ORAL HEALTH STATUS AND ITS ASSOCIATED FACTORS AMONG THE YOUTH IN IGEMBE SUB-COUNTY, MERU COUNTY, KENYA

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Oral Health Status and Its Associated Factors among the Youth in Igembe Sub-County, Meru County, Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for examination with our approval as University Supervisors.

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DEDICATION

This thesis is dedicated to Almighty God, my late dad Daniel Miriti Nkonge, my mum Sarah Thirindi M Muyuri, my brothers Evans Mutethia, Victor Tirima and Jackson Mwenda for their continuous encouragement, prayers, support and inspiration while carrying out this research.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome.
ART	Atraumatic Restorative Treatment.
CBS	Commonwealth Bureau of Statistics.
CDA	Commonwealth Dental Association.
CI	Confidence Interval.
DMFT	Decayed, Missing Filled Teeth.
GoK	Government of Kenya.
HIV	Human Immunodeficiency Virus.
KDHS	Kenya Demographic Health Survey.
KEMRI	Kenya Medical Research Institute.
KNOHP	Kenya National Oral Health Policy.
KNOHS	Kenya National Oral Health Survey.
NACADA	National Agency for the Campaign against Drug Abuse
NIDR	National institute of Dental Research.
NOHP	National Oral Health Policy.
PHC	Primary Health Care.
SPSS	Statistical Package for Social Sciences.
WHO	World Health Organization.

ABSTRACT

Oral health is an essential and integral part of overall health throughout human life. The mouth is the mirror that reflects human's health and well-being. Poor oral health has negative consequences on individuals' behaviours, which may affect an individual's performance at school, home and work as well as the individual's concentration and self-esteem. Individuals cannot enjoy their food and are shy to laugh and are unable to socialize. Sometimes they feel neglected and inferior to other healthy people Holt *et al*, (2013). Oral health problems are usually the first signs of other bodily health issues such as infectious diseases, immune disorders, nutritional deficiencies, stroke, lung cancer and mouth cancer Barzel *et al*, (2013). Therefore the target of this study is to determine the oral health status and its associated factors among the youth in Igembe sub-county, Meru County. This study was a cross-sectional study where quantitative data was collected. Stratified random sampling was used to select the respondents. Data was collected through a questionnaire which was adopted from the WHO Oral Survey Handbook. Oral diagnosis was done by two dental examiners. The World Oral Health assessment form was also used. Data was analyzed using SPSS window version 25 and Epi Info. Descriptive statistics such as frequencies and percentages were used to analyze categorical data. Inferential statistics by use of Chi-square test were used to determine the interactions between the independent variables and the dependent variable. Control of confounders was done using logistic regression models. Data was presented inform of tables, charts, frequencies and percentages. The response rate was 100%. In the study findings it was revealed that the prevalence of dental caries and periodontal disease was 62% and 47% respectively. The factors which had a significant association (p<0.05) with the prevalence of dental caries and periodontal diseases included; age, gender, level of education, income, health care insurance, tobacco smoking, alcoholism and Miraa chewing. After calculation of the Simplified Oral Hygiene Index (OHI-S), it was revealed that majority, 80% of the respondents have a poor oral health status. Therefore, it was recommended, the County Government in collaboration with the Public Health department should create awareness among the youths on the importance of regular dental check-ups as part of preventive measures and teaching good habit on oral hygiene.

CHAPTER ONE

INTRODUCTION

1.1 Background information

Oral health is demarcated as the absence of diseases and optimal functioning of the mouth and its tissues, in a way that preserves the highest level of self-esteem. Oral health defines a standard which empowers an individual to eat, speak and socialize without disease. Dental caries and periodontal diseases are the major oral diseases in the world. The prevalence of dental caries in the world ranges between 60 and70 percent (WHO, 2014). Other diseases and conditions that affect the oral cavity include dental fluorosis, oral cancer, Edentulism, cranial facial birth defects and malocclusion of teeth. Dental caries is the most common dental disease of mankind (WHO, 2014).

Utilization of oral health services encompasses visiting a dental specialist frequently. The National Institute for Clinical Excellence (NICE-United Kingdom) states that the commended intermission between dental examinations should be determined precisely for every patient, and tailored to meet his or her needs, on the basis of an assessment of disease levels and risk of or from dental diseases. It commends that for adults, the intermission ought to be between 3 and 24 months. This is due to the fact that problems are managed more easily at a primary stage. People at high risk of dental diseases need more regular check-ups. These may comprise smokers, diabetics, and people with existing gum disease, people with a feeble immune response to bacterial disease and people who tend to get widespread caries or build up plaque (NICE Guideline, 2013).

A study done in Europe indicated that dental attendance varies with the socio-economic status of the population (Patel R., *et al* 2012). Due to challenges facing oral health worldwide, especially in developing countries, WHO has formulated policies to expand oral health. Hence, some of this these policies comprise establishment of community-based health projects to educate and endorse oral health in rural areas. It also works together with governments of various countries for full

implementation of these policies, Africa being one of the developing continents with significant prevalence of oral diseases. In Africa, most of the countries are underdeveloped hence not much courtesy is given to oral health. Nevertheless, there is noticeable improvement in the oral hygiene awareness as a result of the partnership between WHO and Governments to ensure that the population is educated on the importance of oral hygiene (WHO Journal, 2012).

In Kenya, over the years the mandate for oral health has surpassed the financial provision from the exchequer. The majority of the oral health personnel are dentists. A Kenyan dentist treats six times more patients against the World Health Organisation ratio of 1:7000. The Country has about 1288 registered dentists and one is forced to handle up to 100,000 patients. When all the sectors are combined, the ratio of dentists to the general population is 3:100,000 (KMPDU, 2020). By tradition, dentistry has been largely a reparative occupation. Though, reparative dentistry unaided cannot bring about the control of dental disease. Plaque control is vital in conservation of decent oral health. At individual level the toothbrush and the chew stick are the basic instruments for upholding virtuous oral hygiene. They are the main instruments in overall use for achieving goals of plaque control (Soben, 2010). The use of dentifrices correspondingly plays a significant role in plaque control as they have abrasive properties. Dentifrices particularly tooth pastes and mouth wash are known to play a significant role as adjuncts to tooth brushing in plaque control procedures (Garcia-Godoy *et al*., 2011). Refined sugars also have a role in dental caries and inhibition of major dental problems can be realized by reducing its intake. High consumption of refined foods and snacks goes hand in hand with high prevalence of dental caries (Ngatia *et al.,* 2001).

Recent reports show that the prevalence of oral infections associated with Miraa chewing and tobacco smoking are on the progress both in the developed and developing countries (Punal-Rioboo *et al.*, 2010). The carcinogens developed from Miraa (khat) chewing lead to acquisition of genomic disorders endorsing malignancy. Two types of precancerous lesions in the oral cavity are identified, the principal precancerous lesion being white lesions (leukoplakia) and the less common red lesions (erythroplakia) (Leopold, 2006). A high prevalence of oral leukoplakia in

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any population is a robust indicator of risk for oral cancer. In addition, the usage of tobacco has commonly been acknowledged as the major etiologic factor for oral leukoplakia (WHO, 2012). However, the opinion of this lesion in individual who do not use tobacco suggests that non-tobacco influences may also play a role (WHO, 2012). Also, alcohol and Miraa have been alleged as probable etiological co-factors for oral mucosal cancer, but their independent roles have not been well-known (WHO, 2014).

In Kenya, Meru County, in addition to tobacco usage, the Ameru people extensively use alcohol and Miraa, which is popular because of its socio-cultural values in this community. This ethnic group is ranked high among communities most affected by both oral and nasopharyngeal carcinomas (Carrier *et al* 2014). The success of oral health in this region will depend on the enhanced understanding of the prevalence and identification of potential risk factors involved. This study therefore sought to determine the oral health status and its associated factors among the youth in Igembe constituency, Meru County.

1.2 Statement of the problem

Oral health is one of the most neglected areas in the global health, yet 90% of people have had dental problems or toothache caused by caries and severe periodontitis which affect up to 15% of the worldwide population (Beaglehole, 2012). Awareness, attitudes and commitment of individuals to effective oral health practices are very important for decent oral health and absence of any of these three factors results in poor oral health. The latter inclines the people to oral diseases which cause loss of teeth if not managed appropriately. Loss of teeth is detrimental to the quality of life: Physically, socially as well as psychologically.

Oral diseases such as dental caries, gum diseases, fluorosis, oral mucosal lesions and tooth wear are a major proportion of Kenya´s oral problems. A report produced by the Kenya National Oral Health Survey, (2015) showed that the prevalence of dental caries among the adult population and children was 34.5% and 32.5% respectively hence leading to an overall prevalence of 67%. On average, every adult had one decayed tooth with a DMFT of 0.72. This meant that the adult population had unmet

dental caries related treatment needs. The prevalence of fluorosis among the adult was 23.7% and 41.4% among the children, the prevalence of oral mucosal lesions was 3.2% among the children while among the adults was 20.8% and the prevalence of tooth wear was 14.6% among the adult population. Over 99% of children said they had at least one dental problem. All the adults indicated that they had at least one current dental problem which required attention. The high prevalence of gum related diseases and dental caries among both adult and children's populations was an indication of poor oral hygiene practices. Hence, these could be further accredited to the point that the government has allocated very little funds towards provision of oral health services. Oral health accounts for only 0.0016% of the Ministry of Health budget (KNOHS, 2015). The Government offers very negligible oral health services at public health facilities. There are also no planned insurance schemes for subsidizing the high cost of oral health care. Majority of those visiting a dentist pay out of pocket expenses.

In Meru County, specifically the Igembe sub-counties are ranked high among areas most affected by oral diseases in Kenya, with the youth being the most affected (Carrier, 2014). This finding was supported by the fact that most of the youths who turned up for the Kenya Defence Forces recruitment in Igembe North, Meru County was turned away due to decayed and missing teeth. Only eight young men were recruited and the majority were rejected due to oral health problems. However, the main cause of the poor oral health in the region could not be established (KDF recruitment report, 21st Feb 2018). This study therefore sought to determine the oral health status and its associated factors among the youth in Igembe sub-county, Meru County.

1.3 Justification of the study

The commonest cause of tooth mortality in Kenya is dental caries followed by periodontal disease (Sanya *et al.,* 2017). Dental caries has been cited as the most common cause of tooth mortality at the Kenyatta National Hospital (KNOHS, 2015). At the same time, caries in Kenya has received little attention, most of the studies being carried out on children in the capital city, Nairobi. Only a few studies have

been done in the rural areas and none has been done in Meru County on prevalence and risk factors associated with oral health status among the youth.

The recommendations of this study will therefore be useful in promoting oral health among the youth in Meru County and will also be useful in identifying oral health risk factors. The study would also assist the Meru County government in identifying measures to deal with the high dental caries in the region. The study will also contribute to the achievement of the two of the big four agenda, that is Universal health coverage and Employment opportunities. Finally, it is anticipated that this study will help fill gaps in this area and may prompt other researchers to undertake similar studies in other regions.

1.4 Objectives

1.4.1 General Objective

To determine the oral health status and its associated factors among the youth in Igembe sub-county, Meru County.

1.4.2 Specific Objectives

1. To determine the oral health status among the youth in Igembe sub-county, Meru County.

2. To determine the socio-demographic and socio-economic factors associated with oral health status among the youth in Igembe sub-county, Meru County.

3. To determine the prevalence of dental caries and periodontal diseases among the youth in Igembe sub-county, Meru County.

4. To determine the lifestyle factors associated with oral health status among the youth in Igembe sub-county, Meru County.

1.5 Research Questions

1. What is the oral health status among the youth in Igembe sub-county, Meru County?

2. What are the socio-demographic and socio-economic factors associated with oral health status among the youth in Igembe sub-county, Meru County?

3. What is the prevalence of dental caries and periodontal diseases among the youth in Igembe sub-county, Meru County?

CHAPTER TWO

LITERATURE REVIEW

2.1 Prevalence of oral diseases

The worldwide prevalence of oral diseases is 60-90%. Oral diseases in children, youths and adults are higher in poor and disadvantaged population. The risk factors comprise unhealthy diet, tobacco usage, harmful alcohol and poor oral hygiene. Globally, oral cancers contribute to 10 cases out of 100,000 with the prevalence higher in men than women (Akrebs *et al.,* 2009).

In Europe differences in prevalence levels of oral diseases do exist with countries such as Spain having a prevalence of 61% and mean DMFT 1.52 (Smyth *et al.*, 2010) whereas in Italy prevalence was 45% and mean DMFT was 1.44 (Ferro *et al.*, 2011). In Asia a study done on Saudi Arabia found the prevalence of dental caries among 12-year-olds to be 68.9% (Amin & Al-Abad, 2017) while in Thailand the prevalence was 70% with a DMFT of 2.4 (WHO, 2014). Krustrup and Peterson (2007) made a study on "Dental caries prevalence among youths in Denmark". They found that significantly more untreated decay was found among men, rural areas and in-low-income groups (Krustrup & Peterson, 2007).

