KNOWLEDGE, ATTITUDE AND USE OF SUGAR-FREE CHEWING GUM AMONG DENTAL AND MEDICAL STUDENTS AT THE UNIVERSITY OF NAIROBI

BY

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BDS LEVEL III

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DECLARATION

I, Mercy Murugi Njue, do hereby declare that this project is my original work and has not been submitted by any other person(s) in any other institution for the award of a degree or otherwise.

SIGN..........................DATE........31/10/11

SUBMISSION FOR APPROVAL

This research project has been submitted for examination with our approval as University of Nairobi supervisors.

DR. B N MUA
Signed..........................Date........31/10/11

DR AWANGE
Signed..........................Date...31 OCTOBER 2011
DEDICATION

To my loving parents, Mr. and Mrs. Njue, for their overwhelming support and prayers.

To my brothers and sister, with love.
ACKNOWLEDGEMENTS

I would like to thank the Almighty God for His grace without which, I would never have come this far.

I am also grateful to my two supervisors, Dr. B. N Mua and Dr. Awange. Your constant supervision, guidance, wisdom, time and encouragement throughout this research project was invaluable.

Finally, I would like to thank all the students from the School of Dental Sciences and the School of Medicine who took part in this research. You made the study possible. May God bless you abundantly.
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<td>University of Nairobi</td>
</tr>
<tr>
<td>BDS</td>
<td>Bachelor of Dental Sciences</td>
</tr>
<tr>
<td>KNH</td>
<td>Kenyatta National Hospital</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
</tr>
<tr>
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SUMMARY

INTRODUCTION: Gum chewing is a common practice all over the world. Sugar free chewing gum has been shown to have a lot of benefits to oral health. It stimulates saliva production, xylitol, which is a sweetening agent, has anticariogenic effects and it can be used as a vehicle for therapeutic agents. However, there is little use of sugar free chewing gum.

OBJECTIVE: To assess knowledge, attitude and use of sugar free chewing gum among medical and dental students at the University of Nairobi.

STUDY DESIGN: This was a cross-sectional study.

STUDY AREA: The study was conducted in the School of Dental Sciences and School of Medicine at the University of Nairobi.

STUDY PARTICIPANTS: A total of 313 undergraduate students from both schools were targeted.

METHODODOLOGY: Simple random sampling method was used to select a sample of three hundred and thirteen students. The sample size was calculated using an appropriate formula. 28 students were selected from the School of Dental Sciences and 285 students from the School of Medicine. Self administered questionnaires were distributed to all the selected 313 students. Variables of this study included degree course, knowledge on sugar free chewing gum, attitude towards use of sugar free chewing gum and the use of sugar free chewing gum. The data was analyzed using SPSS 17.0 and MS EXCEL software and presented using charts, tables and text.

RESULTS: A high percentage 211(74%) of the students reported using chewing gum with (55.4%) of these using sugared chewing gum, (15.8%) using sugar free chewing gum and (2.8%) using herbal chewing gum. 278(97.5%) knew that sugar free chewing gum has benefits to oral health and only 7(2.5%) did not know. Generally there was a good attitude towards sugar free chewing gum with 149(89.2%) reporting that there was a difference between sugared and sugar free chewing gum.

CONCLUSION: It was found that majority of the dental and medical students had basic knowledge about sugar free chewing gum. There was very little use of sugar free chewing gum with many of the students reporting that it was expensive and unavailable. Majority of the students had a good attitude towards sugar free chewing gum.

