

## Awareness on causes, risk factors and prevention of periodontal diseases among secondary school students in Kinondoni district, Dar-es-Salaam, Tanzania. Yokoyana J<sup>1</sup>, Mumghamba EGS<sup>2</sup>

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### Abstract

**Aim:** To assess the awareness on causes, risk factors and preventive measures for periodontal diseases among secondary school students in Kinondoni district in Dar es Salaam Region. **Study participants and methods:** This was a cross-sectional descriptive study. A total of 225 students, both males (49.8%) and females (50.2%) aged between 12 and 21 years were randomly selected from two secondary schools (Kambanga and Kiluvya). Information on the awareness on causes, risk factors and preventive measures for periodontal diseases was collected using a self-administered structured questionnaire. **Results:** The study participants pinpointed that the predisposing factors for periodontal diseases were lack of brushing (86.2%), cigarette smoking (55.1%), plaque (22.2%), calculus (20.9%) and HIV/AIDS (75.4%). In relation to lack of tooth brushing and HIV/AIDS as predisposing factor for periodontal diseases, a higher proportion of females were aware at an age of 12-16 years, whereas to males it was at 17-21 years age group ( $P=0.001$ ). Assessment on awareness of the participants in relation to preventive measures against periodontal diseases included tooth brushing (88%), dental flossing (6.2%), regular dental visits for checkup (67.7%), frequent consumption of fruits (51%) and use of fluoridated toothpaste (87.3%). Half of the study participants reported to have experienced gingival bleeding; but most of them were not aware of the necessary preventive measures. Most of participants were not aware on the role of plaque and calculus in the development of periodontal diseases (79%). **Conclusion:** These results suggest that awareness on periodontal diseases among secondary school students in Kinondoni district is still low and therefore oral health education need to be advocated more for enhanced understanding.

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### Introduction

Awareness on risk factors and prevention of periodontal diseases is very important for promotion and maintenance of oral health status. Without knowledge and understanding of these factors there can be no informed decisions and actions to promote oral health. An individual must be aware of the factors like poor oral hygiene, cigarette smoking and nutrition deficiencies for example lack of vitamin C, which are predisposing factors to periodontal diseases (1,2). Also an individual has to be aware that abiding to proper oral hygiene practices like regular tooth brushing, dental flossing, and rinsing with water and paying regular dental visits are helpful in the prevention of periodontal diseases and some other oral diseases (3-5).

According to the Tanzania National Oral Health Plan 1988-2002, the prevalence of periodontal disease is high compared to that of dental caries (6). The WHO and the National policy towards management of these diseases, priority is given to prevention rather than curative approaches (6-7).

However, such approaches cannot produce good results unless the target population has enough awareness on risk factors and preventive measures for each specific disease, including periodontal diseases.

Many researches have been done on various aspects of periodontal diseases (8-15). The prevalence of periodontal conditions and in particular microbial plaque, calculus and gingival bleeding in Tanzania has been reported to be high (8-10). In a study done in 1994 on oral health status among different age groups in two regions; Tanga and Mbeya, it was shown that most of periodontal sextants in all age groups were affected by bleeding or calculus whereas periodontal pockets and tooth loss was rare (8). In another study done among teenager school children in Dar es Salaam, reported that almost all study participants that were examined showed early signs of gingivitis, over 50% of all sextants in the mouth were affected, and that there was an increased prevalence of periodontal conditions among study participants aged 15-18 years (9).

It has been described from several research reports that microbial plaque is a major etiological agent for periodontal diseases whereby poor oral hygiene is a major risk factor for plaque accumulation (1, 7, 11). Other factors which have been implicated for modifying periodontal diseases includes nutritional deficiencies e.g. lack of vitamin B and C, adverse habits like cigarette smoking, age, sex (more prevalent in males than female), geographical locations, diabetes and low social economic status (low income level and low level of education (1, 2, 12, 13). A study done by Mammal, pointed out that periodontal diseases are not only putting people at risk of losing teeth, but also they are at risk of developing other general health problems pertaining to chronic medical disorders like cardiovascular diseases, cerebral vascular diseases and low birth weight infants (11).