The prevalence of oral diseases in rural and urban areas of African countries is related to age, socioeconomic status and specific location. In South Africa the prevalence of dental caries among 12 years old was 22% with a DMFT of 0.7 (Addo-Yobo, *et al.*, 2007). In Zimbabwe a study done there revealed that the prevalence of dental caries in all age groups was high. The prevalence of unmet treatment needs was very high with extraction as the predominant mode of treatment. The study further revealed that majority of the Zimbabweans was not receiving and were not seeking oral care (Frenken *et al.*, 2011).

2.1.1 Dental Caries

Dental caries refers to a transmissible microbiologic disease of the teeth that result in confined termination and annihilation of the calcified tissues. The pathogenesis of

caries comprises from the commencement of the formation of plaque. The superficial of the tooth that is covered by the plaque, when there is a decline in the pH of the localized area, causes the dissolution and demineralization of tooth (WHO, 2012). The prevalence of dental caries has been described to contrast from one country to another owing to the dissimilarities in socio-economic status (SES) patterns and demographic factors. A nationwide oral health survey done in Portugal by Aalmeida *et al*, revealed the prevalence proportion rates of dental caries was 46.9% in 6 years old and 52.9% in 12-year-old in 2003 (Petersen, *et al.,* 2003). Whereas in Australia prevalence of caries was revealed to be 34% in 3–6-year-old by Hallet, *et al.,* 2002, with DMFT at 2.28. In a nationwide study in 2003 in the United Kingdom, 34% of 12-year-olds and 49% of 15-year-olds had clear decay. WHO data displays developing countries to have a lesser caries experience than developed countries (Pitts NB, 2006). Risk factors for dental caries comprise diet of refined carbohydrates, poor oral hygiene, use of non-fluoridated tooth paste, poor oral health seeking behaviour and tooth morphology among others. A study by Kyale, *et al.,* 2007 revealed that 97.8% of 12-year-olds children brushed their teeth by a tooth brush and tooth paste. In the same study 77% of the children had visited a dentist, though, 48.4% of the children simply visited a dentist once there was something wrong. As regards regularity of eating sweets, 60.4% ate sweets everyday while 39.6% ate several times a week; this is a considerably high number and places these children at the risk of caries formation. Maserejian *et al.* (2009), did a prospective cohort study which followed up children aged 6-10 years old who received comprehensive dental care for 5 years. The results displayed that socio-demographic factors were not allied with advanced caries experience. A recent study in India comparing Body Mass Index and caries experience in 12-15 years by Narang, *et al*., found no significant correlation between the two factors (Ridhi *et al.,* 2012).

2.1.2 Periodontal disease

Periodontal disease is an inflammatory disease that affects the soft and hard structures that support the teeth and is a foremost source of connective tissue attachment and tooth loss in population (WHO, 2012). They are the most common prolonged diseases affecting people of all ages worldwide. Though, the severe forms

of the disease are more distinct in older individuals predominantly due to lengthy exposure to risk factors. Numerous methods have been established to study the distribution of periodontal disease and can be categorized as mild, moderate or severe on the basis of multiple measurements of periodontal pocket depth, attachment loss and gingival inflammation around teeth (Armitage, 2002). Moreover, statistics from large epidemiological studies specify in some populations periodontal disease is more predominant in males than in females and it worsens with increasing age. One of the main risk factors of periodontal diseases is deliberated to be poor oral hygiene (Petersen, 2009). The most extensively acknowledged methods for controlling periodontal diseases and the associated conditions are personally and professionally applied mechanical oral hygiene measures (Axelsson *et al.,* 2002). According to WHO report (2014) periodontal diseases in mankind, 80% of the young children in the world have gingivitis, over 90% of the world adult population have experienced gingivitis, periodontitis or both (WHO, 2014).

2.2 Lifestyle factors associated with poor oral health

2.2.1 Alcoholism

Alcoholism has been defined by World Health Organization "a term of long-standing use and variable meaning, generally taken to refer to chronic continual drinking, frequent episodes of intoxication, and preoccupation with alcohol and the use of alcohol despite adverse consequences". According to a study conducted by Mahesh *et al.*, 2017 India, alcohol addiction not only affects health of the entire body but also the oral health of an individual. Alcoholics are at high risk of developing dental caries, gingival diseases and may suffer from oropharyngeal cancers. The risk of oral cancer further increases when alcohol is consumed along with cigarette (Mahesh *et al.*, 2017). The risk of oral cancer is six times higher in those who drink alcohol compared to non-drinkers (Ireland Dental Health Foundation Journal, edition 2018). People who have alcohol use disorder tend to have higher plaque levels on their teeth and are three times as likely to experience permanent tooth loss (CDC Journal, 2017). According to a study conducted by Banker *et al.,* 2011 in United States, it was noted that drinks high in alcohol, like spirits, dry the mouth hence exposing the

tooth's surface to plague and bacteria. Gum disease, tooth decay and mouth sores are all much more likely for heavy drinkers and alcohol abuse is the second most common risk factor for oral cancer (CDC Journal, 2017)

2.2.2 Tobacco Smoking

A number of clinical studies and regional health surveys have found an association between tobacco smoking and poor oral health. According to a report by World Health Organization, 90% of individuals with malignancy of the mouth, lips, tongue and throat use tobacco, and the risk of developing these cancers rise with the amount smoked or chewed and the extent of the habit. Smokers are six times more probable than non-smokers to develop these cancers. A report by CDC revealed that, 16% of smokers have poor oral health, four times the rate of people who have never smoked (CDC, 2017). Individuals who smoke less than 10 cigarettes per day are two times more likely to develop gum disease. This rises to four or five times more likely in heavier smokers. Also, the more cigarettes smoked, the worse the gum disease. Smokers also do not respond very well to gum treatment, this is because smokers have a lowered resistance to infections and have impaired healing. Hence gum disease is still the most common cause of teeth loss among the smokers (WHO, 2016). Besides the more serious risks of oral cancer and gum disease, according to CDC, smoking can also affect the sense of taste and smell and delay recovery after a tooth extraction or other dental procedure. In addition, the tar from cigarette smoke stains teeth, causes bad breath and can discolour the tongue. The deteriorating effect of smoking on periodontal disease is also well known among the young (Heikkinen *et al.*, 2010) even with short-term or low tobacco consumption (Rosa *et al*, 2008) reported in their epidemiological study that smokers have four times more periodontitis than non-smokers. In addition, Machuca *et al., (*2011), found that deeper probing depths and greeter bleeding values were recorded among smoking conscripts compared to non-smoking conscripts. Al-Shammari *et al.*, (2009) made a study on "Dental patient awareness of smoking effects on oral health" and found that the prevalence of smoking was 29.3%. Fewer smokers and non-smokers supposed that oral health and smoking are associated and that smoking affected oral cancer.

They established that smoking dental patients were considerably less mindful of the oral health effects of smoking than non-smokers (Al-Shammari *et al.*, 2009).

2.2.3 Khat (Miraa) Use

One of the earliest studies describing effects of khat on oral tissues was carried out in Yemen and was conducted among a group of 121 Yemeni males (Hill *et al.*, 2011). The study revealed a lower dental caries rate among khat chewers when compared to non-chewers. The author's suggested that the diet rich in fiber used by Yemenis could partly explain the low caries rate. However, dental hard tissues depicted severe wearing out due to abrasive forces experienced during chewing. One subsequent study demonstrated that the low caries rate did not have any link at all to the fluoride content in khat leaves (Hattab *et al.*, 2009). Khat in itself is considered to be non-cariogenic and the way it is used is suggested to have a cleansing effect on the teeth with a potential to lower dental caries rate among users (El-Wajeh *et al.*, 2009). A number of studies have suggested that the high consumption of sugary drinks and numerous use of sugar to counteract the bitter taste of khat in the mouth during khat chewing could predispose to increased caries (El-Wajeh *et al.*, 2009). This factor could explain the higher number of missing teeth found among khat chewers in some recent studies (Halboub *et al.*, 2013). Increased dental discolouration has often been reported in chronic khat chewers. The staining was noted to specifically affect teeth on the chewing side and adjacent to the point where the khat bolus in placed while chewing when compared with the non-chewing side (Nyanchoka *et al.*, 2008). In one study, over 90% of the khat chewers had dental staining whereas no staining was noted in the control group, indicating a significant association between khat chewing and staining of teeth. Moreover, the observed dental staining among khat chewers was found to be independent of the habit of smoking tobacco (Yarom *et al.*, 2010).

2.2.4 Poor oral hygiene

Many previous studies have found that good oral hygiene and a healthy diet are associated with good oral health (Bawadi *et al.*, 2011). It is clear on the basis of experimental and epidemiologic studies that microbial plaque is the direct cause of gingivitis and poorer oral hygiene increases the prevalence of gingivitis (Beck &

Arbes, 2009). Dental attendance has also been associated with dental caries and periodontal health. Nguyen *et al.*, 2008, reported how former or never regular attendance significantly increases caries occurrence among men. In addition, former or never regular attenders had a significantly higher DMFT value but fewer filled teeth than always regular attenders (Aldossary *et al.*, 2015). Additional study was performed by Marques *et al*, (2008) in order to evaluate the connotation between oral health and hygiene practices and oral cancer in the cosmopolitan area of Sao Palo, South-eastern Brazil. They revealed that the use of complete dental prosthesis was not connected with oral cancer but regular gum bleeding displayed a strong association (OR 3.1, 95% CI 1.2-7.9). Those who never attended a dental visit were more likely to have oral cancer (OR 2.5, 95% CI 1.3-4.8). They concluded that gum bleeding and poor oral hygiene were the factors associated with oral cancer irrespective of tobacco and alcohol consumption (Marques *et al.*, 2008).

2.3 Socio-demographic and socio-economic factors associated with oral health status

Socio-demographic factors and socio-economic factors (socioeconomic status, SES) are among the most important factors associated with oral health, even in the 21st century. The topic has widely been studied in the past decades, and the impact of SES has not changed even with new information technology. It seems that no matter how socioeconomic status is measured, the difference in oral health always exist (Schwendicke *et al.*, 2015).

2.3.1 Level of Education and Level of income

Educational background in the family and family income are both associated with oral health, Buchwald *et al.*, (2013), suggested that the impact of socioeconomic disparity on caries experience may be explained by individual oral hygiene habits (tooth brushing and flossing), preventive interventions (sealant use and fluoride exposure) and recent history of dental attendance (Buchwald *et al.*, 2013). Sabbath *et al.*, 2009 conducted a study and found out that the possibilities of poorer oral health were advanced among African-American, Mexican-Americans and other indigenous groups than in white Americans. Adjusting for income and education

resulted in a decrease in the (ORs) odds ratios for having poorer perceived oral health (44%), tooth loss (29%), gingival bleeding (61%) and periodontitis (30%) among African-Americans than White Americans. From this study, they determined that education and income have a significant role in ethnic differences in oral health (Sabbath *et al.*, 2009). A study by Haugejorden *et al.,* 2008 in order to assess inequality in dental status associated educational level, gross personal and family income among Norwegian adults. They evaluated that low gross personal and adjusted family income was linked with amplified probability of having fewer than 20 natural teeth. Educational level was significantly associated with dental status in bivariate but not in multivariate analysis (Haugejorden *et al.*, 2008). Thomas *et al.,* 2011 conducted a study on "oral and dental health care practices in pregnant women in Australia". There was a substantial relationship between knowledge and practices with both education and socio-economic status. Women with lower education level and lower socio-economic status were more probable to be at higher risk of poor periodontal health as associated with women with higher levels of education and higher socio-economic status (Thomas *et al.*, 2011). A parallel study was conducted by Turrell *et al.*, 2009 in Brisbane Australia. They found out those respondents with low levels of education and those from a low-income household reported poorer oral health. Jamieson and Thomson, 2010 revealed that edentulism was most dominant among those from low socio-economic status households who were inhabitants in high deprived areas. Poor self-rated oral health and 2+ years since the previous dental check-up were also utmost prevalent amongst these same individuals. In divergence, respondents from high social economic status households situated in the least destitute areas had the lowest prevalence of edentulism, poor self-reported oral health or 2+ years since their last dental check-up (Jamieson and Thomson, 2010). According to a study conducted by Alkhatib *et al.,* 2010, on oral health problems among the young Syrian adult population and found the following: The prevalence of oral health problems was high with 96% of the respondents claiming that they experienced one or more problems in the previous year. Socio-demographic variations in experience of dental pain were apparent, with young men of lower education having the greatest odd of dental pain (Alkhatib *et al.*, 2010). A parallel study was conducted by Amarasema *et al.,* 2011, in order to explore the socio-

demographic factors associated with tooth loss in rural inhabitants of Sri Lanka. The study findings revealed that tooth loss increased significantly with age and also education, income, oral hygiene practices and tobacco use also were significantly allied with tooth loss in bivariate analysis (Amarasema *et al.*, 2011).