RECOMMENDATION: Use of sugar free chewing gum should be encouraged.
1.0 INTRODUCTION

Gum chewing is practised by many people all over the world. Gum is used for fighting bad breath or even bad habits such as smoking. 70% of the consumers are teenagers, and girls chew more gum than boys.2

Chewing a sugar free gum can increase the initial salivary flow rate of about 500ml per day by a factor of 10.3 In addition to the more effective clearance of carbohydrate from the mouth, stimulated saliva contains higher concentrations of remineralizing ions and bicarbonate to buffer the acids formed from plaque.4 It has also been shown that this stimulated saliva is more effective from its ability to buffer and remineralize. Research has shown that salivary stimulation from chewing sugar free gum after the consumption of sugary foods not only prevents the fall from plaque pH normally seen, but also results from an increased remineralizing effect from previously demineralised enamel.3

Chewing gum contributes to plaque reduction 7, and some studies have shown beneficial effects on oral hygiene and gingivitis.11 In addition to this, there is an increasing body of evidence emerging that chewing of sugar free gum can remineralize the tooth surface and help prevent caries.9

Chewing sugar free gum has been proven, from a number of clinical studies, to reduce caries by stimulating the production of saliva, which neutralizes the plaque acids that cause tooth decay. It has been calculated that people chewing sugar free gum three times a day reduce their risk of caries by 40% compared to those who do not chew gum.16 Studies have shown that chewing sugar free gum leads to fewer caries compared to non-chewing controls. The implication is that sugar free products actually inhibit caries’ activity due to dietary carbohydrate.3,15

Chewing gum not only acts as a salivary stimulant but may also be a useful vehicle for some agents such as fluoride, chlorhexidine and calcium phosphate. Moreover, in some countries gum containing nicotine has been used to substitute the nicotine from cigarettes to reduce the effects of nicotine withdrawal reaction from people attempting to stop smoking.6

Several substances have been incorporated in chewing gum for additional benefits. These include xylitol and sorbitol.8 Xylitol is believed to reduce incidence of dental caries according to a study done by Isokangas et al.12

Brushing is the most effective method of cleaning teeth. Nevertheless, a toothbrush can remove only 71-86% of deposits from tooth surfaces and 60-74% from the accessible proximal surfaces.17

Fundamentally, the use of dental floss or interproximal brush appears to provide an adjunct effect on interdental hygiene when associated with tooth brushing. However, the main problems with all interdental cleaning methods are the individual’s manual dexterity and motivation.
Chewing-gum may serve as an effective oral hygiene device when brushing may not be possible. Sugar-free gums are simple, inexpensive and are readily available.

Literature on the use of sugar free chewing gum among college students in Kenya is lacking hence the aim of this study was to determine the knowledge, attitude and use of sugar free gum among dental and medical students. The results would then be used to design programs for increasing the knowledge on oral health benefits of sugar free gum among the students. This may then spill over to the community as a means of enhancing the prevention of dental caries and periodontal diseases through the non-knowledgeable individuals.
2.0 LITERATURE REVIEW

For hundreds of years, people have chewed on natural materials including thickened resin and latex from certain trees, sweet grasses, leaves, grains and waxes. Ancient Greeks chewed gum thousands of years ago and were believed to chew tree resin taken from bark of the Mastic tree. William F Semple, an Ohio dentist, used rubber to create a product for jaw exercise and gum stimulation. He received the first patent to manufacture chewing gum from December 1869. Sugarless or sugar-free gums first entered the market in the early 1950s.

A study published in the Journal of Dental Research showed positive results of children chewing sugarless gum after meals with close to a 40 percent reduction of dental cavities compared to non-chewers.

A study done by Pradnya Kakodkar and Soniya Mulay on the effect of sugar-free gum in addition to tooth brushing on dental plaque gave the following results. The baseline percentages of cumulative plaque and interdental debris were 63.12% and 76.44%, respectively. There was no significant difference in the plaque scores following either water rinsing (61.73%) or gum chewing (59.44%) after meals, but a statistically significant reduction of 14.18% in interdental debris was observed among those who chewed the gum (p < 0.05). It was therefore concluded that after meals, gum chewing in addition to daily tooth brushing reduced interdental debris, but had no effect on established buccal and lingual dental plaques.