A number of studies have been done in relation to knowledge on periodontal diseases in different groups of people and therefore was reported that many people had poor or limited knowledge on causes of periodontal diseases and the necessary control measures (15-17). For example, in a study done in Japan in 1997 involving 110 students of junior high school showed that only 31% of the students identified dental plaque as the main cause of periodontal disease and only few students (11%) were able to identify the preventive action of fluoride (15). In a different study, inadequate knowledge on oral health was reported among the respondents of both sexes; however, more girls than boys had more knowledge on prevention of periodontal diseases (16). Reports from United Kingdom among adolescents aged 14-16 years showed that over 87% of the participants knew that periodontal diseases could be prevented and that the main reason for visiting a dentist was to have extraction, in addition failure to brush teeth was believed to be the cause of gingival bleeding by only 38 percent (17). A study done in Caribbean islands, 345 adolescents aged 15-19 years old were assessed on oral health knowledge whereby the majorities were aware of the signs of periodontal diseases though they incorrectly defined the meaning of dental plaque (18). From the same study, it was further reported that 25% of the study participants had experienced gum bleeding on tooth brushing, 60.8% were aware that bleeding on tooth brushing was a sign of periodontal diseases and that it could be prevented by brushing and flossing mainly before going to bed. Poor

knowledge on preventive measures such as dental flossing and periodic dental visits in relation to oral health has been reported among high school pupils in Israel and Northeastern Ontario (19, 20).

Tooth brushing practice is well accepted as a major preventive measure against microbial plaque that is responsible for periodontal diseases (3, 7). Other preventive measures against periodontal diseases included dental flossing, mouth rinsing, and periodic visits to dentists for dental check up (3, 7, 18). In relation to source of knowledge, reports show that schools were the main source of information about oral health followed by parents, dentists and media (15, 19).

During practical training in periodontal treatment, Doctor of Dental Surgery (DDS) students, used secondary school students from Kinondoni district. On clinical examination, most students had poor oral hygiene. Through rapid assessment it was noted that most had limited awareness on causes, risk factors and prevention of periodontal diseases. Information on awareness on periodontal diseases among secondary school students in Tanzania is scarce. Therefore, the purpose of this study was to assess the awareness on risk factors and preventive measures against periodontal diseases among secondary school students in Kinondoni district, Dar es Salaam Region.

#### **Study participants and methods**

This was a cross-sectional descriptive study, and the only two government secondary schools in Kinondoni district, which were under the authority of the Municipal education officer, were included for convenience. A total of 225 randomly selected students from the two secondary schools (Kambaga and Kiluvya) participated in the study. The age range was 12-21 years with a mean of 16.8 years whereby the median and mode was both at 17.0 years of age. There were 112 (49.8) and females were 113 (50.2%). Among males participants, most of them (69.6%) were at the age of 17-21 years, while most of the females were at the age of 12-16 years, and the difference was statistically significant,  $p=0.001$  (Table 1).

Information as related to awareness on causes, risk factors and preventive measures for periodontal diseases was collected by one person (YJ) using a self-administered structured.

Questionnaire in Swahili, the national language. In particular, data was collected on demographic information of the study participants, and awareness on causes and predisposing factors for periodontal diseases including lack of tooth brushing, role of microbial plaque, calculus and nutrition (consumption of fruits). Also information on tobacco, diabetes mellitus and HIV/AIDS in relation to increased risk for periodontal disease was collected. Self-assessment and or awareness on the appearance of plaque, calculus, experience on gum bleeding

on tooth brushing, oral ma-odor and tooth mobility was collected from all the study participants. Preventive aspects that were covered were on effective toothbrushing, use of dentifrices and importance of regular dental visits. The study participants were also requested to specify the source of information that they were giving during data collection. There was no pilot study done to test the questionnaire. However, questions were formulated using the experience gained from Morogoro field rotation during DDS training.

**Table 1: Distribution of the study participants by age and sex**

Age group (years)	Sex					
	Male		Female		Total	
	n	%	n	%	n	%
12-16	34	30.4	60	53.1	94	41.8
17-21	78	69.6	53	46.9	131	58.2
Total	112	(100)	113	(100)	225	(100)

*Chi<sup>2</sup> test, p = 0.001*

Data was entered into a personal computer (PC) and analyzed using the “Epi-Info Version 6 of the year 2000. Frequency and cross tabulations for various variables under study were generated, for different variables. Also recoding was done for the purpose of dichotomizing the age groups, class of study and responses from the questionnaire as some of the categories had very few study participants. The Chi square ( $\chi^2$ ) and Fisher’s Exact test was used to test the differences among the groups and the level of statistical significance was set at  $p < 0.05$ . The Muhimbili University College of Health Sciences (MUCHS) granted ethical clearance as categorized as “Elective studies for undergraduate students at MUCHS”.

**Results**

Study participants’ responses in relation to predisposing, causative and preventive factors for periodontal diseases are shown in Table 2. About 86% of the study participants were aware that lack of brushing can predispose to periodontal diseases (Table 2). Of these, the male (98): female (96) ratio was almost 1:1. However, awareness in relation to age, most of

the male participants (70.4%) were at the 17-21 years age group, while most females (53.1%) were at the 12-16 years age group and the difference was statistically significant ( $p = 0.001$ , Table 3). The age and sex differences among those who were not aware that lack of brushing can predispose to periodontal diseases was statistically not significant, and it was also the case when compared those “aware” and “not aware” by age group (Table 3).