2.3.2 Place of Residence

The place of residence is associated with oral health, (Kamppi *et al.*, 2013) found that Australian conscripts who had lived most of their lives in areas with access to fluoridated drinking water had about 25% lower caries experience than those without fluoride exposure. Living in an urban or rural area affects oral health (Kamppi *et al.*, 2013). According to the studies in the Finnish conscripts, living in a metropolitan region significantly declines the number of decayed teeth (Ceylan *et al.*, 2017). The reason for a better oral health status in urban areas may be the bigger proportion of well-educated inhabitants compared to rural areas (OFS, 2012). In addition, people who live in urban areas use more dental services, which also affect oral health (Aldossary *et al.*, 2015). Additional study was done by Ogawa *et al.*, 2009 to determine the dental caries prevalence among the Myanmar population. The most important discoveries were: the mean number of decayed teeth (DT) in rural areas was higher than that in urban areas, while the mean number of filled teeth (FT) in rural areas was lower than that in urban areas. Mean knowledge and attitude scores for correct answers were also considerably higher for the urban than the rural subjects (Ogawa *et al.*, 2009). Another systematic study was performed by Vargas *et al.*, 2011 on oral health status of rural young adults in United Status. The authors found that young adults living in rural areas were more likely to report having unmet dental care needs and were less likely to have had a dental visit in the past year compared with young adults living in the urban areas. The prevalence of edentulism among rural young adults was 16.3%, almost twice that of urban young adults. Caries experience also was more probable to be greater among young adults residing in rural areas. Hence, they established that oral health differences existed among young adults living in rural and urban areas (Vargas *et al.*, 2011).

2.4 Dietary practices associated with oral health status

Diet plays a significant role in the nutritional status and henceforth the growth of the individual. When diet and oral health is considered, Moynihan states that, "Good diet is vital for the development and conservation of healthy teeth, but healthy teeth are significant in permitting the consumption of assorted and health diet throughout lifecycle" thus emphasizing the two-way relationship between diet and oral health (Moynihan *et al.,* 2017). Young adults form the back bone of forthcoming generation and many severe diseases in adulthood have their origins in adolescence, for instance, dietary habits and tobacco usage (WHO, 2014). Unhealthy lifestyle factors like skipping meals and food choice leading to a poorer nutrient ingestion are common amongst this vulnerable adolescent group. Children and adolescents are giving preferences for sweetened foods, and soft drinks that are rich in carbohydrates and thus are at risk for oral diseases (Drewnoski *et al.*, 2012).

Consumption of sugary foods in between meals is considered a risk factor for dental caries (Burt *et al*., 2006). There is less risk of dental caries when sugary foods are consumed together with the main meal due to increased salivary activity that helps to neutralize the acidic effect and wash away the food (Burt *et al.*, 2006). In recent past it has been documented those carbonated drinks are a major risk for caries development in children (Cook *et al.*, 2008). Studies done in the past inclined to focus on cariogenic diets hence undermining the role of sugared beverages; of particular concern are soft snacks which are common among the youth (Cook *et al.*, 2008). Consumption of sugary foods just afore slumbering has been allied with increased caries prevalence. This is because of reduced salivary production that happens at night-time hence the buffering effect saliva is not present (Zhang *et al*, 2016). Almasi *et al,* 2016 did a study to find out the knowledge and practices of oral hygiene methods among primary and secondary teachers in Riyadh, Saudi Arabia. The study exposed that almost 86% male and 90% female teachers suggested that dental caries was due to the wrong technique of teeth brushing, though sugar and sugary drinks were considered the focal factor by 90% of male and 98% of female teachers (Almasi *et al*, 2016). Ide *et al.*, 2012 made a study to examine the relationship between intake of sweets and oral health status in the adult population,

in Japan. The authors found that among males, individuals who took sweet drinks almost daily compared to individuals who barely took, had higher risk of missing teeth, filled teeth and gum bleeding. Dose response relationship was also observed between intakes of sweet drinks and these variables. These results specified that intake of sweet drinks is a determinant factor of oral health status, independent of dental health behaviour, particularly among the males (Ide *et al.*, 2012).

2.6 Prevention of oral diseases

2.6.1 Primary prevention of oral diseases

Primary prevention is done before the disease process has started. Primary prevention protects individuals against diseases, often by placing barriers between etiological agent and the host. There are numerous ways of primary prevention of oral diseases. These comprise of health education which encompasses offering comprehensive explanation on the causes of oral diseases and methods of prevention to communities and individuals. This aids to reduce the prevalence of oral diseases. Results of a two-year study done in China specify that oral health education offered in schools had some optimistic effect in improving the oral hygiene of children (Peng *et al.,* 2004). Another method is maintenance of a decent oral hygiene. The elimination of plaque by adequate oral hygiene practices such as suitable tooth brushing and flossing helps to prevent dental caries. Dietary control is a technique of primary prevention attained by restriction of sugary foods and drinks. Sucrose and refined carbohydrates are the leading causes of caries and thus should be evaded (Holt *et al.*, 2001). Non-sugary substitutes such as xylitol can be used instead and these decrease the occurrence of dental caries. Fibrous foods have been revealed to stimulate the flow which in turn prevents tooth decay in addition food containing calcium help in re-mineralization of teeth (Twetman, 2009). A fourth technique of primary prevention is the usage of fluorides. This can be done in two ways. The leading method is topical application by use of fluoridated toothpastes and professional application. Secondly, thru systematic ingestion of fluoride tablets or fluoridated water in areas with low fluoride concentration (Dennison and Evans, 2009)

2.6.2 Secondary prevention of oral diseases

Secondary prevention targets patients early in the disease progression to arrest or reverse the progression and to improve the prognosis. This comprises initial detection of caries by evaluating risks for every individual at regular intervals. The following factors should be considered when evaluating caries risk: clinical sign of previous disease, dietary habits, especially frequency of sugary foods and drinks consumption, social history, especially socioeconomic status, use of fluoride, plaque control, saliva and medical history (Dennison & Evans, 2009). For carious lesions that are only restrained to the enamel, preventive methods rather than operational care is suggested. This comprises topical fluoride varnish, twice every day, routine use of toothpaste having at least 1000 ppm fluoride, flossing and dietary advice (Dennison & Evans, 2009). Alternative method is the usage of fissure sealants applied in pits and fissures that are probable to become carious. A fissure sealant is a plastic coating positioned on pits and fissures of teeth. Fissure sealants can likewise be used to reinstate small to moderate sized fissures (Ahovuo-Saloranta *et al.*, 2008).

2.6.3 Tertiary prevention of oral diseases

The goal of tertiary prevention is to lessen complications that may arise because of oral ailments such as soreness and pain. The intention is to limit disability and complications of treatment. This encompasses rehabilitation of carious teeth by permanent fillings, root canal treatment, crowns, extractions and provision of dentures (WHO, 2012). Fillings are used to fill holes (cavities) that have moulded, typically as a result of degeneration or tooth wear. There are numerous forms of filling, each appropriate for different cavities. Amalgam fillings are made of an amalgamation of metals including silver, tin, copper and mercury. Amalgam is tremendously strong and able to withstand the grindings and chewing of molars over long periods of time. Tooth-coloured fillings match the colour of teeth, making them a natural-looking substitute to amalgam fillings. They are frequently used in teeth and are anteriorly positioned. They are less robust than the amalgam. Root canal treatment includes the elimination of blood vessels and nerves that are existing at the center of the tooth. A material is then positioned inside the canal to replace the blood

vessels and nerves and subsequently the tooth is either filled using amalgam or tooth-coloured filling. If a tooth has been deteriorated by a lot of decay or a large filling, a crown (or cap) can be fitted to reinforce it and improve its look. Crowns are formed like normal teeth and fit appropriately over the prepared tooth (Kidd *et al.*, 2012). The teeth that are expansively dented due to dental caries, extraction is done since the tooth cannot endure any filling material. The removed tooth/teeth can then be substituted using partial or complete dentures to prevent loss of function (Kidd *et al.*, 2012).

2.7 Conceptual Framework

Independent Variables   Dependent Variables
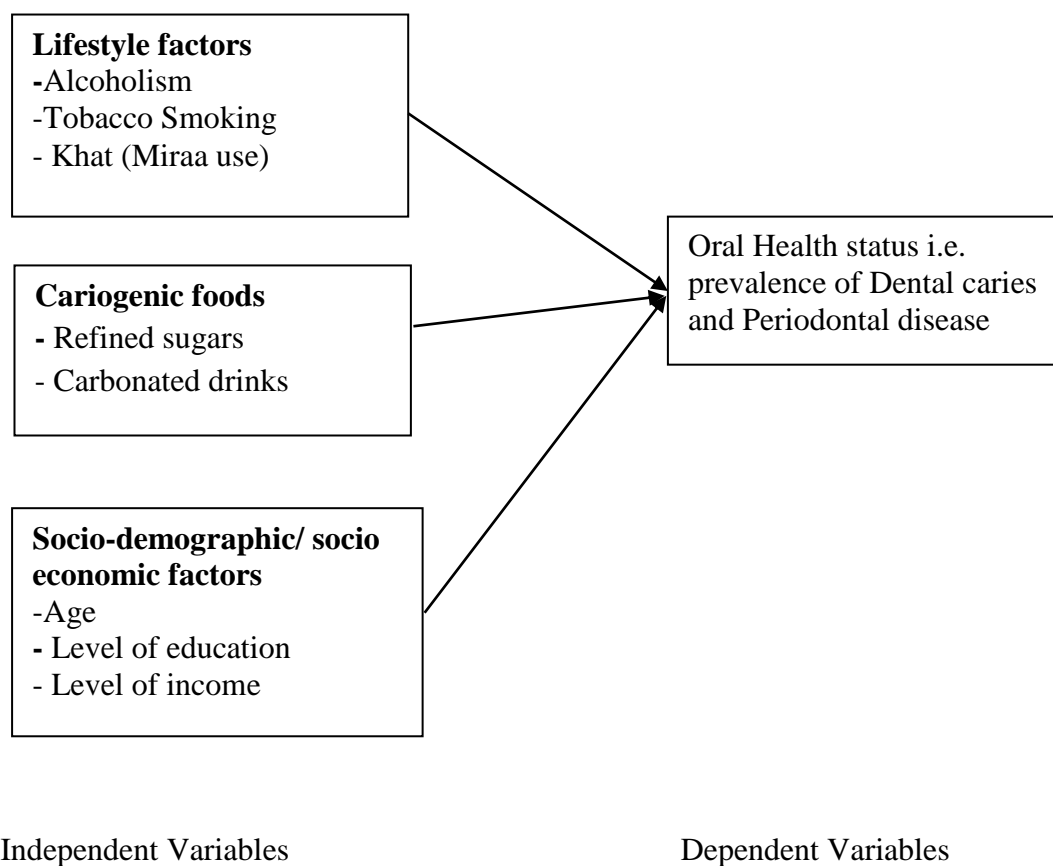
Figure 2.1: Conceptual Framework

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study area

Meru County is one of the 47 counties in Kenya, located in the former Eastern Province. The area lies within one degree on both sides of the equator and 37º- 38º east, longitude. It is the home of the Ameru (Meru) tribe which is sometimes described as being related to the tribes living around the Mt. Kenya region: the Kikuyu and Embu people. Meru County has become increasingly cosmopolitan to the lucrative trade in khat (Miraa), a minor narcotic, particularly popular with Somali community both in Kenya, Somalia and people of Somali descent in the diaspora. The rich loamy soil is particularly good for cultivation of Miraa which grows under the same climatic and soil conditions as Arabic Coffee, that is, it grows well on well drained slopes 1500-3000 meters above sea level. Other economic activities are tea farming, dairy farming, trade and tourism to some extent. Several factors led to the choice of this location. First, the area is ranked high among areas most affected by oral diseases in Kenya, with the youth being the most affected (Carrier N, Journal of African Cultural Studies, 2014). Secondly, the area is the largest Miraa growing region in the county. Finally, Miraa has been in the headlines after being related to causing oral harm. The people of Igembe sub-county are now predominantly Christians i.e. Presbyterians and Roman Catholic and other denominations reflecting the work of missionaries, with also minorities of Indian descent who are mainly Hindus and African/Arab descent who are Muslims. (Meru County DEAP, 2009).

3.2 Study design

A cross-sectional study design was conducted where quantitative data was collected.

3.3 Study population

The study population were the youth (persons aged 18-35 years) residing in Igembe sub-county, Meru County.

3.3.1 Inclusion Criteria

➢ All the youth who consented to take part in the study.

3.3.2 Exclusion Criteria

➢ The youth who did not consent for the study.
➢ The mentally challenged individuals.

