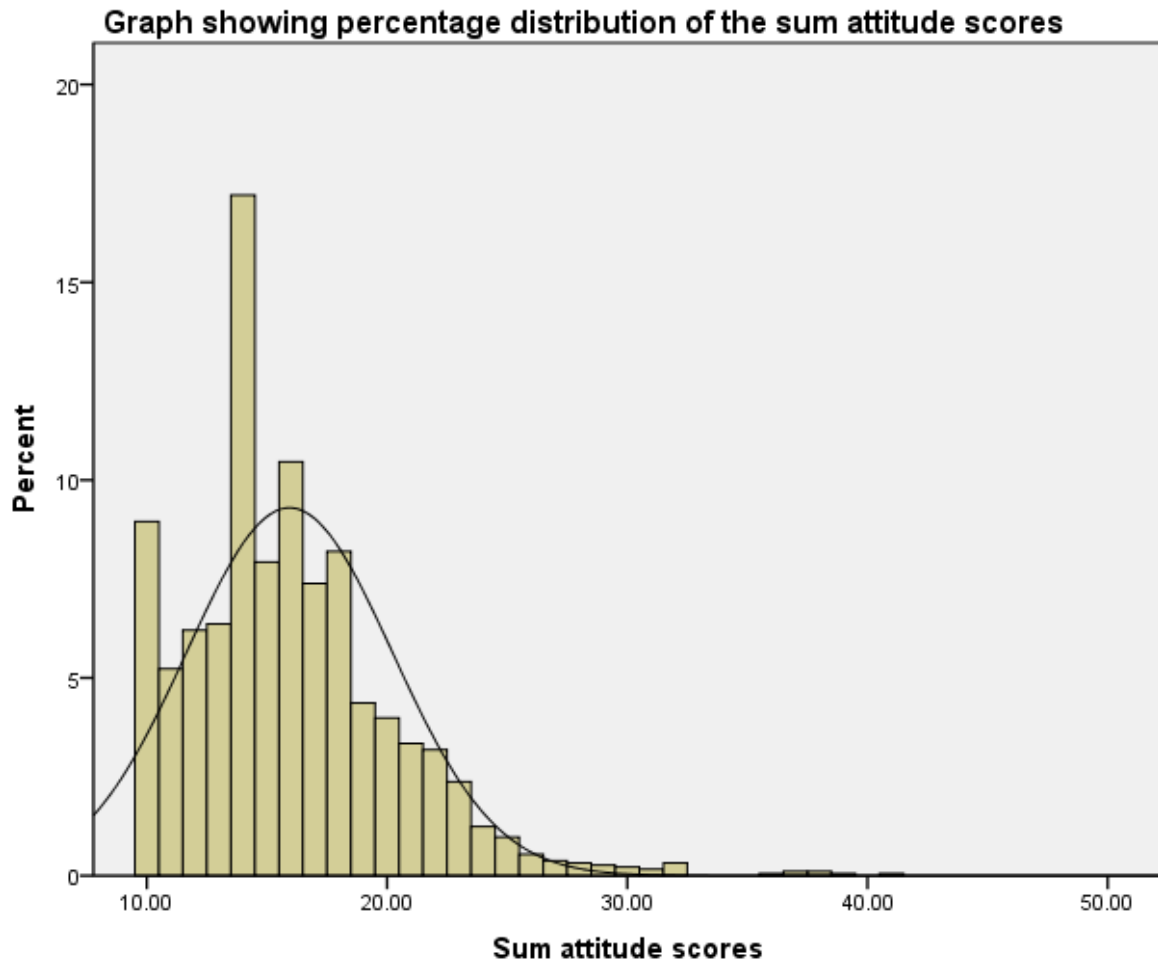
Table 25: Oral health related behaviors by knowledge score

Total oral health knowledge	Have sweets/chocolates more than	had seldom	Drunk sodas at least once month	Brush teeth every day	Smoked cigarettes at least once in last 30 days	Gone to a dental clinic at least once in last 2 years
	% (n)		% (n)	% (n)	% (n)	% (n)
Good	33.4 (330)		45.8 (452)	80.3 (789)	6.6 (65)	19.8 (195)
Bad	34.7 (278)		50.9 (408)*	78.8 (633)	7.0 (56)	18.4 (147)
Total	34.1 (608)		48.4 (860)	79.6 (1422)	6.8 (121)	19.1 (342)

*** $p < 0.05$**

6.12 Oral health related attitudes

Figure 4 showing distribution of sum attitude scores



NB: The smaller the sum attitude score, the better the overall attitude

Figure 4 above depicts the percentage distribution of the sum attitude score scores. A score of 10 denotes the best possible attitude whilst a score of 50 is the worst possible attitude. It can be noted that the distribution of the sum attitude scores was left skewed. i.e. clustered towards the lower values (good attitude). The overall mean sum attitude score was fairly good (mean score 15.9).

Table 26 depicts mean attitude scores by socio-demographic characteristics. One way ANOVA was conducted to explore the impact of socio-economic variables on levels of oral health attitude, as measured by the sum attitude score. It should be noted that in this score, the higher the mean score, the poorer the mean attitude of the participants. Participants were divided into four groups by wealth index, into two groups by: sex, age, father's education, religion and residence. There were no statistically significant differences at $p < 0.05$ between all the measured socio-economic variables and health attitude.

Table 27 depicts mean attitude scores by oral health knowledge. One way ANOVA was conducted to explore the association between oral health knowledge and oral health attitude, as measured by the sum attitude score. The mean attitude score for students with good knowledge was different from those with bad knowledge. As shown in table 27, students classified as having good knowledge had better oral health attitude as compared to their opposite counterparts. There was a statistically significant difference at the $p < 0.05$ for the two groups.

Table 28 depicts mean attitude scores by oral health behaviors. One way ANOVA was conducted to explore the association between oral health behaviors and oral health attitude, as measured by the sum attitude score. The only statistically significant difference at $p < 0.05$ was found on breakfasting behavior. Students who had breakfast for at least 16 days in the last month also had a better oral health attitude as compared to their counterparts.

Table 26: Mean attitude scores by socio- economic status.

Independents	N	Mean (95% CI)	Standard deviation	P-value
Wealth Index				
1 st quartile (Least poor)	399	15.9 (15.4 – 16.3)	4.62	0.534
2 nd quartile	510	15.9 (15.5 - 16.3)	4.27	
3 rd quartile	474	15.8 (15.4 - 16.1)	3.94	
4 th quartile (Most poor)	439	16.2 (15.8 - 16.6)	4.34	
Sex				
Male	808	16.1 (15.8 - 16.4)	4.53	0.159
Female	1046	15.8 (15.6 – 16.1)	4.09	
Age				
16-17 years	1389	15.9 (15.7 – 16.1)	4.18	0.328
18-20 years	465	16.1 (15.7 – 16.5)	4.61	
Father's education				
Up to primary level	803	16.1 (15.8 – 16.4)	4.16	0.055
At least secondary level	795	15.7 (15.4 – 16.0)	4.34	
Religion				
Christian	880	15.8 (15.5 – 16.1)	4.45	0.114
Muslim	968	16.1 (15.8 – 16.4)	4.14	
Residence				
Urban	1059	15.8 (15.6 – 16.1)	4.30	0.296
Semi urban	557	16.1 (15.7 – 16.4)	4.39	

Table 27: Mean attitudes and 95% CI by level of knowledge.