Studies have shown that daily chewing gum has beneficial effects. It increases salivary flow, raises the pH of plaque and saliva, reduces oral malodor and is effective for stain removal. Very few studies have examined the anti plaque effect of sugar-free chewing-gum and the results of these studies were variable. Some studies showed the anti plaque effect of chewing-gum, but other studies suggested that chewing sugar-free gum can reduce occlusal plaque but has no plaque inhibitory effect on smooth surfaces. Imfeld stated that chewing-gum can result in some reduction of debris, but little or no reduction of plaque.

Some studies claim that xylitol-sweetened gum had an anti-cariogenic effect. The evidence is strong enough to support the regular use of xylitol-sweetened gum as a way to prevent caries. There also is good evidence that when mothers of infants and young children chew xylitol-sweetened gum, it will block transmission of mutans streptococci from mother to child.

An increase in stimulated saliva flow has been associated with an increase in plaque pH and a higher salivary buffer capacity. Manning and Edgar (1993) reported that chewing sugar-free chewing gum directly after meals reduced the immediate plaque pH response and thus enhanced the potential of enamel remineralisation. Edgar and Geddes (1990) suggested further that the anti-cariogenic saliva effect may be further attributed to increased salivary bicarbonate, leading to higher buffer strength, as well
as to an increased supply of alkaline substrates to the plaque. Furthermore, an increase in salivary flow rate may significantly contribute to oral health through optimized cleansing of the tooth surface and to accelerated clearance of dietary sugars and plaque acids away from the tooth surface.\textsuperscript{5}

A study done by F Messina, A Saba, C Vollono on the beliefs and attitudes towards the consumption of sugar free products in a sample of Italian adolescents demonstrated inconsistencies between behavioral intention and consumption of sugar free products. This could be attributed to lack of information among Italian adolescents regarding sugar free products.\textsuperscript{20}
3.0 PROBLEM STATEMENT, JUSTIFICATION AND OBJECTIVES

3.1 PROBLEM STATEMENT

Dental caries is a bacteria disease in which diet is a major etiologic factor. Sugared gum is cariogenic. Ingestion of sugar plays a dominant role in caries etiology and caries-control strategies that aim to restrict exposure to sugars have been used for generations. These restrictive strategies often fail because people find them disagreeable. Substitution therapy—replacing a harmful habit with a positive, more culturally acceptable practice—can be effective. In dentistry, the application of this principle to a caries-control strategy involves replacing the sugared chewing gum with sugar free chewing gum since chewing gum is already a culturally acceptable habit.

A large percentage of the population chews gum and this trend can be used to an advantage if initiatives are undertaken to enlighten people on the benefits of sugar free chewing gum as an adjunct to oral hygiene practices and in caries prevention.

This can be enhanced through increasing knowledge on caries prevention through the dental and medical students. Dental and medical students were the study population because they will be encountering conditions presenting in the oral cavity.

3.2 JUSTIFICATION OF THE STUDY

There is scarcity of information regarding the knowledge of availability of sugar free chewing gum and the benefits to oral health.

Educating the students will be useful as they will in turn educate the general population. Dental and medical students are an important group in the prevention of diseases as they encounter various groups of people with different disease conditions during their training and even when they become professionals. They can also educate the community during community health outreach programs.

The information obtained would provide a baseline data which could be used by policy makers to develop strategies aimed at improving the oral hygiene of the public.

3.3 OBJECTIVES

GENERAL OBJECTIVE

The general objective was to assess knowledge, attitude and use of sugar free chewing gum among dental and medical students of the University of Nairobi.
SPECIFIC OBJECTIVES

1. To determine knowledge of sugar free chewing gum among medical and dental students of the UON.

2. To determine the attitude towards sugar free chewing gum among medical and dental students of the UON.

3. To determine the use of sugar free chewing gum among medical and dental students of the UON.

4.0 MATERIALS AND METHODS

4.1 STUDY AREA

The study was conducted at the Schools of Dental Sciences and Medicine, University of Nairobi.