3.4 Sample Size Determination

The sample size was determined using the Cochran (1998) statistical formula below:

$$n = \frac{Z^2 \, p \, q}{d^2}$$

n= Sample size when population is more than 10000.

z=the standard normal deviate usually set at 1.96 corresponding to 95% confidence interval.

p=it is the proportion in the population estimated to have the characteristics being measured. 67% (KNOHS, 2015)

q=it is 1-p which is taken as 1-0.67=0.33.

d=it is the level of statistical significance (100-95=5%) 5%=0.05

$$n = \frac{1.96^2(0.67 \times 0.33)}{0.05^2}$$

n = 340

Sample size= 340

3.5 Sampling technique

Stratified random sampling was used to select the respondents, where the area was divided into four locations (stratum) as shown in the table 3.1 below. Listing of persons in the target population was first done in the stratum. Hence, from each stratum simple random sampling was done to come up with the desired sample size of 340 respondents.

Table 3.1: Location (Stratum)

Location(stratum)	Population
Maua	107
Maili tatu	62
Kangeta	77
Laare	94
Total	**340**

3.6 Study Variables

3.6.1 Dependent Variable

➢ Oral health status i.e. prevalence of dental caries and periodontal disease

3.6.2 Independent Variables

➢ Socio-demographic factors: age, gender.
➢ Socio-economic factors: level of education, income levels.
➢ Lifestyle factors: tobacco smoking, alcoholism, Miraa chewing.
➢ Cariogenic foods: refined sugars, carbonated drinks

3.7 Data Collection Instruments

A questionnaire adopted from the WHO Oral Survey Handbook was used to collect data from the selected sample. The questionnaire entailed all aspects taking into

account the socio-demographic and socio-economic factors and all other variables in the study were incorporated in the questionnaire. Oral examination instruments included; mouth mirror, explorer and probe.

3.8 Data Collection Procedure

Quantitative data was collected by use of questionnaires, individual interviews and observations. The purpose of this was to assess the oral health of the respondents. This was done using the World Oral Health assessment form from the WHO. The Oral diagnosis was done by two dental examiners. Oral examination was carried out under natural light using disposable wooden spatulas, surgical gloves and masks. If the dental examiners discovered a case that required further dental treatment, the study participant was issued with a referral letter to the nearest dental clinic.

3.9 Oral Health Indices

3.9.1 Dental Caries Indices

Using the DMFT (Decayed Missing and Filled Teeth), a tooth was considered decayed when there was an open carious cavitation on any surface of the tooth. A tooth was classified as missing in the index if it was extracted due to caries. A tooth was classified as filled if it had a restoration for a carious lesion. Exfoliated teeth in the primary and mixed dentition, unerupted and those extracted for other reasons apart from caries were not included in the indices.

3.9.2 Periodontal disease indices

Periodontal probe was gently used to measure the pockets (space) between the tooth and the gums. The indices used were as follows:

- The number and percentage of individuals with absence of periodontal disease (score 0).
- The number and percentage of individuals with pockets 4-5 mm (score 1).
- The number and percentage of individuals with pockets 6mm (score 2).

3.9.3 Oral Hygiene Status

Using the Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillon. The oral hygiene of each participant was classified as "good" when the OHI-S score was 0-0.9, "fair" when it was 1.0-1.9 and "poor" when it was 2.0 up to 6.

3.10 Pre-testing

Pre-testing of the data collection instruments was done before the actual data collection to improve the validity and reliability of the responses. This was done using simple random sampling technique of 124 respondents from Tigania location. This area was selected since it comprised people who had parallel characteristics to those in the study area.

3.11 Data Processing and analysis

The questionnaire was checked manually for completeness and consistencies, and then coded, entered, and analyzed using SPSS window version 25. Descriptive statistics such as frequencies and percentages were used to analyze categorical data. Inferential statistics by use of Chi-square test was used to determine the associations between the independent variables and the dependent variable.

3.12 Data Presentation and Dissemination

Data was presented inform of tables, charts, frequencies and percentages. Data was disseminated to the School of Public Health, Kemri, JKUAT and Meru County Public Health Office.

3.13 Ethical Considerations.

Ethical approval was obtained from KNH-UoN Ethics and Research Committee. Area permission was sought from Meru County Public Health Offices. The questionnaires were administered to respondents upon obtaining their informed and voluntary consent. Before giving the respondent a questionnaire they were assured of anonymity of the information collected. Participants were informed that the oral

health assessment will be done using the World Oral Health assessment form from the WHO. Participants who consented to the oral health indices assessment were informed of any benefits or risks and hence were informed of their rights to decline to take part in the study or refuse to answer or complete the entire questionnaire. Participants were assured that all collected information was treated with absolute confidentiality and all records were kept safe.

CHAPTER FOUR

RESULTS

4.1 Response rate

This chapter presents findings organized in form of tables, bar graphs, pie charts and narratives. The sample size was 340. The response rate was 100%.

4.2 Socio-demographic Information

4.2.1 Distribution of study respondents by age

The mean age of study respondents was 27($\pm$3) years. Majority, 52% of the study respondents were aged 23-27 years, (table 4.1)

Table 4.1: Distribution of study respondents by age

Age	Frequency	Percentage
18-22 years	34	10%
23-27 years	177	52%
28-32 years	102	30%
33-35 years	27	8%
Total	**340**	**100%**

4.2.2 Distribution of study respondents by gender

Majority, 54% of the study respondents were male, (figure 4.1)
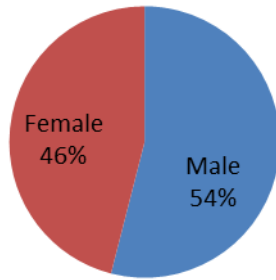
Figure 4.1: Distribution of study respondents by gender

4.2.3 Religious affiliations

Most, 52% of the respondents were Christians, 27% were Muslims, and 17% did not have any religious belief while 4% were Hindu, (figure 4.2)
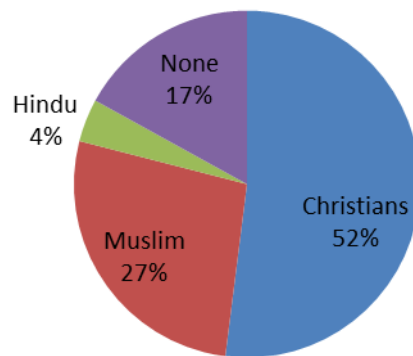
Figure 4.2: Religious affiliations

4.2.4 Distribution of study respondents by marital status

Majority, 52% of the respondents were single, 28% were married, 12% were separated, 6% were widowed while 2% were divorced, (figure 4.3).
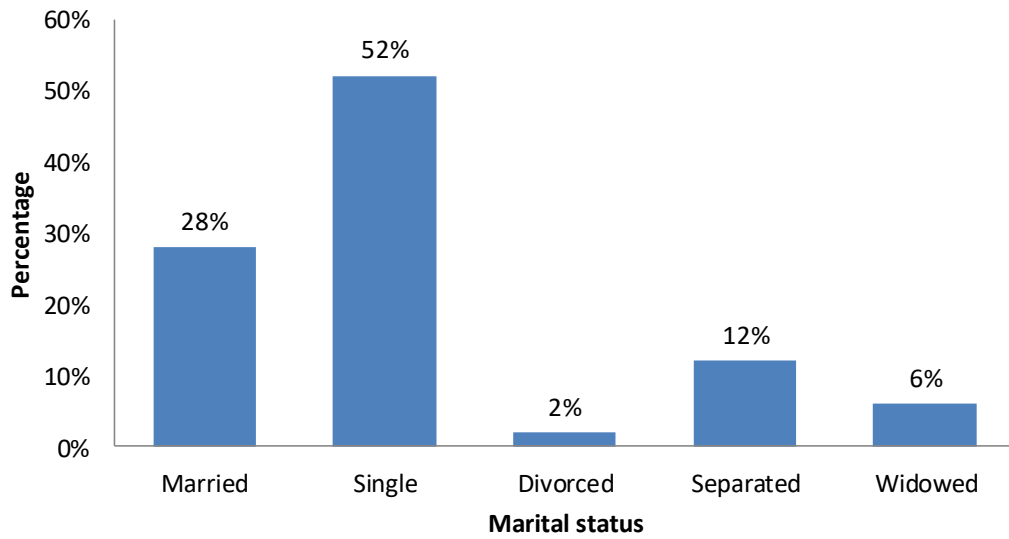
Figure 4.3: Distribution of respondents by marital status

4.2.5 Distribution of respondents by place of residence

Sixty eight percent of the study respondents resided in a rural setting while thirty two percent in an urban area, (figure 4.4)
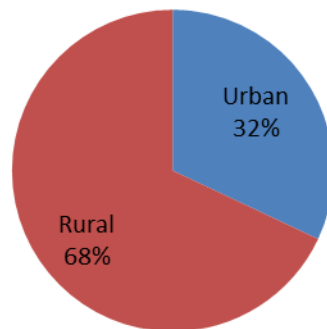
Figure 4.4: Distribution of respondents by place of residence

4.3 Socio-economic information

4.3.1 Distribution of respondents by highest level of education

In this study, 75% of the respondents had attained the primary school level of education, 14% secondary school, while 4% had no formal education, (figure 4.5)
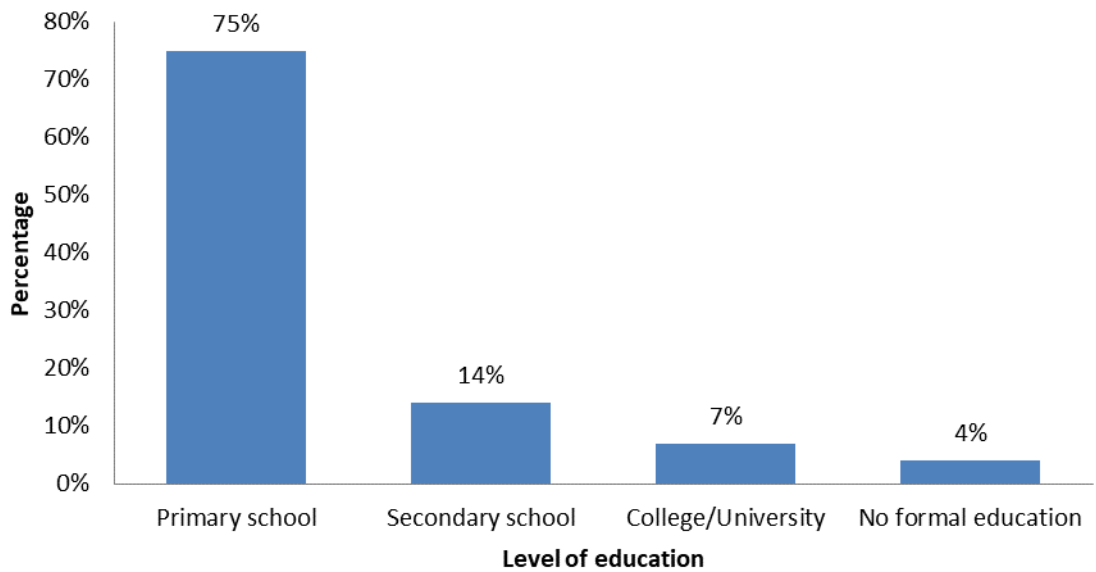
Figure 4.5: Distribution of respondents by highest level of education

4.3.2 Distribution of study respondents by occupation

Forty six percent of the study respondents were business people, eighteen percent were unemployed while five percent were casual laborers, (figure 4.6)
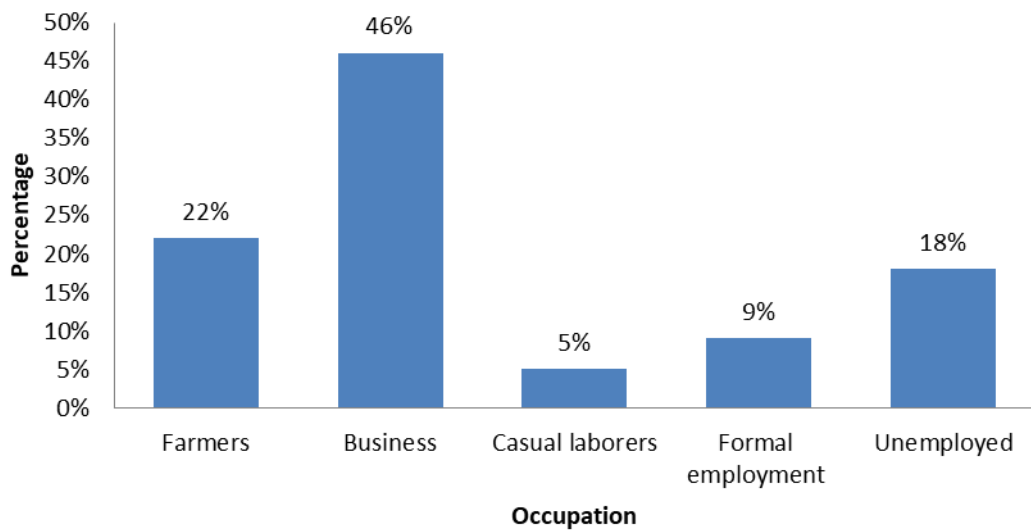
Figure 4.6: Distribution of study respondents by occupation