Independents	Numbers (n)	Mean (95% CI)	Standard deviation	P-value
Good knowledge	980	15.2 (14.9 – 15.4)	3.70	
Bad knowledge	804	16.7 (16.4 – 17.0)	4.67	0.003**

Table 28: Mean attitude score by oral health related behaviors.

Independents	Categories	Mean (95% CI)	Standard deviation	P value
Days had breakfast	0 -15 days	16.3 (16.0 – 16.6)	4.56	0.003**
	16-30 days	15.7 (15.5 – 16.0)	4.09	
Breakfast offered at school	Never	15.9 (15.7 – 16.2)	4.15	0.830
	At least once	16.0 (15.7 – 16.3)	4.43	
Snacks offered at school	Never	16.0 (15.7 – 16.2)	4.20	0.653
	At least once	15.8 (15.4 - 16.3)	4.62	
Fried foods eaten	Never	16.1 (15.8 – 16.4)	4.40	0.106
	At least once	15.8 (15.5 – 16.1)	4.19	
Vegetables eaten	Never/ once a day	16.0 (15.7 – 16.2)	4.23	0.694
	More than once daily	15.9 (15.6 – 16.2)	4.35	
Fruits eaten	Never/ once a day	16.1 (15.8 – 16.4)	4.16	0.269
	More than once daily	15.8 (15.6 – 16.1)	4.36	
Drinking soft drinks	Never/ Rarely	16.0 (15.7 -16.2)	4.24	0.691
	At least once weekly	15.9 (15.6 – 16.2)	4.33	
Eating chocolates and sweets	Never/ Rarely	16.2 (15.8 – 16.3)	4.41	0.081
	More than once daily	15.7 (15.4 – 16.0)	4.01	

7 Discussion

7.1 Methodological issues

Secondary school students are mainly adolescents in their late teens. An attempt was made to include all secondary school students from the selected schools fulfilling the selection criteria. Although the response rate was excellent (99.9%) it should be pointed out that there was an under representation of Form IV students. The major reason for this is that this study was conducted during a period preceding their final examinations and therefore the students were either busy revising or had been exempted from attending school as they conducted their own private studies. The overall response rate achieved in the present study is comparable but higher than the response rates reported in studies conducted in Tanzanian adolescent secondary school students in Kilwa (34) and Arusha (47). This high observed response rate could be due to the fact that there was no listing of all the students fulfilling the inclusion criteria, and the response rate instead relied upon the students present in school on the particular day of the survey that fulfilled the mentioned criteria of age. This high response rate could also be due to a high mean age of the target group. The high level of maturity might have led to a higher response rate as the respondents were more assured of anonymity and also could understand the importance of their input in this study. The fact that there was no accompanying dental examination might also have contributed to this high response rate, as it eliminated uncertainties of perceived safety of the study as well as fear accompanying dental procedures.

7.2 *Materials and methods*

The present study was a cross-sectional, self-administered questionnaire-based survey (Appendix 1). Cross-sectional studies measure the prevalence of disease and disease risk factors at a particular point in time. Cross-sectional studies are easy and economical to conduct and are very useful for investigating exposures that are fixed characteristics of individuals, such as socio-economic status, gender and ethnicity. Cross-sectional surveys are an economical means of supplying information on several issues of health and oral health of a population and are useful for hypothesis generation. The main disadvantage of cross-sectional studies is their inability to attribute causality i.e. whether an exposure precedes or follows the outcome. A self-administered structured questionnaire was used due to constraints of time, resources and the relatively large sample size requirements. The usage of this instrument was considered appropriate since all the students at this level of education are able to read and write. Further, the usage of this instrument ensured complete anonymity. Despite these advantages, it is difficult to assess the reliability of oral health variables in surveys. A complementary clinical examination might have functioned as an objective assessment of the outcome of various variables from the questionnaire. Self-administered questionnaires have been successfully used in studies on oral health behaviors in similar settings (33, 47).

7.3 *Reliability and Validity*

Reliability is the tendency towards consistency found in the repeated measurement of the same phenomenon (64). There are several different methods for reliability estimation. These include: test-retest method, the split halves method, the alternative form method and internal consistency method. The test-retest method involves the administration of the same test to the same people after a period of time. Thus, test-retest variability is concerned with how stable

the a certain outcome measure remains as a function of time passage (temporal stability) (65). A planned test-retest study was not implemented due to severe time constraints of the main data collection process. Instead in its place an internal consistency method was employed.

Internal consistency reliability relates to item homogeneity, or the degree to which the items on a test jointly measure the same construct. Whenever a test's items are linearly combined into a single composite score, the issue of item homogeneity refers to the ability of that particular scale to act as a reflection of the test's entire items (66). Alpha coefficients above .80 are desirable, in the range between .70 to .79 are considered extensive, whereas .60 to .69 are considered to possess moderate internal consistency (67). Values of alpha coefficients are also reliant upon the number of items in the scales, and it has been noted that having scales with low number of items (i.e. below 10) may make it difficult to obtain decent Cronbach alpha values (68).

Information bias is a systematic error in a study that can arise because the information collected from or about study subjects is erroneous (69). Two important types of information bias in cross sectional studies are recall bias and social desirability bias. Recall bias in a survey setting refers to selective and differential recall of information as a result of the subjects being different with respect to demographic variables or exposures. An important distinction must be made between recall which is based and that which is inaccurate. In the latter case, an increase in sample size would tend to decrease the error, whereas in the former, the bias would still persist (64). To try and minimize recall bias in this study, questions that inquired on past experiences were framed within a specific time period which wasn't too long, that is, in the last 30 days, or in the last 7 days. Further, questions that required this information were framed to inquire in most instances towards the "immediate past".

Social desirability bias is that differential in the presentation of information as a result of social pressure to conform to expected modes of behaviors. Self-reported events tend to be distorted in a socially desirable direction and behaviors which are associated with a social stigma or are perceived to be personally threatening are often under-reported. Also, the accuracy of self-reported events may be less among individuals who do not admit to socially undesirable behaviors(70). To try and minimize this, the investigator, prior to distribution of the questionnaires stressed on the anonymity of participants, ensured that the students filled the questionnaires as independently as possible and emphasized on the importance of true information, further elaborating that there is no single “correct” answer to any of the items (70, 71).

External validity refers to whether it is permissible to generalize the findings to a wider, general population from which the sample studied was drawn from (64). An important part of evaluating the external validity of self-administered questionnaires is to assess non response bias. High response rates reduce the probability of such bias to occur. The response rates from this study can be considered to be high enough as to eliminate the occurrence of this bias.

The participants of this study attended public secondary schools, randomly selected from a list of secondary schools in Dare es Salaam, Tanzania. It is expected that this study would have managed to portray the diversity in the characteristics of the 16-20 year old adolescents studying in those secondary schools in Dar es Salaam. Despite various attempts to ensure a high rate of secondary school studying opportunities, admission to such schools is merit based. This fact coupled with the reality that attendance at such a level is voluntary, means that the participants of this study are not representative of the general population of youth with similar ages in Dar es Salaam. However, this study offers a valuable insight in this age group which is very rarely investigated, taking into account the costs and logistical difficulties

in conducting this survey in the general population. It is expected that the out of school adolescents will have markedly different characteristics as compared to same aged school going adolescents.