The School of Dental Sciences is one of the schools of the UON. It is located within the city of Nairobi opposite Nairobi Hospital. It has approximately 145 undergraduate students.

The school of medicine is also one of the schools of the UON. It is also within the city of Nairobi, next to Kenyatta National Hospital, approximately two kilometers from the Central Business District. It has approximately 1500 undergraduate students.

4.2 STUDY POPULATION

Undergraduate students in the School of Dental Sciences and School of Medicine at the University of Nairobi.

4.3 STUDY DESIGN

This was a cross-sectional study.

4.4 VARIABLES

SOCIO-DEMOGRAPHIC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male or female</td>
</tr>
</tbody>
</table>

INDEPENDENT

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of chewing gum</td>
<td>Likert scale</td>
</tr>
</tbody>
</table>
Knowledge on the effects of sugar free chewing gum to oral health | Likert scale
---|---
Attitude towards sugar free chewing gum | Likert scale
Degree course | Medicine or Dental surgery

**DEPENDENT**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chewing gum habits</td>
<td>Frequency of chewing gum</td>
</tr>
<tr>
<td></td>
<td>Type of chewing gum used</td>
</tr>
</tbody>
</table>

**4.5 SAMPLE SIZE**

The sample size was computed using the following formula:

\[
N = \frac{Z^2 \cdot P \cdot (1-P)}{C^2}
\]

Where:

\( n \) = Sample size

\( Z \) = Z value of 1.96 corresponding to a confidence level of 95%

\( P \) = Prevalence of dental caries

\( C = 1 \) - confidence level (0.95)

For a study population of less than 1000, assuming a confidence level of 0.95% and a prevalence of 50%, sample size is calculated as follows:

\[
n = \frac{(1.96^2 \cdot 0.5 \cdot (1-0.5))}{(1-0.95)^2}
\]

\( n = 385 \)

For this study, since the study population is <10000 the formula

\[
f = \frac{n}{1+n/N}
\]
Where \( nf = \text{desired sample size of a population} < 10000 \)
\[ n = \text{sample size derived for a population} > 10000 \]
\[ N = \text{estimated size of the population under investigation} \]

Taking \( n = 385 \)
\[ N = 1645 \]
\[ nf = 385 \]
\[ 1 + \frac{385}{1645} = 313 \]

### 4.6 SAMPLING METHOD

A stratified random sampling method was used to select subjects from the schools of medicine and dental sciences. Since the school of dental sciences has approximately 145 students and the school of medicine has about 1500 students, proportionate allocation of subjects from both schools was done. The number of the students who were picked from each of the two schools was calculated in the ratio of 145:1500 as follows;

**School of dental sciences**

\[
\left( \frac{145}{1645} \right) \times 313 = 27.6
\]
\[ = 28 \]

**School of medicine**

\[
\left( \frac{1500}{1645} \right) \times 313 = 285.4
\]
\[ = 285 \]

This was then distributed equally among the different levels of study. Students were randomly selected as follows;

From the school of medicine, 57 students were picked from each level of study (level I, II, III, IV, V).

From the school of dental sciences, 7 students were picked randomly from each level of study (I, II, III and IV).
4.7 INCLUSION CRITERIA
Undergraduate dental and medical students who consented to participate in the study

4.8 EXCLUSION CRITERIA
Students not undertaking either of the two courses.
Students who did not consent to the study.

4.9 DATA COLLECTION INSTRUMENTS AND TECHNIQUES
A self-administered questionnaire (Appendix I) was used to collect data. The questionnaire was administered by the researcher and collected back once the students filled the required information.

4.10 DATA ANALYSIS AND PRESENTATION
The data was analyzed using SPSS version 17 and MS EXCEL. Cross-tabulation was used to compare different variables. Data was presented by use of charts, tables and texts.
4.11 ETHICAL CONSIDERATIONS

1. The research proposal was submitted to the UON/KNH ethics research and standards committee for approval.
2. Permission to conduct the study was sought from the UON.
3. Informed consent was sought from all the subjects prior to the study.
4. Confidentiality of all the information given was guaranteed.
5. Subjects were free to decline from participating in the study and to withdraw participation at any given time.