4.3.3 Distribution of respondents by level of income

In this study, 23% of the respondents had a monthly income of sh 6000-sh 10,000 while 20% had below sh 1000 and 4% had above sh 20,000. (Figure 4.7)
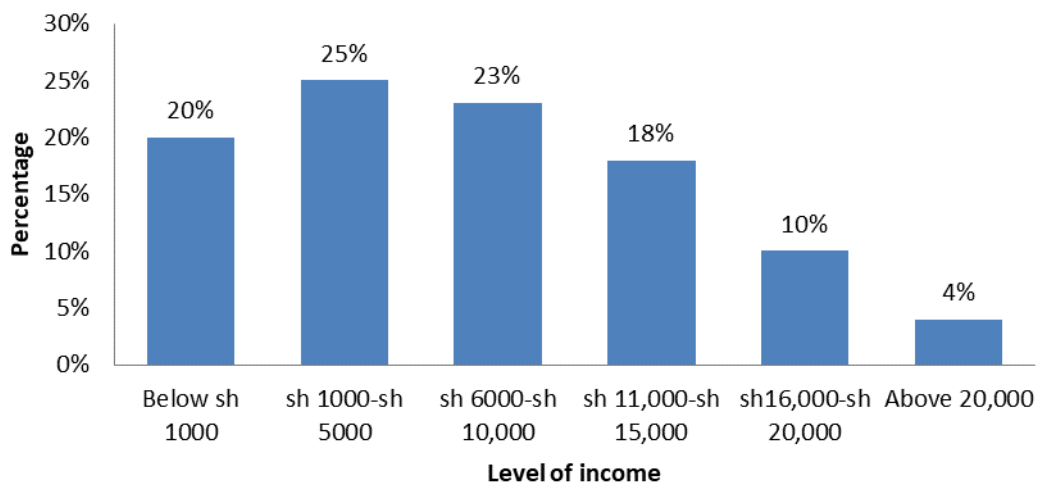
Figure 4.7: Distribution of respondents by level of income

4.3.4 Distribution of respondents by Health care Insurance (NHIF)

Majority, 85% of the study respondents did not have any health care insurance, (figure 4.8)
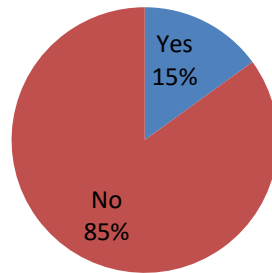
Figure 4.8: Distribution of respondents by health care insurance

4.4 Lifestyle Information

4.4.1 Distribution of study respondents by tobacco smoking status

In this study, 26% of the study respondents were current smokers while 8% were former smokers, (figure 4.9)
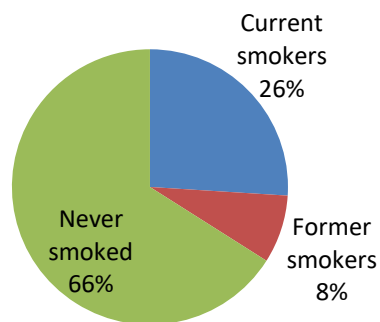
Figure 4.9: Distribution of respondents by tobacco smoking status

4.4.2 Distribution of study respondents by type of tobacco used

Majority, 52% of the study respondents used kuber (smokeless tobacco), 23% smoked cigarettes while 19% smoked hand rolled cigarettes, (figure 4.10)
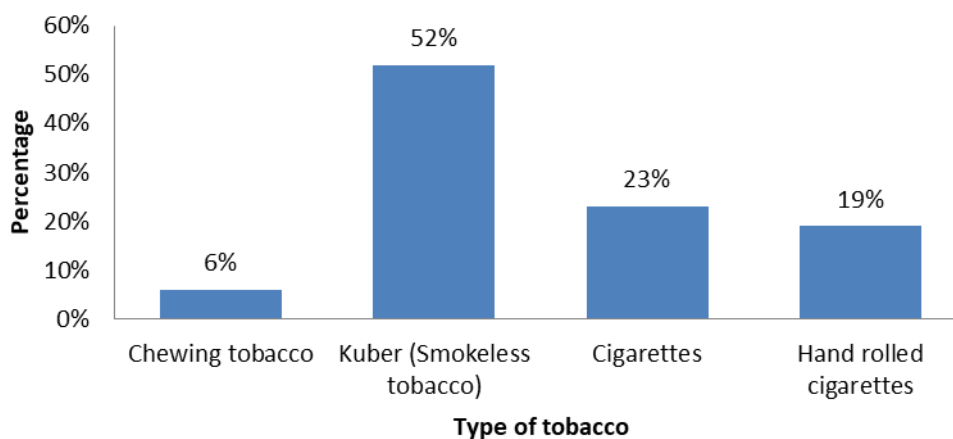
Figure 4.10: Distribution of study respondents by type of tobacco used

4.4.3 Distribution of study respondents by alcohol consumption status

In this study, 56% of the study respondents were current alcohol consumers while 7% were former alcohol consumers, (figure 4.11).
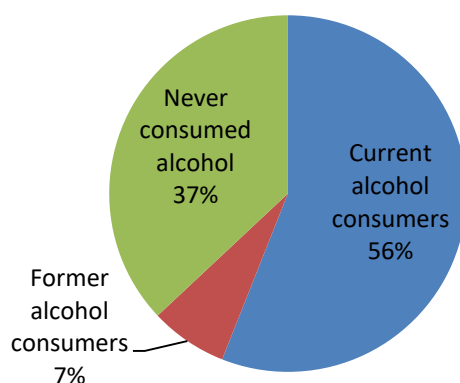
Figure 4.11: Distribution of respondents by alcohol consumption status

4.4.4 Distribution of study respondents by type of alcoholic drink consumed

In this study, 47% of the study respondents consumed spirits and gins, 34% consumed beer, and 10% consumed whisky while 9% consumed traditional alcoholic drinks, (figure 4.12)
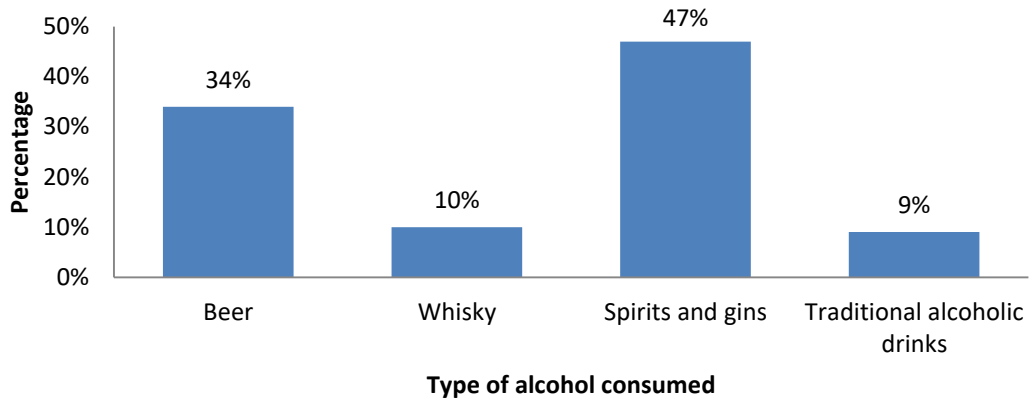
Figure 4.12: Distribution of study respondents by type of alcohol drinks consumed

4.4.5 Distribution of respondents by Miraa (khat) chewing

Majority, 88% of the study respondents chewed Miraa, (figure 4.13)
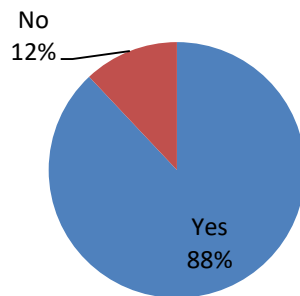
Figure 4.13: Distribution of respondents by Miraa chewing

4.4.6 Substances used to chew Miraa with

In this study, 34% chewed Miraa with sweets (candy), 30% chewed with sugary tea/coffee and 20% chewed with soda/soft drinks, (figure 4.14)
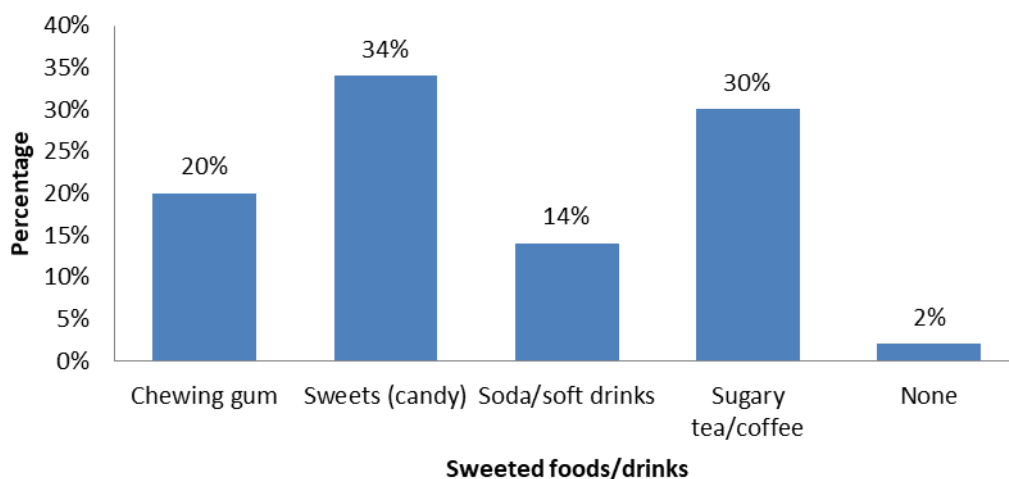
Figure 4.14 Substances used to chew Miraa with

4.4.7 Distribution of respondents by frequency of teeth cleaning

Majority, 51% of the respondents cleaned their teeth sometimes while 11% had never cleaned their teeth, (figure 4.15)
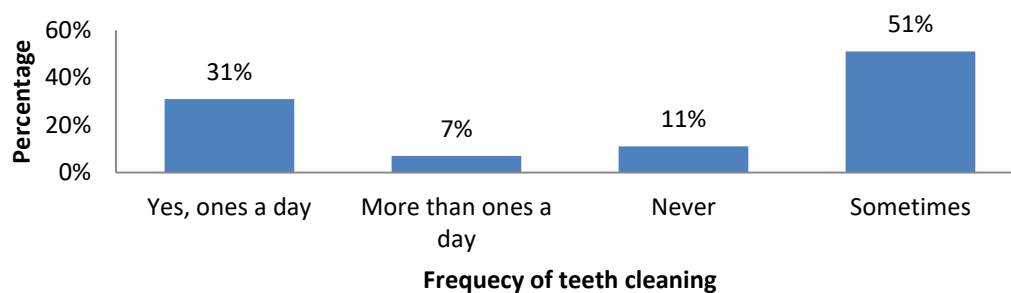
Figure 4.15: Distribution of respondents by frequency of teeth cleaning

4.4.8 Distribution of respondents by oral hygiene aids

Forty seven percent of the study respondents used toothbrush for teeth cleaning while 12% used charcoal for teeth cleaning, (figure 4.16)
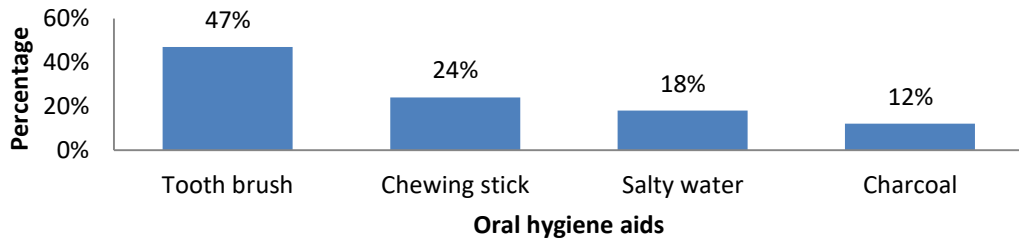
Figure 4.16: Distribution of respondents by oral hygiene aids

4.4.9 Distribution of respondents by visit to the dentist within last 12 months

Majority, 62% of the study respondents had not visited the dentist within the last 12 months, (figure 4.17).
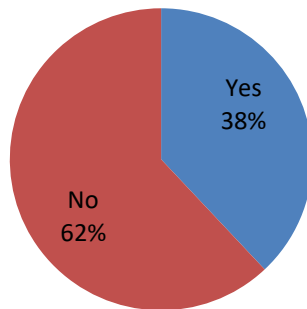
Figure 4.17: Distribution of respondents by visit to the dentist within the last 12 months

4.5 Cariogenic foods

4.5.1 Distribution of respondents by frequency of consuming cariogenic foods

Majority, 54% of the respondents consumed sugary tea/coffee on daily basis and then followed by cakes/biscuits, (table 4.2)