7.4 Discussion of Results

7.4.1 Health and oral health behavior

A high proportion (78.9%) of the students reported daily tooth brushing. There were no differences in the performance of this behavior by any of the selected socio-demographic variables, including gender. In accordance with reports from other studies, tooth brushing was a frequently reported oral hygiene behavior among secondary school students in Dar-es-Salaam. This proportion is similar to that reported by other studies conducted in SSA countries in which the prevalence of regular tooth brushing was shown to vary from 62.8% to 94.3% (43). There are studies conducted amongst school going adolescents in Tanzania (34) which report similar prevalence in regular tooth brushing, whilst other studies report much higher prevalences at 93.4% and 94.6%, respectively (44, 72).

The prevalence of consumption of sugary foodstuffs was moderately high. A study conducted by Mbawalla et al (47) in northern Tanzania also reported similar but slightly higher frequency (53.2%) of at least weekly soda drinking. Being a female, wealthy and having a parent with a high level of education was positively associated with increased consumption of sugary foodstuffs. These findings reflect those presented by Mashoto et al (34) in Tanzania. Having a parent with a high level of education can be used as a rough indicator of the social economic position of the student's household. It is generally expected that having a parent with a high level of education increases the chances of also belonging in the wealthiest quartile. Therefore, the observed variability in sugary foodstuff consumption may be

attributed to a third factor: ability to purchase. Thus, students with accessibility to these costly foodstuffs also consumed them most. This study could not explore the possible reasons as to why females consume more sugary foodstuffs than males, but one offered explanation has been that in SSA and East African countries in particular, sugary foodstuffs have become socially identified as more appropriate for consumption by females. This explanation is not conclusive, but offers an avenue into a further look unto this issue.

In accordance with conclusions from other studies in Tanzania, whereby the prevalence of dental attendance were 10.4% and 12.6%, levels of dental clinic attendance were low (33, 47). Belonging to the wealthiest quartile and having a parent with a high level of education was associated with an increased frequency of dental attendance. The rates of dental clinic attendance from this study were slightly higher, but supported by findings from other studies conducted in Tanzanian school going adolescents (34, 47). Okullo et al (73) in their study conducted amongst school going Ugandan adolescents reported a much higher proportion (44%) attending a dental clinic within the same time period. The reasons as to why dental attendance was necessitated were not assessed in this study. However, by extrapolation of the findings that belonging in a high SES is positively associated with dental attendance, and from studies that cite dental caries as the main reason for dental attendance and tooth extraction being the main treatment offered as well as the fact that dental preventive care is almost non-existent in Tanzania (21, 34) it can be hypothesized that students with a high SES, also suffered the most caries. This is a plausible explanation, given that students with a high SES have also been shown to have the highest levels of consumption of sugar, and a high frequency of sugar consumption is a risk-factor for development of caries (23).

Being wealthy and having a parent with high level education was associated with increased frequency of having breakfast and to have fast foods (fried foods). Vegetables were more

accessible for consumption as compared to fruits. Being a female, having a parent with a high level of education and being in the least poor quartile were associated with an increased consumption of legumes. Studies from Uganda and Ghana support these findings by reporting an increased consumption of vegetables in female adolescents (53). Study findings reveal that although the wealthy students consumed the most sugared foodstuffs, they also had healthier foods more frequently as well. This rather varied picture gives interpretational challenge towards determining the impact of dietary behaviors on health, especially in students from a high SES.

Overall the prevalence of hygiene practices were poor, but comparable with results from a study by Pengpid et al(43) conducted amongst nine SSA countries. The prevalence of these hygiene behaviors were lower as compared by results from other studies conducted amongst Tanzania adolescents aged 13-15 years (44, 72). These findings of low levels of hygienic behavior do not only reflect a low level of awareness, and a failure of institutionalization of simple disease preventive measures, but also point at the more basic structural failures, such as, is there an accessible source of water in these schools? Is soap for hand washing provided? Are there measures in place to enable these students to enact these hygiene behaviors? Sadly, the scope of this particular study was limited, but these are intriguing questions that should be answered by more studies.

Rates of attendance of physical education class also found to be low. Peltzer et al (52) in their study conducted across 8 SSA countries amongst school going adolescents also reported a generally low level of physical activities in adolescents. Physical inactivity was more pronounced in female students. This reported lower level of physical activity in females as compared to males is supported by a study conducted in Seychelles (54) which also reported the prevalence of being overweight higher in females than in males in public schools. This

current study did not explicitly pursue as to the reason of low attendance of physical education class, although a plausible explanation is the lack of physical education as a session in these schools or perhaps that physical exercises in females of this particular setting is not a preferable activity by the females themselves.

The lifetime prevalence of cigarette smoking i.e. has ever smoked a cigarette, reported in this study was moderately high (14.1%) but comparable to results obtained by Mbawalla et al (44) who conducted their study in school going adolescents aged 13 to 15 years in another part of Tanzania. Being an older (18-20 years) and a male student was associated with a higher frequency of having ever tried to smoke cigarettes and of being a current smoker. Opposite to the findings in this study, being younger has been described as being associated with increased prevalence of smoking elsewhere in SSA (50). The tendency of males being smokers more frequently than females has been reported in many studies conducted in SSA countries (49, 50, 74). In fact, in many SSA countries and Tanzania in particular, being a female smoker is associated with negative connotations and socially frowned upon. The prevalence of usage of other forms of tobacco was reported to be low (1.9%). In comparison with results from a study conducted in adolescents across eight SSA countries (52), the average prevalence across countries was reported as 11.4% (ranging from 4.3% to 16.1%). This lower prevalence of usage in this study is most probably due to unavailability of these alternate tobacco products (such as snuff) in Dar es Salaam. None of the major tobacco companies in Tanzania advertise or produce any other alternate forms of tobacco, apart from cigarettes.

Levels of alcohol consumption were lower than levels reported elsewhere in SSA (52). A total of 8.1% of the students reported to have had an alcoholic beverage *in the last 30 days* preceding this current study. A significantly higher proportion of males reported these

drinking behaviors as compared to females. Being Muslim was associated with a markedly lower frequency of these drinking behaviors as compared to being a non-Muslim. This is reflected by the results of a study by Peltzer et al (50) in which adolescents from Senegal, which is a predominantly Muslim country (75) had the lowest levels of alcohol and drug use as compared to other SSA countries included in the study. Older students had higher levels of alcohol use as compared to younger students. The difference could be due to the fact that legal alcohol drinking age limit is 18, and thus these older students are free from the shackles of litigation and thus able to freely consume alcohol.

More students were able to remember having taken drugs in the last 30 days as opposed to intake in their whole lives. The prevalence of ever having used drugs was low, at 2.0%, whereas 3.4% reported to have used drugs at least once during the past 30 days. This obvious logical impossibility could be a result of either recall limitations, or a manifestation of social desirability bias. Males reported to have ever used a drug more frequently than females. In comparison with other studies conducted in SSA, the reported prevalence of drug use was much lower on average (52) in this study than elsewhere.

7.4.2 Health and oral health knowledge

In Tanzania, oral health education is integrated as part of the primary school education curriculum. Despite the failure to attribute any discernible effect on behavior due to this intervention measure (62), education attained from primary schools was shown to be an important source of health related information for the students in secondary school.