4.12 PERCEIVED BENEFITS OF THE STUDY

1. The results of the study can form a baseline data which could be used to establish a health program to educate on the types of sugar free chewing gum available and the role sugar-free chewing gum plays in preventing dental diseases.
2. This research proposal is in partial fulfillment of the requirements for the award of BDS at the UON.

4.13 PROBLEMS ANTICIPATED

1. Financial constraints.
2. Inadequate time to do the study.
5.0 RESULTS

A structured self administered questionnaire was distributed to 28 undergraduate students of the School of Dental Sciences and 285 undergraduate students of the School of Medicine of the University of Nairobi, enquiring on their knowledge, attitude and use of sugar free chewing gum. The questionnaires were further distributed equally within the classes in each school i.e. to 7 students for each of the four levels in the School of Dental Sciences and 57 students for each of the five levels in the School of Medicine. 24 (85.7%) students from the School of Dental Sciences and 261 (91.6%) students from the School of Medicine filled the questionnaires and returned them to the investigator. Table 1 shows the total number of questionnaires that were filled and returned to the investigator from each class. Therefore a total of 285 students from both schools were studied.

Table 1: Distribution of questionnaires and response rates by school and level of study

<table>
<thead>
<tr>
<th>Level of study</th>
<th>Dental</th>
<th>Medicine</th>
<th>Dental + Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. distributed</td>
<td>Returned filled</td>
<td>% Filled</td>
</tr>
<tr>
<td>i</td>
<td>7</td>
<td>5</td>
<td>71.4</td>
</tr>
<tr>
<td>ii</td>
<td>7</td>
<td>6</td>
<td>85.7</td>
</tr>
<tr>
<td>iii</td>
<td>7</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>iv</td>
<td>7</td>
<td>6</td>
<td>85.7</td>
</tr>
<tr>
<td>v</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>24</td>
<td>85.7</td>
</tr>
</tbody>
</table>
Socio-demographic information

The study involved a total of 285 dental and medical students from first to fourth level at the school of Dental Sciences and first to fifth level at the school of Medicine. Among the 285 students, 166 (58.1%) were male and 119 (41.9%) were female. 24 (8.4%) students were from the School of Dental Sciences and 261 (91.6%) were from the School of Medicine. Among the students from the School of Dental Sciences, 15 (62.5%) were males and 9 (37.5%) were females. Among the students from the School of Medicine, 159 (60.9%) were male and 102 (39.1%) were female (Fig 1).

Figure 1: Distribution of respondents by gender according to school

Use of chewing gum

Most of the students, 211 (74%) reported using chewing gum compared to 74(26%) who did not use chewing gum. 15( 62.5%) dental students used chewing gum while 9(37.5%) did not. 196(75.1%) medical students used chewing gum while 65(24.9%) did not.
Table 2: Use of chewing gum

<table>
<thead>
<tr>
<th></th>
<th>Use chewing gum</th>
<th>Do not use chewing gum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental students</td>
<td>15</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>62.5%</td>
<td>37.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Medical students</td>
<td>196</td>
<td>65</td>
<td>261</td>
</tr>
<tr>
<td></td>
<td>75.1%</td>
<td>24.9%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>211</strong></td>
<td><strong>74</strong></td>
<td><strong>285</strong></td>
</tr>
</tbody>
</table>

**Type of chewing gum used**

Majority of the students 158 (74.9%) used sugared chewing gum while 45 (21.4%) used sugar free chewing gum and 6 (2.8%) used herbal chewing gum. A further 2 (0.9%) students did not know the type of chewing gum they use. (Fig 2)

![Figure 2: Type of chewing gum used.](image)

**Knowledge on sugar free chewing gum**

All the students from the School of Dental Sciences who used chewing gum, 15 (100%), reported that they had heard of sugar free chewing gum. 191 (97.4%) from the school of Medicine reported to have heard of sugar free chewing gum. Only 5 (2.6%) from the school of Medicine had never heard of sugar free chewing gum. (fig 3)
Fig 3a: knowledge of sugar free gum

Of those who had heard of sugar free chewing gum, 7(3.4%) said that sugar free gum has no taste, 33(16%) said that sugar free chewing gum has no sugar and 166(80.6%) said sugar free chewing gum has sweetening agents.