Table 4.2: Distribution of respondents by frequency of consuming cariogenic foods

Food/drink	Daily	3-6 times a week	Less than twice a week	Never
Sweets (candy)	22%	18%	10%	50%
Cakes/biscuits	31%	38%	24%	7%
Chewing gum	14%	20%	32%	34%
Chocolate	–	27%	19%	54%
Soda or other soft drink	11%	42%	47%	–
Sugary tea/coffee	54%	22%	20%	4%

4.5.2 Frequency of mouth washing after eating sweetened foods (cariogenic foods)
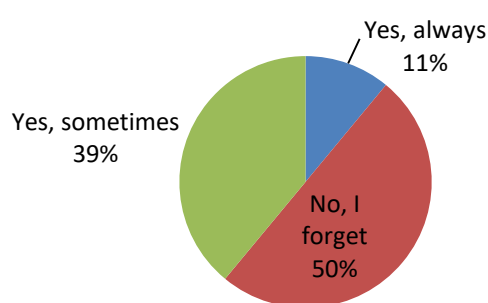
Figure 4.18: Frequency of mouth washing after eating sweetened foods (cariogenic foods)

4.6 Prevalence of Dental caries and Periodontal disease (gum disease)

4.6.1 Prevalence of dental caries among the study respondents

In this study finding it was revealed that the prevalence of dental caries was 62%, (table 4.3)

Table 4.3: Prevalence of dental caries among the study respondents

Gender	Caries tooth	Cariesfree subject	Total subject examined
Male	40%	14%	54%
Female	22%	24%	46%
Total	**62%**	**38%**	**100%**

4.6.2 Prevalence of periodontal disease (gum disease) among the study respondents

In this study finding it was revealed that the prevalence of periodontal disease was 47%, (table 4.4)

Table 4.4: Prevalence of gum disease among the study respondents

Score	Variable	Frequency	Percentage
0	Absence of periodontal disease	180	53%
1	Shallow pocket (4-5mm)	92	27%
2	Deep pocket (6mm)	68	20%

4.6.3 Distribution of respondents by number of teeth extracted due to dental problem

In this study, 48% of the study respondents had been extracted more than 5 teeth due to a dental problem, (figure 4.19)
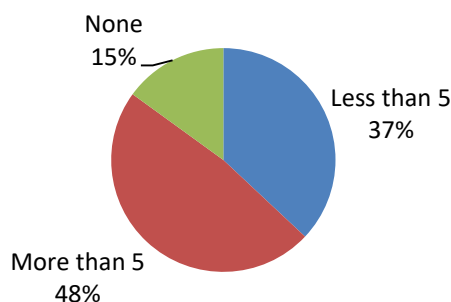
Figure 4.19: Distribution of respondents by number of teeth extracted due to dental problem

4.6.4 Oral Health Status

In this study findings, after calculation of the Simplified Oral Hygiene Index (OHI-S), it was revealed that majority, 80% of the respondents have a poor oral health status, (table 4.5)

Table 4.5: Oral Health Status

OHI-S score	Rating scale	Frequency	Percentage
0-0.9	Good	10	3%
1.0-1.9	Fair	58	17%
2.0-6.0	Poor	272	80%

4.7 Measures of association

4.7.1 Dental caries bivariate analysis by chi-square test

From the table 4.6 below, it can be seen that the factors which had a significant association (P<0.05) with the prevalence of dental caries include; age, gender, level

of education, income, Health care insurance, tobacco use, alcoholism and Miraa chewing.

Table 4.6: Dental caries bivariate and multivariate analysis

Factor	With Dental caries	Caries free	AOR (95% CI)	P-value
Age			0.024 (0.006-0.095)	0.004
18-22 years	21(6.1%)	13(3.9%)		
23-27 years	149(43.9%)	27(8.1%)		
28-32 years	32(9.4%)	70(20.6%)		
33-35 years	9(2.8%)	17(5%)		
Gender			0.211 (0.041-0.130)	0.002
Male	136(40%)	48(14%)		
Female	75(22%)	82(24%)		
Religious affiliations			0.751 (0.027-2.031)	0.412
Christian	121(35.5%)	57(16.7%)		
Muslim	58(17.2%)	34(10%)		
Hindu	7(2.2%)	6(1.7%)		
None	24(7.2%)	32(9.4%)		
Marital status			2.604 (1.192-3.141)	0.073
Married	53(15.6%)	41(12.2%)		
Single	123(36.1%)	55(16.1%)		
Divorced	6(1.7%)	2(0.6%)		
Separated	17(5%)	24(7.2%)		
Widowed	13(3.9%)	6(1.7%)		
Place of residence			0.034 (0.276-0.821)	0.004
Urban	89(26.1%)	21(6.1%)		
Rural	123(36.1%)	108(31.7%)		
Level of education			0.027 (0.006-0.095)	<0.001
Primary school	151(44.4%)	104(30.6%)		
Secondary school	40(11.7%)	7(2.2%)		
College/University	9(2.8%)	15(4.4%)		
No formal education	11(3.3%)	2(0.6%)		
Income			2.451 (1.274-4.012)	<0.001
Below sh 1000	49(14.4%)	19(5.6%)		
Sh 1000-sh 5000	64(18.9%)	21(6.1%)		
Sh 6000-sh 10,000	58(17.2%)	19(5.6%)		
Sh 11,000-sh 15,000	19(5.6%)	41(12.2%)		
Sh 16,000-sh 20,000	13(3.9%)	21(6.1%)		
Above sh 20,000	7(2.2%)	7(2.2%)		
Health Care Insurance			2.118(0.791-5.817)	<0.001
Yes	15(4.4%)	36(10.6%)		
No	196(57.8%)	92(27.2%)		
Tobacco use			2.657 (0.724-14.141)	<0.001
Yes	111(32.6%)	6(1.8%)		
No	100(29.4%)	125(36.7%)		
Alcoholism			0.017 (0.004-0.071)	<0.001
Yes	147(43.3%)	66(19.4%)		
No	64(18.9%)	62(18.3%)		
Miraa chewing			0.279 (0.125-0.518)	<0.001
Chewing Miraa with sweeteners	174(51.1%)	11(3.3%)		
Chewing Miraa with no sweeteners	23(6.7%)	91(26.7%)		
Did not chew Miraa	15(4.4%)	26(7.8%)		

*Significant at p<0.05

4.7.2 Periodontal disease (gum disease) bivariate analysis by chi-square test

From the table 4.7 below, it can be seen that the factors which significant association (P<0.05) with the prevalence of periodontal disease (gum disease) include the following; age, gender, level of education, income, tobacco use, alcoholism and Miraa chewing.

Table 4.7: Periodontal disease (gum disease) bivariate and multivariate analysis by chi-square test

Factor	With Periodontal disease	No Periodontal disease	AOR (95% CI)	P-value
Age			0.027 (0.006-.0.074	0.003
18-22 years	17(5%)	17(5%)		
23-27 years	96(28.3%)	81(23.9%)		
28-32 years	34(10%)	68(20%)		
33-35 years	13(3.9%)	13(3.9%)		
Gender			3.579 (1.756-7.334)	0.002
Male	117(34.4%)	66(19.4%)		
Female	43(12.8%)	113(33.3%)		
Religious affiliations			0.952 (0.357-2.011)	0.174
Christian	51(15%)	126(37.2%)		
Muslim	66(19.4%)	26(7.8%)		
Hindu	7(2.2%)	6(1.7%)		
None	36(10.6%)	21(6.1%)		
Marital status			0.813 (0.310-2.206)	0.156
Married	55(16.1%)	40(11.7%)		
Single	72(21.1%)	106(31.1%)		
Divorced	2(0.6%)	6(1.7%)		
Separated	26(7.8%)	15(4.4%)		
Widowed	6(1.7%)	13(3.9%)		
Place of residence			0.877 (0.294-2.151)	0.164
Urban	75(22.2%)	34(10%)		
Rural	85(25%)	146(42.8%)		
Level of education			0.041 (0.004-0.071)	<0.001
Primary school	119(35%)	136(40%)		
Secondary	26(7.8%)	21(6.1%)		

school				
College/University	6(1.7%)	19(5.6%)		
No formal education	9(2.8%)	4(1.1%)		
Income			0.117 (0.125-0.087)	<0.001
Below sh 1000	40(11.7%)	28(8.3%)		
Sh 1000-sh 5000	34(10%)	51(15%)		
Sh 6000-sh 10,000	28(8.3%)	49(14.4%)		
Sh 11,000-sh 15,000	26(7.8%)	34(10%)		
Sh 16,000-sh 20,000	19(5.6%)	15(4.4%)		
Above sh 20,000	13(3.9%)	2(0.6%)		
Health Care Insurance			3.650 (1.512-6.628)	<0.001
Yes	21(6.1%)	30(8.9%)		
No	140(41.1%)	149(43.9%)		
Tobacco use			0.018 (0.006-0.071)	<0.001
Yes	100(29.4%)	15(4.4%)		
No	60(17.8%)	164(48.3%)		
Alcoholism			0.015 (0.004-0.015)	<0.001
Yes	94(27.8%)	58(17.2%)		
No	66(19.4%)	121(35.6%)		
Miraa chewing			0.261 (0.131-0.527)	<0.001
Chewing Miraa with sweeteners	121(35.5%)	75(22%)		
Chewing Miraa with no sweeteners	14(4.1%)	89(26.2%)		
Did not chew Miraa	25(7.4%)	16(4.7%)		

*Significant at p<0.05

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-demographic characteristics of the study respondents

The mean age of study respondents was 27($\pm$3) years. Majority, 52% of the study respondents were aged 23-27 years, while 30% were aged 28-32 years and the least were aged 33-35 years at 8%. The study findings revealed that tooth loss tended to increase significantly with age among the study respondents while vulnerability to dental caries and periodontal diseases tended to increase significantly among the younger youths as compared to the older youths. The findings were in agreement with a study conducted by Amarasema *et al.,* 2011, in order to explore the socio-demographic factors associated with tooth loss in rural inhabitants of Sri Lanka. The study findings revealed that tooth loss increased significantly with age. In these study findings it was revealed that majority, 54% of the study respondents were male, while 46% were female. There was a strong significant association (P<0.05) between gender and the risk to dental caries and periodontal diseases. This is because the male had a higher prevalence of dental caries (40%) and periodontal disease (34.4%) as compared to the females at dental caries (22%) and periodontal diseases (12.8%) respectively. Majority, 52% of the study respondents were single while 28% were married. There was no significant association between the marital status of the respondents and the risk to dental caries and periodontal diseases. According to these study findings, majority, 68% of the respondents were rural inhabitants while 32% resided in the urban areas. Furthermore, the study findings revealed that mean number of decayed teeth (DT) in rural areas was higher than that in the urban areas, while the mean number of filled teeth (FT) in rural areas was lower than that in the urban areas. It was revealed that young adults living in rural areas were more likely to report having unmet dental care needs and were less likely to have had a dental visit in the past year compared with young adults living in the urban areas. These finding was in concordant with a study conducted by Vargas *et al.*, 2011 who revealed that Caries experience was more probable to be greater among young adults

residing in rural areas. Hence, they established that oral health differences existed among young adults living in rural and urban areas.

5.1.2 Socio-economic characteristics of the study respondents

The level of high education among the study respondents was significantly low with the majority, 75% of the respondents attaining primary school level of education, 14% secondary school education and only 7% attaining college/university level of education. Additionally, it was revealed that the girls had a higher and better education level as compared to the boys. There was a low transition of boys from primary school to secondary school as compared to the girls. The researcher sought further explanation on why boys were dropping out of school more than girls and it was revealed that boys drop out of school to pick Miraa an activity which does not favour girls since it was a taboo for girls to climb trees. The money from Miraa lured boys out of school. The other reason given was that initiation led for demand for more freedom and that caused rebellion and subsequent dropout from school. Traditionally, the boys after initiation were entitled to inheritance of fathers' property and that led to lack of concentration in school and subsequent dropout from school. The level of income among the study respondents was revealed that 23% of the respondents had a monthly income of sh 6000-sh 10,000 while 20% had below sh 1000 and 4% had above sh 20,000. Furthermore, the researcher revealed that the respondents who did not have health care insurance had a higher prevalence of dental caries and periodontal diseases at 57.8% and 41.1% respectively. The level of education and the level of income both had a strong association with the oral health. These findings were in agreement with a study conducted by Thomas *et al.,* 2011 on "oral and dental health care practices in pregnant women in Australia" which revealed that Women with lower education level and lower socio-economic status were more probable to be at higher risk of poor periodontal health as associated with women with higher levels of education and higher socio-economic status (Thomas *et al.*, 2011). A parallel study was conducted by Turrell *et al.*, 2009 in Brisbane Australia. They found out those respondents with low levels of education and those from a low income household reported poorer oral health.