A higher proportion of students who reported to have received education regarding a balanced diet confirmed vegetable consumption more frequently as compared to their counterparts who

had not received dietary education. Contrariwise, a higher proportion of students who confirmed intake of sweets/chocolates are also those that reported to have received dietary counseling as opposed to those that reported not to have had dietary counseling. Whereas on one hand, a positive association between received education and subsequent supportive behavior can be inferred, it also becomes immediately evident that there are more factors to be considered, especially when it comes to sugar consumption. Nyandindi et al (76) in their study of school going children in Tanzania reported on the high desirability of sugary foodstuffs by these students. This is made apparent by the findings of this study that despite the dietary counseling attained, it had results quite opposite to those intended.

As far as health behaviors are concerned, regular hand washing with soap was the least performed behavior, concomitantly, it was also a behavior that the least proportion of students reported to have been taught the importance of, in their current school year. Students who reported to have been taught on the importance of hand washing and physical activities (exercising outside school hours, attend physical education class) had a significantly higher proportion reporting performance of these behaviors as compared to those reporting not to have been taught. Also, students who reported to have received education on the dangers of drugs had significantly lower proportion reporting to have ever used drugs as compared to students that did not receive this education (15.2% versus 24.2%). In light of these instances, it can be reasonably surmised that the performance of health behaviors is at least partly influenced by the knowledge gained on the importance of that behavior.

Overall, the level of oral health knowledge was fairly good. Students displayed worst knowledge on the question asking on the role of lights and vitamins in the prevention of gum disease. Less than half responded correctly. This shows a gap in the knowledge attained with regards to periodontal disease. Students still fail to correctly distinguish between vitamin C

deficiency and gingivitis. Prevailing partial knowledge regarding gingivitis and periodontal diseases has been reported in other studies amongst adolescents in Tanzania (42, 76).

A vast majority of the students (83.4%) indicated that they were supposed to go to the dentist *only* if they have a severe toothache. Further, about three quarters of the students (with a significantly higher proportion being female) also responded “true” to the statement *you are supposed to see the dentist at least once annually*. To confuse matters even more, only 19.0% of the students actually reported to have attended a dental clinic in the past 2 years preceding the study. This is a strong indication that possession of knowledge is not by itself sufficient to effect behavior affecting that knowledge. Possible reasons of this discrepancy between behavior and knowledge could be: poor attitudes of the students on preventive dental care, high cost of treatment (in terms of distance and out of pocket payment) and limited availability of dental personnel and dental services themselves.

A significantly higher proportion of male students (80.3%) responded “true” to the statement asking as to whether *The cause of dental caries is infrequent tooth brushing* as opposed to 70.4% of the females. Despite this difference in proportions reporting on importance of tooth brushing towards prevention of dental caries, there were no differences by gender towards the actual performance of tooth brushing behavior. Possibly, the behavior is performed equitably across gender but with varying motivational reasons towards doing so across genders.

7.4.3 Health and Oral health attitude

Overall, the average attitude was fairly good. Exploration on the impact of socio-economic variables on levels of oral health attitude, demonstrated no statistically significant differences in the mean attitude scores. This failure of demonstrable differences could be due to forthright

lack of variations in the attitudes, or more likely as a result of low sensitivity of the scale to measure attitudinal variations (Cronbach alpha 0.482). Despite the failure for outright statistical significance, the level of parental education was borderline significant ($p = 0.055$), in that students reporting to have parents with a high level of education also had a better attitude. Upon exploration of mean attitudes by knowledge scores, students classified as having good knowledge were associated with possession of better health attitudes. Thus, it can be cautiously inferred that knowledge with regards to health and oral health issues can be one of the major factors influencing health related attitudes. On examination of the relationship between attitudes and health and oral health behaviors, frequency of breakfast taking was the only behavior which had a demonstrable significance to attitudes. Those students that had breakfast in at least 16 days in a month (who also happened to belong in the wealthiest quartile most frequently) had better attitudes as compared to their counterparts. The concept of breakfasting frequency *in itself* to influence health attitude is difficult to comprehend and even more difficult to explain. Rather, it can be cautiously surmised that what determines this difference in attitudes is not the behavior itself per se, but rather factors that are associated with the behavior e.g. socio-economic status.

7.5 Conclusions and recommendations

- The present study has demonstrated a moderately high consumption of sugary foodstuffs. Being of a high socio economic status is associated with an increased consumption of sugary foodstuffs and of fast foods. Clustering of risk factors known to be responsible for chronic diseases in this sub group of the study population is alarming, although not surprising. Promotion of a healthy lifestyle within this affluent subgroup when still at school might reduce the potential for development of chronic diseases in the future.

- The rate of attendance to dental clinics is very low despite the relatively high levels of knowledge regarding the importance of regular dental visits. This hints at underlying problems, either with the ease of availability of dental services, or with just an overall negative attitude towards preventive measures. Either ways, further studies should be done to identify where the problem lies.
- Levels of hygiene behaviors were generally quite poor. Ensuring that each school has a reliable source of water might go a long way towards fostering of good hygienic practices. It might be of benefit to bundle in hygiene instructions along with oral health education which is provided in the primary school to inculcate good hygiene habits during the early, formative years.
- The levels of physical activities were low. Females were more inactive in general as compared to males. The importance of physical education classes in schools should be further emphasized and enforced just like other academic lessons. Particular attention should be given to female students.
- Oral health education attained from primary schools still continues to be a relevant source of information through the secondary school years and that education attained on various health issues had a positive impact on behavior. These programs should be strengthened and made to be accessible to every school going child at the primary level of education.

The present study brings forth interesting findings. It shows mainly a SES and a gender vector in many of the behavioral, knowledge and attitude variables with respect to health and oral health in secondary school students. The coverage of the target population is sufficient to draw valid inferences towards the general population. Moreover, this study enabled explorations of many variables at a relatively small amount of time. The inclusion of many

variables means that although the study offers us a valid “snapshot” of the population, it has also made it problematic to analyze any of the issues at any appreciable degree of depth. The findings from this study can be used as a point of departure for further studies intending to delve deeper into the issues present herein.

Unfortunately, due to the design of the study, necessitated by resource and time constraints, it is not possible to determine causality. Longitudinal studies are required to define that. The usage of self-administered questionnaires and therefore self-reported measures, despite its numerous advantages, also introduces elements of information bias, in forms of recall and social desirability biases. Further, a lack of accompanying clinical examination has removed the possibility to corroborate self-reported findings to objective measurement findings. This would have greatly improved the perceived validity of the reported findings. Thus, it is prudent that these limitations should be taken into account when interpreting the results from this study.

Proposed areas of further research:

- Assessment of correlates of irregular dental clinic visits amongst adolescents
- Assessment of perceptions and determinants of sugary foodstuff consumption in adolescents

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9 Appendix 1

Questionnaire No.:-----

Youth Health Survey

This is a questionnaire that is used to gather information about young people's health. It is voluntary for you to participate in this study. You can withdraw from the study at any time, and you can also skip questions that you find too personal to answer. Please do not write your name on this questionnaire. All the information you give us will be kept private; nobody will know who filled in this questionnaire. Your teachers, neighbours, family and other learners will not see your answers.

We are trying to find out better ways of improving the health and oral health of young people. Your responses **are of great value** and will help to keep young people in this country healthy. **Please help us by filling in this questionnaire.**

This is not a test and there are no right or wrong answers. **PLEASE BE HONEST IN YOUR ANSWERS.**

Please take your time and answer carefully. In questions where there are boxes, please check the box next to the answer you want to give. If you have any questions, please raise your hand and ask the project staffs present in the classroom.