Fig 3b knowledge on sugar free chewing gum
Use of sugar free chewing gum

Of the 206 students who admitted to knowing about sugar free chewing gum, 62 (30.1%) used sugar free chewing gum while 144 (69.9%) students did not (see fig.4)

Of the 144 students who did not use sugar free chewing gum, 89 (61.8%) said it was expensive, 48 (33.3%) said it was unavailable, 3 (2.1%) did not know the reason why they did not use sugar free gum while 4 (2.8%) had other reasons. (see table 3 below)

Fig 4: use of sugar free chewing gum
Table 3: Reasons for not using sugar free chewing gum

<table>
<thead>
<tr>
<th>REASON</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is expensive</td>
<td>89</td>
<td>61.8%</td>
</tr>
<tr>
<td>It is unavailable</td>
<td>48</td>
<td>33.3%</td>
</tr>
<tr>
<td>I don’t know</td>
<td>3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Other reasons</td>
<td>4</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

**Frequency of using sugar free chewing gum**

23(11.2%) reported that they chewed sugar free gum mostly in the morning, 21(10.2%) chewed gum in the afternoon, 25(12.1%) chewed sugar free gum after meals and majority 137(66.5%) chewed sugar free gum at other times.

Moreover, 31(15%) chewed sugar free gum daily, 14(6.8%) chewed sugar free gum once a week and 161(78.2%) chewed sugar free gum randomly.

Table 4: frequency of using sugar free gum in a day

<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>23</td>
<td>11.2%</td>
</tr>
<tr>
<td>Afternoon</td>
<td>21</td>
<td>10.2%</td>
</tr>
<tr>
<td>After meals</td>
<td>25</td>
<td>12.1%</td>
</tr>
<tr>
<td>Other times</td>
<td>137</td>
<td>66.5%</td>
</tr>
</tbody>
</table>

Table 5: frequency of chewing sugar free gum in a month

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number of students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>31</td>
<td>15%</td>
</tr>
<tr>
<td>Weekly</td>
<td>14</td>
<td>6.8%</td>
</tr>
<tr>
<td>Others</td>
<td>161</td>
<td>78.2%</td>
</tr>
</tbody>
</table>
Knowledge on availability of sugar free chewing gum

231(81.1%) reported that sugar free chewing gum can be obtained from a supermarket, 20(7%) from a kiosk, 26(9.1%) from a chemist and 8(2.8%) did not know.

Fig 5: knowledge on the availability of sugar free gum

Knowledge on the benefits of sugar free chewing gum

278(97.5%) students knew that sugar free chewing gum had benefits to oral health while 7(2.5%) did not. Of these 278, 277(99.6%) knew of dental conditions that can be prevented by use of sugar free chewing gum while 1(0.4%) did not.

Fig 6: knowledge on benefits of sugar free chewing gum to dental health
Attitude towards sugar free chewing gum

Only 167(58.6%) answered the question compared to 118(41.4%) who did not answer. Majority, 149(89.2%) felt that there was a difference between sugar free and sugared chewing gum while 18(10.8%) felt that there was no difference. For those who reported that there was a difference between sugared and sugar free chewing gum, 77(51.7%) said that xylitol (the substitute in sugar free chewing gum) can’t be metabolized by cariogenic bacteria hence the protective benefit of sugar free chewing gum. 29(19.5%) said that sugar free chewing gum does not contain sugars hence does not cause dental caries. 15(10.1%) said that chewing sugar free gum increases saliva production hence protecting against dental caries. A further 37(24.8%) did not have any reason.