5.1.3 Lifestyle characteristics of the study respondents

In this study, 26% of the study respondents were current tobacco smokers while 8% were former tobacco smokers. Kuber was the most common type of tobacco used by the study respondents. This was a smokeless form of tobacco which was abused by placing it under the lower lip. Kuber is alleged to contain more nicotine content than cigarette (NACADA report, 2019). Current smokers were less likely to have visited a dentist in the past 12 months and also more likely to have stained teeth, experienced teeth sensitivity, tooth ache and also had gum bleeding. There was strong significant association (P<0.001) between smoking and poor oral health among the study respondents. These finding was in consent with a study by WHO which revealed that 90% of individuals with malignancy of the mouth, lips, tongue and throat use tobacco, and the risk of developing these cancers rise with the amount smoked or chewed and the extent of the habit. Furthermore, it was revealed that the respondents who smoked were more prone to periodontal disease (gum disease). The gums affected because of smoking had a lack of oxygen in bloodstream hence causing the infected gums not to heal easily. This finding was in concordant with a study conducted by CDC which revealed that individuals who smoke less than 10 cigarettes per day are two times more likely to develop gum disease (CDC, 2017). In this study, 56% of the study respondents were current alcohol consumers while 7% were former alcohol consumers. The researcher further discovered that the risk of oral diseases increased when alcohol was consumed along with cigarettes. This was in agreement with a study conducted by Mahesh *et al.*, 2017 which revealed that alcoholics are at high risk of developing dental caries, gingival diseases and may suffer from oropharyngeal cancers (Mahesh *et al.*, 2017). In this study, 88% of the study respondents chewed Miraa (khat) while 12% did not. Respondents who chewed Miraa with no cariogenic foods and regularly brushed teeth were found to have a better oral health as compared to the respondents who chewed Miraa with cariogenic foods. The fluoride content in Miraa did not have any link with the dental caries. This finding concurred by a study conducted by El-Wajeh *et al.*, 2009 which revealed that Khat in itself is considered to be non-cariogenic and the way it is used is suggested to have a cleansing effect on the teeth with a potential to lower dental caries rate among users (El-Wajeh *et al.*, 2009). However, in this study, the high

prevalence of dental caries and periodontal diseases among the khat users could be explained by the fact that majority of the respondents 51.1% with dental caries and 33.9% with gum diseases among the khat chewers used sweeteners (cariogenic foods) to chew Miraa with so as to counteract the bitter taste of Miraa in the mouth during chewing. Furthermore, majority of the youths kept khat bolus in the mouth throughout the day and night since most of them were in the khat business. Brushing of teeth among the study respondents was very rare since most of them were in a 24-hour khat business which they gave more attention as compared to their oral health. In this study, 87% of the khat chewers had dental staining whereas no staining was noted among the non-chewers, indicating a significant association between the khat chewing and staining of teeth. Moreover, the observed dental staining among the Miraa chewers was found to be independent of the habit of smoking tobacco.

5.1.4 Prevalence of dental caries

In these study findings it was revealed that the prevalence of dental caries was 62%. This finding was in line with a study done by (Smyth *et al.*, 2010) and (Ferro *et al.*, 2011) who revealed that countries such as Spain having a prevalence of 61% and mean DMFT 1.52 (Smyth *et al.*, 2010) whereas in Italy prevalence was 45% and mean DMFT was 1.44 (Ferro *et al.*, 2011). Additionally similar studies done Asia, Saudi Arabia found the prevalence of dental caries among 12-year-olds to be 68.9% (Amin and Al-Abad, 2017) while in Thailand the prevalence was 70% with a DMFT of 2.4 (WHO, 2014). Factors which had a significant association (P<0.05) with the prevalence of dental caries included; age, gender, level of education, income, Health care insurance, smoking, alcoholism and Miraa chewing.

5.1.5 Prevalence of Periodontal (gum diseases)

In these study findings it was revealed that the prevalence of periodontal disease was 47%. Deep pockets of more than 6mm were found in 20% of the respondents. Bleeding on gentle probing was found on 27% of the respondents examined. These findings were in concordant with studies in Morocco and West Africa which had a periodontal diseases prevalence of 84.2% respectively. Other studies for instance in Gambia showed a high proportion (80%) who are in need of complex periodontal

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treatment. Factors which had significant association (P<0.05) with the prevalence of periodontal disease (gum disease) included the following; age, gender, level of education, income, smoking, alcoholism and Miraa chewing.

5.2 Conclusion

Oral health status among the study respondents was poor. This was showed by calculation of the Simplified Oral Hygiene Index (OHI-S), which revealed that majority, 80% of the respondents have a poor oral health status.

The prevalence of dental caries among the study respondents was very high with the majority (85%) of the respondents having lost their teeth due to a dental problem.

The prevalence of periodontal disease among the respondents was high with most of them diagnosed with plaque, dental calculus and gum bleeding on dental probing. This current health situation is of major public health significance and needs urgent attention.

Age, gender, level of education, income and health care insurance were found to be significantly associated with the prevalence dental caries and periodontal diseases among the study population.

Tobacco use, alcoholism and Miraa chewing were found to be significantly associated with the prevalence of dental caries and periodontal diseases among the study population.

Many of the study respondents claimed to brush their teeth but this was not reflected in the teeth mortality as it was very high. It can be concluded that teeth brushing was not done effectively.

Lack or breakdown of facilities for dental procedures in most public hospitals contributed to poor oral health status among the study respondents.

5.3 Recommendations

➤ The youths should be encouraged on brushing teeth at least twice a day, avoiding risk factors such as tobacco use, alcoholism and chewing Miraa with cariogenic foods. Brushing of teeth should highly be recommended among the Miraa chewers especially at night to avoid keeping of khat bolus.

➤ The County Government to enforce existing laws and regulations about use of tobacco products and alcohol sales and service.

➤ The County Government and the community leaders to develop community coalitions that build partnerships between schools, faith-based organizations, law enforcement, health care and public health agencies to reduce excessive alcohol use.

➤ The County Government in collaboration with the Public Health department should create awareness among the youths on the importance of regular dental check-ups as part of preventive measures and teaching good habit on oral hygiene.

➤ The County Government to adopt a health systems approach that focuses on promoting and integrating clinical best practices (behavioural and pharmacological) which help tobacco dependent consumers increase their chance of quitting successfully.

➤ The County Government should carry out oral health promotion in the rural areas.

➤ Due to the high school drop outs in the region, community mobilization programmes are essential in the region to sensitive the youths on the importance of education. This should be carried out through seminars, workshops for youths, parents, leaders and other influential members of the community.

➤ The County Government should equip the public hospitals with proper and working dental facilities and to repair the damaged ones. The youths to be encouraged to utilise the available dental services.

➤ The County Government in collaboration with the National Government to create jobs among the youths so as to reduce Miraa dependency and also reduce school drop outs.

➢ Oral health should be incorporated into other health programmes especially primary health care.

5.4 Suggestions for further research

Based on the findings of the current study the researcher made the following suggestions for further research:

- The extent of drug abuse among the youths in Igembe Sub-Counties.
- The prevalence of oropharyngeal cancer among the Miraa chewers in Igembe Sub-Counties.
- The impact of Miraa farming on boy-child education in Igembe Sub-Counties.

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Appendix I: Photographs

a) Severe Dental Caries

(b) Dental caries and teeth staining.

(c) Periodontal gum disease

(d) Severe gum disease

Appendix II: Informed Co Explanation and Consent Form

Study Title: Oral health status and its associated factors among the youth in Igembe sub-county, Meru County.

Investigator: Dennis Munene Miriti

Institutional affiliation: Kenya Medical Research Institute (KEMRI) and Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Introduction

Good morning/Afternoon, my name is Dennis Munene Miriti, a student at Itromid KEMRI. I am conducting a study on the oral health status and its associated factors among the youth in Igembe sub-county, Meru County. I would like to seek your permission and consent before conducting this study. I would be very glad if you accept my request to volunteer as a participant in my study. Please read the consent form below.

Being in the study is your choice

The purpose of this form is to obtain your consent to participate. If you choose to participate, a questionnaire will be administered to you and the interview will take between 10 and 20 minutes to complete. Participation is entirely voluntary and you can choose not to answer any individual question or all of the questions or withdraw from the study at any time. However, we hope you will participate in this interview since your views are very important.

Data security and confidentiality

All information obtained by research team will be used in confidence for the sole purpose of this research only and it will be strictly confidential and data password protected only accessed by the Principal Investigator (PI).

Information about the research and researcher

If you require any additional information regarding the researcher, please contact:

Dr Dennis Magu

Telephone no: 0722574388

magudennis@gmail.com

JKUAT

Or

Dr Benjamin Ngugi

Telephone no: 0722700688

Center for Microbiology Research

KEMRI

Information on the KNH-UoN ERC

If you would like to contact the KNH-UoN Ethics and Research Committee, regarding any aspects of this study, the contacts include: P.O Box 19676 Code 00202, Tel. (254-020) 2726300-9 Ext 44355. Email: uonknh-erc@uonbi.ac.ke, Website www.erc.uonbi.ac.ke

<div align="center">

Certificate of Consent

</div>

I have read the above information. I have been given the opportunity to ask questions and the questions have been answered satisfactorily. I agree to participate in the study.

Name of participant……………………………………………………………….

Signature of participant………………………………………………………………

Date…………………………………………………………………………………

Signature of researcher

I have explained the research to the participant and answered his/her questions to the best of my ability. I confirm that consent has been given freely

Name of researcher……………………………………………………………

Signature of researcher………………………………………………………..

Date……………………………………………………………………………

Appendix III: Questionnaire

ORAL HEALTH STATUS AND ITS ASSOCIATED FACTORS AMONG THE YOUTH IN IGEMBE SUB-COUNTY, MERU COUNTY.

INTRODUCTION

The purpose is purely academic. No name will be written on this form to ensure confidentiality. Your willingness to participate in this study will be highly appreciated.

Section A: Socio-demographic Information (tick where appropriate)

1. Age

18-22 years ☐

23-27 years ☐

28-32 years ☐

33-35 years ☐

2. Gender

Male ☐

Female ☐

3. Religion

Christian ☐

Muslim ☐

Hindu ☐

Other(s) specify………………

4. Marital status

Married ☐

Single ☐

Divorced ☐

Separated ☐

Widowed ☐

5. Place of residence

Urban ☐

Rural ☐

Section B: Socio-economic factors

6. Highest level of education attained

Primary school ☐

Secondary school ☐

College/University ☐

No formal education ☐

7. Occupation

Farmer ☐

Business ☐

Casual ☐

Formal employment ☐

None ☐

8. Income per month

Below sh 30, 000 ☐

Sh 30,000-sh 60,000 ☐

Sh 60,000-sh 90,000 ☐

Sh 90, 000 and above ☐

9. Do you have a health care insurance?

Yes ☐   No ☐

Section C: Lifestyle factors

10. Do you smoke or use tobacco in any form?

Yes ☐   No ☐

11. If yes, what form of tobacco do you use?

Chewing tobacco ☐

Kuber (smokeless tobacco) ☐

Cigarettes ☐

Hand rolled cigarettes ☐

12. Do you drink alcohol?

Yes ☐   No ☐

13. If yes, what type of alcoholic drink?

Beer ☐

Whisky ☐

Spirits and gins ☐

Traditional alcoholic drinks ☐

14. Do you chew Miraa?

Yes ☐   No ☐

15. If yes, how long have you chewed Miraa?

Less than 5 years ☐

More than 5 years ☐

16. What do you chew Miraa with?

Chewing gums ☐

Sweets ☐

Soda ☐

Sugary tea/Coffee ☐

None ☐

Other(s) specify………..

17. How often do you clean your teeth?

Never ☐

Sometimes ☐

Once a day ☐

More than once a day ☐

18. What do you use to clean your teeth?

Tooth brush ☐

Chewing stick ☐

Salty water ☐

Charcoal ☐

Other(s) specify……….

19. Have you ever visited a dentist within the last 12 months?

Yes ☐   No ☐

20. If yes, what was the reason for your visit?

My tooth was aching ☐

My gums were bleeding ☐

My teeth were growing badly ☐

For a check up ☐

Other(s) specify……………….

Section D: Dietary practices

21. How often do you eat the following foods?

Food/Drink	Daily	3-6 times a week	Less than twice a week	Never
Sweets				
Cakes/Biscuits				
Chewing gum				
Chocolate				
Soda or other soft drinks				
Sugary tea/Coffee				

22. Do you wash your mouth after eating/drinking sweetens (food/drink)?

Yes always ☐   No ☐   Yes but sometimes ☐

Section E: Prevalence of oral health status

23. Have you ever had a dental problem?

Yes ☐   No ☐

24. If yes, what was it?

Dental caries (tooth decay)   ☐

Gum disease   ☐

Teeth discolouration   ☐

Oral mucosal lesions   ☐

Tooth wear   ☐

Other(s) specify………………..