The present study is carried out by Muhimbili University of Health and Allied Sciences (MUHAS) and Centre for International Health, Bergen (CIH).

THANK YOU VERY MUCH FOR YOUR HELP!

School Name: _____

Date: _____

Question 1-20 are about you and your family background

1. What is your sex?

1. *Male*

2. *Female*

2. How old are you? _____

3. What is your tribe? _____

4. What class are you in?

1. *Form III*

2. *Form IV*

5. What is your religion?

1. *Roman catholic*

2. *Lutheran*

3. *Islam*

4. *Pentecost*

5. *Other (please specify) _____*

6. Which of the following languages are spoken at home? Tick all that apply.

1. *English*

2. *Swahili*

3. *Other (please specify) _____*

7. What is your place of residence?

8. Do you live with both parents?

1. *Yes*

2. *No*

9. If no why?

1. *divorce*
2. *Father died*
3. *Mother died*
4. *Father and mother died*
5. *Not applicable*

10. What is the highest level of education your father has?

1. *No formal education*
2. *Primary education*
3. *Secondary education*
4. *College/university education*
5. *Father died*
6. *I do not know*

11. What is the highest level of education your mother has?

1. *No formal education*
2. *Primary education*
3. *Secondary education*
4. *College/university education*
5. *Mother died*
6. *I do not know*

12. Do you have any of the following things in your home? Only answer “Yes” if you have them and they work.

i) Television

1. *Yes*
2. *No*

ii) Electricity

1. *Yes*
2. *No*

iii) Bicycle

1. *Yes*
2. *No*

iv) Tap water

1. *Yes*
2. *No*

v) Motor car

1. *Yes*
2. *No*

vi) Flush toilet

1. *Yes*
2. *No*

13. Which of the following best describes your home?

1. *Cemented brick house*
2. *Burnt brick house*
3. *Mud brick house*
4. *mud house*
5. *wood house*

14. The roof of your house is made up of.....

1. *Iron sheets*

2. Grass
3. Tiles
4. Others (mention)

15. How many people sleep in the same room with you at night when you are at home?

16. Which of the following is true of your home? Please mark the statement that best describes your situation:

1. *Well off*
2. *Moderate economical status*
3. *Low economical status*

17. Have you ever repeated a school year due to failing exams?

1. *Yes*
2. *No*

18. How many days were you absent from school during the last school term?

1. _____

2. Never been absent

19. Do you think you will complete your schooling up to form four?

1. *Yes*
2. *No*
3. *I don't know*

20. What do you think you will do when you finish secondary school?

1. *Form v*
2. *Go to trade school (VETA)*
3. *Casual labour*
4. *Start a business*
5. *I don't know*
6. *Other, specify*_____

Question 21-29 are on Alcohol and drug use

21. Have you ever tasted alcohol?

1. *Yes*
2. *No*

22 During the past 30 days, on how many days did you have at least one drink containing alcohol?

1. _____

2. *I did not drink alcohol in the last 30 days*

23 During the past 30 days, on the days you drank alcohol, how many drinks did you usually drink per day?

1. *I did not drink alcohol in the last 30 days*
2. *Less than 1 drink*
3. *1 drink*
4. *2 drinks*
5. *3 drinks*
6. *4 drinks*
7. *5 or more drinks*

24 How many of your friends drink alcohol on a regular basis?

1. *None of them*
2. *Some of them*
3. *Most of them*
4. *All of them*
5. *I don't know*

25 Have you ever tried to use drugs/substances of abuse such as bangi, or cocaine?

1. *Yes*
2. *No*

26 During the past 30 days, how many times have you used drugs/substances of abuse such as such as bangi or cocaine?

1. _____

2. *Never*

27 What types of drugs have you tried most times?

1. _____

2. *Never*

28 How many of your friends have tried drugs/substances of abuse such as bangi or cocaine?

1. *None of them*
2. *Some of them*
3. *Most of them*
4. *All of them*
5. *I don't know*

29 During this school year, were you taught in any of your classes the dangers of drug use?

1. *Yes*
2. *No*

Questions 30- 48 are on Dietary Behaviours

30. During the past 30 days, how often did you eat breakfast?

1. _____

2. *Never*

31. During the past 30 days, how often did you bring lunch to school?

1. *Never*

2. *Rarely*

3. *Sometimes*

4. *Most of the time*

5. *Always*

32. During the past 30 days, how often was breakfast offered to you at school?

1. *Never*

2. *Rarely*

3. *Sometimes*

4. *Most of the time*

5. *Always*

33. During the past 30 days, how often were you hungry at school?

1. *Never*

2. *Only a few times*

3. *1-2 day a week*

4. *3-4 days a week*

5. *5-6 days a week*

6. *Every day*

34. During the past 30 days, how often was a snack offered to you at school?

1. *Never*

2. *Rarely*

3. *Sometimes*

4. *Most of the time*

5. *Always*

35. *In the past 30 days, when you ate food at school, where did the food come from? Please mark all that apply*

1. *I didn't have any foods at school in the last 30 days*
2. *I did bring food from home*
3. *My school provides food for students*
4. *Families provide foods for students*
5. *Community members provide foods for students*
6. *I bought food at school*

36. *During the past 7 days, on how many days did you eat fast foods such as Chips, eggs etc?*

1. *Never*
2. *rarely*
3. *sometimes*
4. *most of the times*
5. *everyday*

37. *During the past 30 days, how often did you usually eat fruit such as ripe bananas, oranges, pawpaw, mangoes or pineapples?*

1. *Never*
2. *Once a day*
3. *2 times a day*
4. *3 times a day*
5. *4 times a day*
6. *5 or more times a day*

38. *During the past 30 days, how often did you usually eat vegetables such as amaranth, cassava leaves, pumpkin leaves, cabbage, spinach, occra or carrots?*

1. *Never*
2. *Once a day*
3. *2 times a day*
4. *3 times a day*
5. *4 times a day*
6. *5 or more times a day*

39. During the past 30 days, how often do you drink sugar sweetened soft drinks, such as Coke or Mirinda?

1. *I have never*
2. *once every day*
3. *often every day*
4. *often per week*
5. *rarely*

40. During the past 30 days, how often do you eat sweets like chocolate and candy?

1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Most of the time*
5. *Always*

41. During this school year, were you taught in any of your classes about the benefit of eating healthy food?

1. *Yes*
2. *No*

42. (a) “The food that we bought just didn’t last, and we didn’t have money to get more, how often did this happen – almost every month, some months but not every month, or in only one or two months?”

1. *Almost every month*
2. *Some months, but not every month*
3. *In only 1 or 2 months*
4. *Never happened*

(b) “We couldn’t afford to eat balanced meals, how often did this happen – almost every month, some months but not every month, or in only one or two months?”

1. *Almost every month*
2. *Some months, but not every month*
3. *In only 1 or 2 months*
4. *Never happened*

(c) In the last 12 months did you or adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food, how often did this happen – almost every month, some months but not every month, or in only one or two months?

1. *Almost every month*
2. *Some months, but not every month*
3. *In only 1 or 2 months*
4. *Never happened*

(d) If your family ever cut the size of meals or skip meals because there wasn’t enough money for schools, how often did this happen – almost every month, some months but not every month, or in only one or two months?