FIGURE 7 Attitude towards sugar free chewing gum
### TABLE 6 Attitude towards sugar free chewing gum

<table>
<thead>
<tr>
<th>REASON</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar substitute cannot be metabolized by bacteria</td>
<td>77</td>
<td>51.7%</td>
</tr>
<tr>
<td>Lacks sugars</td>
<td>29</td>
<td>19.5%</td>
</tr>
<tr>
<td>Increases saliva production</td>
<td>15</td>
<td>10.1%</td>
</tr>
<tr>
<td>Without reasons</td>
<td>37</td>
<td>24.8%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>149</td>
<td>100</td>
</tr>
</tbody>
</table>
6.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The main aim of this study was to assess the knowledge, attitude and use of sugar free chewing gum among dental and medical students at the University of Nairobi.

6.1 DISCUSSION

6.1.1 Use of sugar free chewing gum

A total of 285 respondents participated in this study. Of these, 166 (58.1%) were male while 119 (49.1%) were female. 74% reported use of chewing gum. Studies show that 70% of chewing gum users are teenagers. Among those who reported using chewing gum, 74.9% used sugared chewing gum, 21.4% used sugar free chewing gum, 2.8% used herbal chewing gum and a further 0.9% did not know the type of chewing gum they use. These findings clearly show that there is little use of sugar free chewing gum.

Reasons given for not using sugar free chewing gum include 61.8% who felt that it is expensive, 33% said it is unavailable, 2.1% had no reason and 2.8% had other reasons not specified.

6.1.2 Knowledge on sugar free chewing gum

Majority of the participants, 100% from School of Dental Sciences and 97.4% from the School of Medicine responded that they had heard of sugar free chewing gum. Of these, 3.4% said that sugar free gum contains salt, 16% said it has no sugar while majority, 80.6%, said that it has sweetening agents. This shows that majority of the students knew what sugar free chewing gum is.

A high percentage of the students (81.1%) said that sugar free chewing gum can be obtained from a supermarket, 7% said from a kiosk, 9.1% from a chemist and 2.8% did not know. Sugar free chewing gum is mainly available in supermarkets. Most of the students were aware of this.

97.5% of the students knew that sugar free chewing gum has benefits to oral health while 2.5% did not. Of these, 97.1% knew of dental conditions that can be prevented by use of sugar free chewing gum while 0.4% did not know. Studies show that sugar free chewing gum can help prevent dental caries, gingivitis and bad breath.

It is therefore clear that there is considerable knowledge about sugar free chewing gum.

6.3 Attitude towards sugar free chewing gum

89.2% felt that there was a difference between sugar free chewing gum and sugared chewing gum. Of these, 51.7% said that xylitol (the substitute in sugar free chewing gum) can’t be metabolized by cariogenic bacteria hence the protective benefit of sugar free chewing gum. This is supported by a study done by Isokangas et al. 19.5% said that sugar free chewing gum does
not contain sugars hence does not cause dental caries. 10.1% said that chewing sugar free gum increases saliva production hence protecting against dental caries. Increased saliva stimulation increases salivary buffer capacity and is therefore protective. A further 24.8% did not have any reason.

A study done by F Messina on the beliefs and attitudes towards the consumption of sugar free products in a sample of Italian adolescents demonstrated inconsistencies between behavioral intention and consumption of sugar free products. This was attributed to lack of information regarding sugar free products among Italian adolescents.

6.2 CONCLUSION

Based on the findings of this study, the following was concluded:

1. Majority of Dental (100%) and Medical (97.4%) students had basic knowledge on sugar free chewing gum and its benefits to oral health.
2. There was little use of sugar free chewing gum (30.1%) with majority of the students reporting that it was expensive (61.8%) and unavailable (33.3%).
3. Most of the students (89.2%) had a good attitude towards sugar free chewing gum in that they said that there was a difference between sugar free chewing gum and sugared chewing gum. Majority (97.5%) also reported that sugar free chewing gum has benefits to oral health.