25. How many Teeth have you extracted due to dental problem?

Less than 5   ☐

More than 5   ☐

26. How would you describe the health of your teeth and gums in general?

Excellent   ☐

Good   ☐

Fair   ☐

Poor   ☐

I don't know   ☐

THANK YOU FOR YOUR PARTICIPATION

Appendix III: Oral Health Assessment Form

World Health Organization
Oral Health Assessment Form
for Adults, 2013

Leave blank	Year	Month	Day	Identification No.	Orig/Dupl	Examiner
(1) (4)	(5)		(10)	(11) (14)	(15)	(16) (17)

General information:

(Name)

Sex 1=M, 2=F (18) (19)   Date of birth (24)   Age in years (25) (26)

Ethnic group (27) (28)   Other group (29) (30)   Years in school (31) (32)   Occupation (33)

Community (geographical location) (34) (35)   Location Urban (1) Periurban (2) Rural (3) (36)

Other data (37) (38)   Other data (39) (40)

Other data (41) (42)   Extra-oral examination (43) (44)

Dentition status

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Crown (45)																	(60)
Root (61)																	(76)
Crown (77)																	(92)
Root (93)																	(108)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Permanent teeth

Status

0 = Sound
1 = Caries
2 = Filled w/caries
3 = Filled, no caries
4 = Missing due to caries
5 = Missing for any another reason
6 = Fissure sealant
7 = Fixed dental prosthesis/crown abutment, veneer, implant
8 = Unerupted
9 = Not recorded

Periodontal status (CPI Modified)

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Bleeding (109)																	(124)
Pocket (125)																	(140)
Bleeding (141)																	(156)
Pocket (157)																	(172)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Gingival bleeding

Score
0 = Absence of condition
1 = Presence of condition
9 = Tooth excluded
X = Tooth not present

Pocket

Score
0 = Absence of condition
1 = Pocket 4–5 mm
2 = Pocket 6 mm or more
9 = Tooth excluded
X = Tooth not present

Appendix IV: Ethical Form

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC http://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/109

28th March, 2019

Dennis Munene Miriti
Reg. No.HSh315-0029/2017
School of Public Health
College of Health Sciences (CoHES)
J.K.U.A.T

Dear Dennis

RESEARCH PROPOSAL: ORAL HEALTH STATUS AND ITS ASSOCIATED FACTORS AMONG THE YOUTH IN IGEMBE
CONSTITUENCY, MERU COUNTY   (P892/12/2018)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and
approved your above research proposal. The approval period is 28th March 2019 – 27th March 2020.

This approval is subject to compliance with the following requirements:

a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN
   ERC before implementation.
c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events
   whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of
   notification.
d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study
   participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72
   hours.
e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of
   shipment.
f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period.
   (*Attach a comprehensive progress report to support the renewal*).
g. Submission of an *executive summary* report within 90 days upon completion of the study.
   This information will form part of the data base that will be consulted in future when processing related
   research studies so as to minimize chances of study duplication and/ or plagiarism.

Protect to discover

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Appendix V: Publication One

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Appendix VI: Publication Two

INTERNATIONAL PEER REVIEWED JOURNALS & BOOKS

This Certificate is granted to
Prof./Dr./Mr./Ms.
Dennis Munene Miriti

and certifies the publication of the research paper entitled
ORAL HEALTH STATUS AND ITS ASSOCIATED
FACTORS AMONG THE YOUTH IN IGEMBE
SUB-COUNTY, MERU COUNTY

in
Journal of Health, Medicine and Nursing

Volume _5_ **Issue** _1_ **Year** _2020_

Dr. John Schumpeter
Chief Editor
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Appendix VII: Seminar Presentation One

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
SCHOOL OF PUBLIC HEALTH

MINUTES FOR POST GRADUATE PRESENTATIONS

DATE: 31st January, 2020 : VENUE: COHES BOARDROOM

ATTENDEES

PANELISTS

1. Dr. John Gachohi – Lectuer, School of Public Health: Session Chair 2
2. Prof. Gideon Kikuvi – Prof. School of Public Health
3. Prof. Kenneth Ngure – COD, Community Health and Development
4. Dr. Jackline Nyaberi - Lecturer, School of Public Health-Session Chair 1
5. Dr. Denis Magu- Sr. Lecturer, School of Public Health
6. Ms. Caroline Musita- Lecturer. School of Public Health
7. Mr. Peter Ng'ang'a- Tutorial Fellow. School of Public Health
8. Mr. Martin Ogwang'- Tutorial Fellow. School of Public Health

STUDENTS

1. Boniface Wachira
2. David Muriithi Nyaga
3. Cathra Abdi
4. Dennis Munene Miriti
5. Peter Kirimi Mwiti
6. Silvia M Ngugi
7. Cyrus Mutie Paul
8. Peter Ndirangu Githune
9. Gilbert Obegi
10. Samson Anangwe
11. Felix Bahati
12. Joyce Wanjira
13. Daniel Kimani
14. Kunjok David Majuch
15. Haneefa Kasim
16. Joan Wangui
17. Christine W Gikonyo
18. Jackson Chakaya

Postgraduate Coordinator: Dr. Jackline Nyaberi - Lecturer. SOPH : Signature: _____ Date: 31 JAN 2020

Ag. COD, : Mr. Aggrey Mokaya : Signature: _____ Date: 31/01/20

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The meeting was opened with a word of prayer from Mr. Felix Bahati.

The chairpersons were Dr. Jackline Nyaberi and Dr. John Gachohi . The presentations were for thesis and research proposals for both PhD and Masters students for the Public Health and Epidemiology programs.

It was emphasized that for future presentations, every students will need to provide evidence of clearance by their supervisors.

Postgraduate Coordinator: Dr. Jackline Nyaberi - Lecturer. SOPH : Signature: 31/1/2020 Date: 31/1/20 20

Ag. COD, : Mr. Aggrey Mokaya : Signature: _____ Date: 31/1/20 .

3. Dennis Munene Miriti HSH315-0029/2017 (Master of Science in Epidemiology) THESIS SEMINAR I

Oral Health Status and its associated factors among the youth in Igembe Constituency, Meru County

- What's the difference between specific objective 1 and 2?
- On the sample size determination, how was 340 calculated?
- The prevalence used is for which condition? Objective 1 or 2?
- Since there are two conditions, is the 67% applicable to both objective 1 and 2?
- The challenge of using two conditions in one study, what prevalence will be used to calculate the sample size
- For both conditions, use the maximum that can be used....which is 385
- In the thesis, there are lots of prevalence documented
- What was the definition of a strata?
- Its impossible to use a national prevalence figure to calculate for a constituency
- On smoking, what do the study population smoke?
- Were you able to categorize the exposure ....on types of smoke, alcohol?
- Why did you conduct the study in a constituency? Is this conventional? Use sub-county instead of constituency
- Reconsider the objectives and include the oral health status objective
- Consider combining the prevalence objectives
- Objective 4 on dietary practices and lifestyle habits, the results need to be presented comprehensively
- The aspects of diet need to be removed, because what has been presented does not constitute diets
- On presentations of results, consider use of tables especially of multivariate analysis
- On high school drop-out, its not clear, what is the interpretation?
- Highest level of education does not relate to school dropout. Review
- How can the attribution of the food consumed to the dental caries be presented?
- Review how the dietary factors can contribute to the oral health
- In the presentation, use the six by six rule
- What did you do to the study participants whose photos have been presented? Did you do a follow-up to confirm they had received treatment ?
- Categorize /group the data.
- Was any multivariate analysis done ? If yes, in the presentation, include them to indicate how the conclusion was arrived at.

Verdict: Work with supervisors and proceed with manuscript development and submission, proceed to second thesis seminar

Supervisors: Dr. Dennis Magu (JKUAT Main Campus) and Dr. Benjamin Ngugi (Senior Research Officer, KEMRI)

Postgraduate Coordinator: Dr. Jackline Nyaberi - Lecturer, SOPH : Signature: Date: 31/1/2020

Ag. COD. : Mr. Aggrey Mokaya : Signature: Date: 31/0/20

Appendix VIII: Seminar Presentation Two

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

SCHOOL OF PUBLIC HEALTH

MINUTES FOR POST GRADUATE PRESENTATIONS

DATE: 11ˢᵗ March, 2020: VENUE: KENNET WEB CONFERENCE

ATTENDEES; PANELISTS

1. Prof. G. Kikuvi- Postgraduate coordinator
2. Dr. Susan Mambo – Chairman of Department, Department of Environmental Health and Disease Control
3. Ms. Elizabeth Kiilu- Lecturer, School of Public Health
4. Dr Dennis Magu – Senior lecturer, School of Public Health
5. Dr. Nzioki Mativo- Lecturer, School of Public Health
6. Dr. Daniel Mokaya – Lecturer, School of Public Health
7. Dr. John Gachohi - Lecturer, School of Public Health
8. Mr. Amos Olwendo- Lecturer, School of Public Health
9. Dr. Salome Wanyoike_ Parttime Lecturer
10. Dr. George Makaliwa- Lecturer Kisii CBD JKUAT Campus
11. Dr Elizabeth Otieno
12. Ms. Besty Cheriro
13. Dr Daniel Nyamongo
14. Dr George Kimathi

ABSENT WITH APOLOGY

1. Dr. Jackline Nyaberi- Lecturer, School of Public Health
2. Ms. Caroline Musita- Lecturer, School of Public Health

STUDENTS

1. Paul Mutie
2. Philip Tendet
3. Regan Chweya
4. Rosejoy
5. Motitikwa Everlyne
6. Mohammed Mumin
7. Moffat Onduko
8. Martha Nafula
9. Mahad DahirTuryare
10. Abdiwali
11. Abdulhamid Osman SALAH

12. Bashir Shire
13. Dabo
14. Dennis Munene Miriti
15. Edwin Muga
16. Felix Bahati
17. Jackline Njeri Kiarie
18. Lilian Nyanchama Nyanumba
19. Martin Owuor Ochieng
20. Motanya teresia
21. Motitikwa K. Everlyne
22. Stephen owende owoko

1. Preliminaries

The meeting was opened with a word of prayer from Dr. Daniel Mokaya

Dr Susan Mambo welcomed all the members and thanked them for their continuous support. She informed the members that Prof. Gideon Kikuvi had been appointed as the new post-graduate coordinator, taking over from Dr. Jackline Nyaberi who did a very good job whilst serving in the capacity of post-graduate coordinator.

2. Presentations

2.1 Ngonge Regan Chwega HSH315-1347/2017 Msc. Seminar 2

Occurrence of selected disease syndromes and associated utilization of community health care services among communities in Suna West Sub-county in Migori County, Kenya

- Relook where the association is if it is in the occurrence of the syndrome or in the utilization of community healthcare services.
- Align the title with the broad objective.
- Your study population is not clear and this was also mentioned in the first presentation
- Provide an explanation on the association between cemented floor and ILI. Check on the recommendation on "stagnant water within households" with respect to the definition of a household
- Inclusion criteria is not clear. Exclusion criteria is not excluding those not in your study.
- Objectivity of the case definition on the responses.
- Inclusion criteria bullet 2:- a member <18 parent assented. The minor assents after the parent gives permission. Check and correct.
- Conceptual framework was missing hence dependent and independent variable not clear
- Give information on how you selected the 'reference variable' in the data analysis
- In the discussion, you gave findings and their respective recommendations without giving much comparisons of other studies
- Domestic animals not Domesticate animals
- The power-points were not well done, rather copy paste of the word document

Verdict; Work with supervisors to address the issues raised, publish and submit thesis for examination

Supervisors: Dr. John Gachohi Mwangi and Dr. Susan Mambo

2.2 Martin Owour Ochieng HSH/311-1110/2017. Msc. Seminar 1

Level of adherence to antiretrovirals and associated factors among HIV positive patients aged 15 years and above attending selecting comprehensive care centers in Kibwezi West Sub-County, Makueni,

2.6 Dennis Munene Miriti Reg no: HSH315-0029/2017. Msc. Seminar 2

Oral Health Status and its associated factors among the youth in Igembe sub-county, Meru County.

Second seminar presentation.

- Improve justification to make it clear. Provide benefits that may accrue from the study outcomes who will benefit and in what way
- Indicate the prevalence used to calculate the sample size and provide reference
- Results: Specify the smoking being referred to eg tobacco smoking
- Types of alcohols should be Types of alcoholic drinks
- Photographs presented after conclusion should be presented in the relevant sections in the results section

Verdict: Proceed to submission of intent to submit thesis for examination

Supervisors: Dr Dennis Magu and Dr Benjamin Ngugi

Prepared by
Ms Elizabeth Kiilu_____ Date___12.3.21___

Approved by Coordinator Postgraduate Coordinator SoPH, JKUAT

1. Prof Gideon M. Kikuvi _____ Date 12-03-2021_____
2. Dr Susan Mambo COD, EH&DC _____ Date 25/08/21.

END