1. *Almost every month*
2. *Some months, but not every month*
3. *In only 1 or 2 months*
4. *Never happened*

43. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

1. *Yes*
2. *No*
3. *Don't know*

44. In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

1. *Yes*
2. *No*
3. *Don't know*

45. In the last 12 months, how often did you go hungry because there was not enough food in your home?

1. *Almost every month*
2. *Some months, but not every month*
3. *In only 1 or 2 months*
4. *Never happened*

46. During the past 12 months, have you been weighed and measured?

1. *Yes*
2. *No*

47. How do you describe your weight?

1. *Very underweight*
2. *Slightly underweight*
3. *About the right weight*
4. *Slightly overweight*
5. *Very overweight*

48. Which of the following are you trying to do about your weight?

1. *I am not trying to do anything about my weight*
2. *Lose weight*
3. *Gain weight*
4. *Stay the same weight*

Questions 49- 60 are on Social network and decision-making

49. There are many different ways to make a decision or a choice. In the past 12 months, how often have you talked to the following people for help or help to make a decision?

(i) Talked to your parents?

1. *Never*
2. *Sometimes*
3. *Often*

(ii) Talked to your best friend?

1. *Never*
2. *Sometimes*
3. *Often*

(iii) Talked to a teacher?

1. *Never*
2. *Sometimes*
3. *Often*

(iv) Talked to religious leader?

1. *Never*
2. *Sometimes*
3. *Often*

(v) Talked to a health person like a doctor or a nurse or a healer?

1. *Never*
2. *Sometimes*
3. *Often*

(vi) Talked to some other adult in your family besides your parent (for example, your grandmother, an uncle, your older sister?)

1. *Never*
2. *Sometimes*
3. *Often*

50. How confident are you that you could say no to drink alcohol when you do not want to drink alcohol?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

51. How confident are you that you could say “no” if you were offered a cigarette?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

52. How confident are you that you could say “no” if you were offered marijuana?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

53. How confident are you that you could avoid a physical fight if someone wanted to start a fight with you?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

54. How confident are you that you could say “no” to have sexual intercourse against your will?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

55. How confident are you that you could ask a person who is bothering you to stop?

1. *Very confident*
2. *Somewhat confident*
3. *Not very confident*
4. *Not at all confident*

56. How easy or hard is it for you to do physical activities?

1. *Very hard*
2. *Hard*
3. *Easy*
4. *Very easy*
5. *Not sure*

57. How easy or hard is it for you to eat a healthy amount of fruits and vegetables?

1. *Very hard*
2. *Hard*
3. *Easy*
4. *Very easy*
5. *Not sure*

58. How easy or hard is it for you to avoid eating too many sweets?

1. *Very hard*
2. *Hard*
3. *Easy*
4. *Very easy*
5. *Not sure*

59. How easy or hard is it for you to avoid eating too many fried foods?

1. *Very hard*
2. *Hard*
3. *Easy*
4. *Very easy*
5. *Not sure*

60. How easy or hard is it for you to use a condom when having sexual intercourse?

1. *Very hard*
2. *Hard*
3. *Easy*
4. *Very easy*
5. *Not sure*

Questions 61- 68 are on Hygiene

61. Is there a source of clean water for drinking at your school?

1. *Yes*
2. *No*

62. During this school year, were you taught in any of your classes how to avoid worm infections?

1. *Yes*
2. *No*

63. During this school year, were you taught in any of your classes where to get treatment for a worm infection?

1. *Yes*
2. *No*

64 During the past 30 days, how often did you use the toilets or latrines at school?

1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Everyday*

65. During the past 30 days, how often did you wash your hands after using the toilet or the latrine

1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Most of the times*
5. *Always*

66. During the past 30 days, how often did you wash your hands before eating?

1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Most of the times*
5. *Always*

67 During the past 30 days, how often did you use soap when washing your hands?

1. *Never*
2. *Rarely*
3. *Sometimes*
4. *Most of the times*
5. *Always*

68. During this school year, were you taught in any of your classes the importance of hand washing?

1. *Yes*
2. *No*

Questions 69- 80 are on Oral Health

69. During the past 3 months- how often have problems with your mouth or teeth for example such as mentioned above or other caused you any difficulty with eating and enjoying food?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

70. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with speaking and pronouncing clearly?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

71. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with cleaning teeth?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

72. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with sleeping and relaxing?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

73. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with smiling, laughing and showing teeth without embarrassment?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

74. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with maintaining usual emotional state without being irritable?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

75. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with carrying out major school work or social role?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

76. During the past 3 months- how often have problems with your mouth or teeth caused you any difficulty with enjoying contact with people?

1. *Never*
2. *Once or twice a month*
3. *Once or twice a week*
4. *Every or nearly every day*

77. How would you describe the health of your teeth and gums?

1. *Very poor*
2. *Poor*

3. *Good*
4. *Very good*

78. How satisfied are you with the appearance of your teeth?

1. *Very satisfied*
2. *Satisfied*
3. *Dissatisfied*
4. *Very dissatisfied*

79. How often do you brush your teeth?

1. *Never*
2. *Rarely*
3. *Most of the times*
4. *Every day*
5. *I don't brush my teeth*

80. What type of toothpaste do you use?

1. _____

2. *Do not use tooth paste*

Questions 81- 87 are on Mental Health

81. During this school year, were you taught in any of your classes how to handle stress in healthy ways?

1. *Yes*
2. *No*

82 In general, how do you feel about your life?

1. *I feel very happy*
2. *I feel happy*
3. *I feel not very happy*
4. *I do not feel happy at all*

83 In general, how do you think about yourself?

1. *I am very satisfied*
2. *I am quite satisfied*
3. *I am not very satisfied*
4. *I am not satisfied at all*

84 I often feel sad (depressed) without knowing why.

1. *I strongly agree*
2. *I agree*
3. *I disagree*
4. *I strongly disagree*

85 Sometimes I feel everything is so hopeless, that I do not want to do anything.

1. *I strongly agree*
2. *I agree*
3. *I disagree*
4. *I strongly disagree*

86 Sometimes I have been thinking that my life is not worth living.

1. *I strongly agree*
2. *I agree*
3. *I disagree*
4. *I strongly disagree*

87 During this school year, were you taught in any of your classes how to deal with mental health issues?

1. *Yes*
2. *No*

Questions 88- 94 are on Physical Activity

88. During this school year, on how many days did you go to physical education class each week?

1. *Never*
2. *1 day*
3. *2 days*
4. *3 days*
5. *4 days*
6. *5 or more days*

89. Outside school hours, how often do you usually exercise so much that you get out of breath or sweat?

1. *Every day*
2. *4-6 times a week*
3. *2-3 times a week*
4. *Once a week*
5. *Once or twice a month*
6. *Never*

90. During this school year, were you taught in any of your classes the benefits of physical activity?

1. *Yes*
2. *No*

91. How do you normally get to and from school?

1. *Walking*
2. *Cycling*
3. *Bus*
4. *Private car*
5. *Other (specify)_____*

92. If you walk to school, about how long does it take you to walk EACH WAY?

1. *Never walked to school*
2. *Less than 9 minutes each way*
3. *10 to 19 minutes each way*
4. *20 to 29 minutes each way*
5. *30 to 39 minutes each way*
6. *40 to 49 minutes each way*
7. *50 to 59 minutes each way*
8. *60 or more minutes each way*

93. During a week how many hours do you spend watching television or videos/DVD?

1. *Less than ½ hour*
2. *½ to 2 hours*
3. *2 ½ to 4 hours*
4. *4 ½ to 6 hours*
5. *More than 6 hours*
6. *I don't watch television or videos/DVD*

94. During a week how many hours do you spend on the computer or internet?

1. *Less than ½ hour*
2. *½ to 2 hours*
3. *2 ½ to 4 hours*
4. *4 ½ to 6 hours*
5. *More than 6 hours*
6. *Never used a computer or internet*

Questions 95- 108 are on Sexual Behaviors

95. Have you ever had a girl-/boyfriend?

1. *Yes*
2. *No*

96. Have you ever had more than one girl-/boyfriend at the same time?

1. *Yes*
2. *No*

97 Have you ever had vaginal sexual intercourse? This meaning intimate contact with someone during which the penis enters the vagina (female private parts).