6.3 RECOMMENDATIONS

Based on the findings of this study, the following was recommended:

1. Use of sugar free chewing gum should be encouraged. Dentists can recommend sugar free chewing gum to patients as an adjunct to oral hygiene procedures.
REFERENCES


17. Pradnya Kakodkar and Soniya Mulay .Effect of sugar free gum in addition to tooth brushing on dental plaque and interdental debris.


APPENDIX I

KNOWLEDGE, ATTITUDE AND USE OF SUGAR FREE CHEWING GUM AMONG DENTAL AND MEDICAL STUDENTS AT THE UNIVERSITY OF NAIROBI

QUESTIONNAIRE

This questionnaire is part of a community dentistry research project. Please circle the correct response(s) in the questions below and give reason(s) in the blank spaces provided.

DEGREE COURSE (1) BDS .......... (2) MBCHB ...........

GENDER (1) MALE.................. (2) FEMALE ..........................

Q1. Do you chew gum?
   a. Yes
   b. No

If yes, proceed to question 2. If no, proceed to question 9.

Q2. What type of chewing gum do you use?
   a. Sugared chewing gum
   b. Sugar-free chewing gum
   c. Herbal chewing gum
   d. I don’t know

Q3. Have you heard about sugar-free chewing gum?
   a. Yes
   b. No

If yes, proceed to question 4. If no, go to question 9.

Q4. What is sugar-free chewing gum?
   a. A chewing gum that contains salt
   b. A chewing gum that has no taste
   c. A chewing gum that has no sugar
   d. A chewing gum that has sweetening agents

Q5. Do you use sugar free chewing gum?
   a. Yes
Q6. If no, why don’t you use sugar free chewing gum?
   a. It is expensive
   b. It is not available
   c. I don’t know
   d. Other

Q7. When do you chew sugar free gum mostly?
   a. in the morning
   b. in the afternoon
   c. after brushing
   d. after meals
   e. other

Q8. How often do you chew sugar free gum(s)?
   a. daily
   b. once a week
   c. once a month
   d. other

Q9. Who would you recommend sugar-free chewing gum to?
   a. Everyone
   b. Diabetic patients
   c. People with dental caries
   d. Children

Q10. Where can you buy sugar-free chewing gum?
   a. supermarket
   b. kiosk
   c. chemist
   d. I don’t know

Q11. Do you think sugar-free chewing gum is beneficial to your dental health?
   a. Yes
   b. No

Q12. Do you know any dental condition that can be prevented by use of sugar-free chewing gum?
Q13. According to you, is there any difference between sugar free chewing gum and sugared chewing gum? Please explain.

a. Yes
b. No
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22nd August 2011

Njue Mercy Murugi
School of Dental Sciences
University of Nairobi

Dear Mercy

RESEARCH PROPOSAL: CLEARANCE “KNOWLEDGE, ATTITUDE AND USE OF SUGAR-FREE CHEWING GUM AMONG DENTAL AND MEDICAL STUDENTS AT THE UNIVERSITY OF NAIROBI.”
(UP295/07/2011)

Your above revised proposal refers.

This is to inform you that permission has been granted by the KNH/UON-Ethics & Research Committee to carry out research on study titled “Knowledge, Attitude and use of sugar-free chewing gum among Dental and Medical students at the University of Nairobi”.

By a copy of this letter, I am requesting the relevant persons to accord you the professional support and other materials that may be useful to your research.

Yours faithfully

PROF A N GUANTAI
SECRETARY, KNH/UON-ERC

The Deputy Director CS, KNH
The Dean, School of Dental Sciences, UON
The HOD, Records, KNH
Supervisors: Dr B.M. Mua, Dept.of Period. Community and Preventive Dentistry, UON
Dr. Awange, Dept.of Oral Medicine and Oral pathology, UON