1. *Yes*
2. *No*

98. Have you ever had oral sex? This meaning intimate contact with someone during which penis is in the mouth or mouth to vagina or mouth to anus.

1. *Yes*
2. *No*

99. Have you ever had anal sex? This means sexual intercourse during which the penis enters the anus

1. *Yes*
2. *No*

100. During the past 12 months, how many times did you have sexual intercourse?

1. _____
2. *I have never had sexual intercourse*

101. Have you ever used a condom during sexual intercourse?

1. *I have never had sexual intercourse*
2. *Yes*
3. *No*

102. The last time you had sexual intercourse, did you or your partner use any method of birth control, such as withdrawal, rhythm (safe time), birth control pills, or any other method to prevent pregnancy?

1. *I have never had sexual intercourse*
2. *Yes*
3. *No*
4. *I don't know*

103. During the past 12 months, with how many people have you had sexual intercourse?

1. *I have never had sexual intercourse*
2. *I have had sexual intercourse, but not during the past 12 months*
3. *1 person*
4. *2 people*
5. *3 people*

6. *4 people*
7. *5 people*
8. *6 or more people*

104. How many of your friends have had sexual intercourse?

1. *None of them*
2. *Some of them*
3. *Most of them*
4. *All of them*
5. *I don't know*

105. During this school year, were you taught in any of your classes how to use a condom?

1. *Yes*
2. *No*

106. During this school year, were you taught in any of your classes about sexuality?

1. *Yes*
2. *No*

107. During this school year, were you taught in any of your classes how to avoid HIV infection or AIDS?

1. *Yes*
2. *No*

108. During this school year, were you taught in any of your classes where to get tested for HIV infection or AIDS?

1. *Yes*
2. *No*

Questions 109- 115 are on Tobacco Use

109. Have you ever tried or experimented with cigarette smoking, even one or two puffs?

1. *Yes*
2. *No*

110. During the past 30 days, on how many days did you smoke cigarettes?

1. _____

2. *Never tried cigarette smoking*

111. During the past 30 days, on how many days did you use any other form of tobacco, such as tobacco roll, snuff, or chew tobacco?

1. _____

2. *Never tried or experimented cigarette smoking*

112. Has a cigarette company representative ever offered you a free cigarette?

1. *Yes*

2. *No*

113. During the past 30 days, did anyone ever refuse to sell you cigarettes because of your age?

1. *Never tried or experimented cigarette smoking*

2. *I did not try to buy cigarettes during the past 30 days*

3. *Yes, someone refused to sell me cigarettes because of my age*

4. *No, my age did not keep me from buying cigarettes*

114. How many of your friends smoke cigarettes on a regular basis?

1. *None of them*

2. *Some of them*

3. *Most of them*

4. *All of them*

115. During this school year, were you taught in any of your classes the dangers of tobacco use?

1. *Yes*

2. *No*

Questions 116- 124 are on Violence

116. During the past 12 months, how many times were you physically attacked?

1. _____

2. *Never*

117. During the past 12 months, how many times were you in a physical fight?

1. _____

2. *Never*

118. During the past 30 days, on how many days were you bullied?

1. _____

2. *Never*

119. During the past 30 days, on how many days did you carry a weapon, such as a gun, knife, club etc.?

1. _____

2. *Never*

120. During the past 12 months, how many times were you seriously injured?

1. _____

2. *Never*

121. During the past 12 months, has someone ever threatened to use knife or other weapon against you?

1. *Yes*

2. *No*

122. During the past 12 months, have you ever threatened a girl-/boyfriend or have you ever threatened someone with knife or other weapon?

1. *Yes*

2. *No*

123. During the past 12 months, have you been physically forced to have sexual intercourse when you did not want to?

1. *Yes*
2. *No*

124. During this school year, were you taught in any of your classes how to reduce and avoid violence?

1. *Yes*
2. *No*

Questions 125- 152 are on School environment. Please agree or disagree with the following statements about your school

125. I like to go to school

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

126. There are enough toilets or latrines at my school

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

127. The toilets and latrines at my school are easy to get to

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

128. There is water to wash my hands after using the toilet at my school

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*

5. *Strongly disagree*

129. There is water to wash my hands before I eat meals or snacks at my school.

1. *Strongly agree*

2. *Agree*

3. *Neither agree or disagree*

4. *Disagree*

5. *Strongly disagree*

130. I have the freedom to express my own meanings and opinions at school.

1. *Strongly agree*

2. *Agree*

3. *Neither agree or disagree*

4. *Disagree*

5. *Strongly disagree*

131. My school is concerned about my health and well-being.

1. *Strongly agree*

2. *Agree*

3. *Neither agree or disagree*

4. *Disagree*

5. *Strongly disagree*

132. Students at my school are involved in planning health education programs for youth.

1. *Strongly agree*

2. *Agree*

3. *Neither agree or disagree*

4. *Disagree*

5. *Strongly disagree*

133. I am encouraged by my school to take part in meetings and help plan youth health activities.

1. *Strongly agree*

2. *Agree*

3. *Neither agree or disagree*

4. *Disagree*

5. *Strongly disagree*

134. My school discourages students from using tobacco

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

135. My school discourages students from drinking alcohol

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

136. My school discourages students from using drugs

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

137. I have chances to play and be active while I am at school

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

138. I feel safe at school

1. *Strongly agree*
2. *Agree*

3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

139. My school expects students to be respectful to each other

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

140. My school expects that teachers are respectful of students

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

141. My school cares if students are hungry during the day

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

142. If I was sick or needed help when I was at school, my teachers would help me

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

143. Girls are treated the same as boys at my school

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

144. My school cares about my sexual health

1. *Strongly agree*
2. *Agree*
3. *Neither agree or disagree*
4. *Disagree*
5. *Strongly disagree*

145. During the past 30 days, on how many days did you feel unsafe at school or on your way to and/or from school?

1. *Never*
2. *1 time*
3. *2 or 3 times*
4. *4 or 5 times*
5. *6 or more times*

146. To what extent do people of your age in your area of residence participate in sport and recreation?

1. *To very large extent*
2. *To a large extent*
3. *To some extent*
4. *Not at all*

147. To what extent do people of your age in your area of residence participate in economic activities in the village?

1. *To very large extent*
2. *To a large extent*
3. *To some extent*
4. *Not at all*

148. To what extent do people of your age in your area of residence participate in health promoting activities?

1. *To very large extent*
2. *To a large extent*
3. *To some extent*
4. *Not at all*

149. To what extent do people of your age in your area of residence participate in defense and security of the community?

1. *To very large extent*
2. *To a large extent*
3. *To some extent*
4. *Not at all*

150. To what extent do people of your age in your area of residence participate in leadership and community management?

1. *To very large extent*
2. *To a large extent*
3. *To some extent*
4. *Not at all*

151. People of my age are involved in planning and setting priorities regarding community activities concerning youth?

1. *I strongly agree*
2. *I agree*
3. *I neither agree or disagree*
4. *I disagree*
5. *I strongly disagree*

152. People of my age play an important role in how my community runs?

1. *I strongly agree*
2. *I agree*
3. *I neither agree or disagree*
4. *I disagree*
5. *I strongly disagree*

Questions 153- 156 are generally about your health

153. How satisfied are you with your health?

1. *Very satisfied*
2. *Satisfied*
3. *Dissatisfied*
4. *Very dissatisfied*

154. During past 3 months, how often has your health, or how you are feeling, made it difficult for you to get to school?

1. *Never*
2. *Rarely*
3. *One to two times a month*
4. *Once or twice a week*
5. *Every day*

155. During the past 3 months, how often has your health, or how you are feeling, made it difficult for you to spend time with your friends?

1. *Never*
2. *Rarely*
3. *One to two times a month*
4. *Once or twice a week*
5. *Every day*

156. During the past 3 months, how often has your health, or how you are feeling, made it difficult to participate in activities with your family?

1. *Never*
2. *Rarely*
3. *One to two times a month*
4. *Once or twice a week*
5. *Every day*

Questions 157- 163 are on Health services

157. During the past 12 months, did you ever consult anyone with an issue regarding your health?

1. *Yes*
2. *No*

158. If you need health care service, how easy would it be for you to obtain such service?

1. *Very easy*
2. *Easy*
3. *Neither easy or difficult*
4. *Difficult*
5. *Very difficult*

159. Can your parents afford to pay for health services?

1. *Yes*
2. *No*
3. *I don't know*

160. If you need oral health care service, how easy would it be for you to obtain such service?

1. *Very easy*
2. *Easy*
3. *Neither easy or difficult*
4. *Difficult*
5. *Very difficult*

161. If you needed oral health care service, would your parents be able to afford these services?

1. *Yes*
2. *No*

162. During the past 2 years have you attended a dental clinic in order to receive help or treatment?

1. *Yes*
2. *No*

163. Who would you prefer to talk to if you had a health problem (tick of more than one alternative if necessary)?

1. *Someone at a health clinic*
 2. *A medical doctor*
 3. *Traditional healer*
 4. *My mother/female guardian*
 5. *My father/male guardian*
 6. *A relative*
 7. *A teacher*
 8. *A friend*
 9. *Other (specify)*
-

Questions 164- are on importance of oral health education and oral health related knowledge (from Kida questionnaire in 1997)

165. Do you recall having received oral health education in primary school?

1. Yes
- 2 No

166. Do you recall having received oral hygiene instructions in primary school

- 1 Yes
- 2 No

167. Do you recall having received dietary counseling in primary school

- 1 Yes
- 2 No

168. How important are books as a source of oral health information

- 1 Very important
- 2 Important
- 3 neither important nor unimportant
- 4 Unimportant
- 5 very unimportant

169. How important are dental assistants in primary school as a source of oral health information

- 1 Very important
- 2 Important
- 3 neither important nor unimportant
- 4 Unimportant
- 5 very unimportant

170. How important is TV/radio as a source of oral health information

- 1 very important
- 2 Important
- 3 neither important nor unimportant
- 4 Unimportant
- 5 very unimportant

171. How important was teacher in primary school as a source of oral health information

- 1 very important
- 2 Important
- 3 neither important nor unimportant
- 4 Unimportant
- 5 very unimportant

172. How important is parents as a source of oral health information

- 1 very important
- 2 Important
- 3 neither important nor unimportant
- 4 Unimportant
- 5 very unimportant

173. Gum disease might lead to bone erosion

- 1 Correct
- 2 Not correct

174. Gum disease *is not* caused by virus

- 1 Correct
- 2 Not correct

175. Slight bleeding is a first sign of gum disease

- 1 Correct
- 2 Not correct

176. Light and vitamins *do not* prevent gum disease

- 1 Correct
- 2 Not correct

177. Bacterial plaque causes gum disease

- 1 Correct
- 2 Not correct

178. A cause of tooth decay is mainly irregular tooth brushing

- 1 Correct
- 2 Not correct

179. Tooth decay is caused by sugary foods

- 1 Correct
- 2 Not correct

180 A dentist should be visited only when in sever toothache

- 1 Correct
- 2 Not correct

181. Fluoride can prevent tooth decay

- 1 Correct
- 2 Not correct

182. A dentist should be visited regularly once a year

- 1 Correct
- 2 Not correct

183. What's your opinion about oral health education in primary school

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

184. Providing OHE is a waste of time

- 1 Totally agree
- 2 Agree
- 3 Neither agree nor disagree
- 4 Disagree
- 5 totally disagree

185. Students have the right to get primary school oral health education

- 1 Totally agree
- 2 Agree
- 3 Neither agree nor disagree
- 4 Disagree
- 5 totally disagree

186. Oral health information should be taken individually

- 11 Totally agree
- 2 Agree
- 3 Neither agree nor disagree
- 4 Disagree
- 5 totally disagree

187. Providing OHE in primary school is important to prevent oral disease

- 1 Totally agree
- 2 Agree
- 3 Neither agree nor disagree
- 4 Disagree
- 5 totally disagree

Appendix 2



Regnr:	Saksbehandler:	Telefon:	Vår dato:	Vår referanse:
REK vest	Anne Berit Kolmannskog	55970496	27.05.2011	2011/1154/REK vest
			Deres dato:	Deres referanse:
			05.05.2011	

Vår referanse til oppgave ved alle henvisninger

Anne Nordrehaug Åstrøm
anne.nordrehaug@cib.uib.no

Universitetet i Bergen

2011/1154 Oral helse og helsefremmende skoler i Tanzania

Det vises til endringsøknad datert 05.05.2011, der en blant annet ønsker å inkludere en ny utvalgsgruppe i Dar es Salaam, Tanzania og til oppklarende telefonsamtale om saken med prosjektleder.

REK Vest v/ nestleder behandlet saken.

Hovedprosjektet ble godkjent av REK Vest i mars 2009. Forelagt forskningsprotokoll er en omarbeidelse av den opprinnelige protokollen hvor hovedtrekkene skal gjennomføres som en studentoppgave på en ny gruppe skoleelever i Dar es Salaam, Tanzania.

REK Vest har ingen innvendinger til forelagt protokoll og viser til vilkår i vårt brev av 27.03.2009 for hovedprosjektet.

Vedtak

Prosjektendringen godkjennes i samsvar med forelagt søknad.

Med vennlig hilsen,

Ansgar Berg
medleder

Anne Berit Kolmannskog
sekretariatsleder

Kopi til: postmontak@uib.no

Saksbehandlingen følger forvaltningsloven. Komiteenes vedtak etter forskningsetikklovens § 4 kan påklages (jfr. forvaltningsloven § 28) til Den nasjonale forskningsetiske komité for medisin og helsefag. Klagen skal sendes REK Vest (jfr. forvaltningsloven § 32). Klagefristen er tre uker fra den dagen du mottar dette brevet

Revisjonsnr.: 133
Universitetet i Bergen Det medisinske fakultet Postboks 7804 5020 Bergen

Telefon: 55975000

Brev: tfo-vest@uib.no

Web: <http://helseforskning.etikkom.no/>

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Kindly address all mail and e-mails to

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vest, not to individual staff