About twenty-nine percent (28.6%) of males and 15.9% of females were aware of the role of plaque, while 21.4% of males and 20.5% of females were aware of the role of calculus in the development of periodontal diseases (table not presented). About half of study participants (50.2%) reported to have experienced gingival bleeding upon tooth brushing. As regards to prevention of gingival bleeding, few study participants were of the opinion that tooth brushing (38.7%) was important, and that consumption of fruits (51.1%) was necessary, while 45.8% thought that rinsing with water only could be of help too.

Table 2: Frequency distribution table for different variables for causes, risk factors and preventive measures for periodontal diseases

Predisposing, causative and preventive factors for periodontal diseases	Present/ Yes (Y)		
	Absent/No (N)		
	Y/N	n	(%)
Lack of tooth brushing predisposes periodontal diseases	Yes	194	(86.2)
	No	31	(13.8)
Smoking cigarettes predisposes periodontal diseases	Yes	125	(55.1)
	No	101	(44.9)
Diabetes mellitus predisposes periodontal diseases	Yes	31	(13.8)
	No	193	(86.2)
Soft deposits on tooth surface (microbial plaque)	Yes	50	(22.2)
	No	175	(77.8)
Hard deposits on tooth surface (dental calculus)	Yes	47	(20.9)
	No	178	(79.1)
Tooth brushing can prevent gingival bleeding	Yes	87	(38.7)
	No	138	(61.3)
Use of fruits prevents gingival bleeding	Yes	115	(51.1)
	No	110	(48.9)
Use of mouthwash can treat oral malodor	Yes	78	(34.7)
	No	147	(65.3)
Tooth brushing can treat oral malodor	Yes	140	(62.2)
	No	85	(37.8)
Dental visit is important in the treatment of oral malodor	Yes	118	(52.4)
	No	107	(47.6)
HIV/AIDS predisposes an individual to oral diseases	Yes	169	(75.1)
	No	56	(24.9)
Tooth brushing can prevent oral diseases	Yes	198	(88.0)
	No	27	(12.0)

Of all study participants, 67.7% were aware of the importance of having regular dental visits for dental checkup, whereby 49.7% were males and females (50.3%); and also most of them (60.3) were in form III-IV. The difference between class-levels (form I-II versus III-IV) for those that were aware of the importance of regular dental visits was statistically not significant

(Table 4). However, when group comparison was done between those “aware” versus “not aware”, it was found that there was a relationship between education class level and dental visits in that most of the “not aware” (54.1%) were in form I-II, while most of those “aware” (60.3%) were in higher class, form II-IV ( $p = 0.042$ , Table 4).

Table 3: Distribution of study participants according to knowledge on lack of brushing predispose to periodontal diseases by age groups and sex

Age group (yrs)	*Aware of periodontal diseases						**Not aware of periodontal diseases					
	Male		Female		#Total		Male		Female		#Total	
	n	%	n	%	n	%	n	%	n	%	n	%
12-16	29	29.6	51	53.1	80	41.2	5	35.7	9	52.9	14	45.2
17-21	69	70.4	45	46.9	114	58.8	9	64.3	8	47.1	17	54.8
Total	98	100	96	100	194	100	14	100	17	100	31	100

\* $\chi^2$  test,  $p = 0.001$ , \*\*Fisher's Exact test,  $p = 0.473$ , #  $\chi^2$  test,  $p = 0.528$

Tongue brushing during tooth brushing practice was also one of the things that were studied in this group. A higher proportion of the respondents (93.8%) were of the opinion that tongue cleaning during tooth brushing was an

important aspect in oral hygiene; whereby males were (48.8%) and females (51.2%) and the difference was statistically not significant (Fisher's Exact test;  $p = 0.285$ ).

Out of all the study participants who responded to a question concerning HIV/AIDS and periodontal diseases, 75.4% were aware that AIDS could predispose to periodontal diseases, whereby most of the female (56.7%) and male (70.9%) respondents were at the 12-16 years and 17-21 years age group, respectively (p = 0.001, Table 5).

As regards to knowledge on the cause of tooth mobility in adults, only few (8.4%) of the study participants were aware of the causes and there was no statistically significant difference between sexes as well as age groups.

Table 4: Distributions of study participants according to knowledge on the necessity for regular visit to dentists for checkup by class of study and sex

Class of Study	*Aware of periodontal diseases						**Not aware of periodontal diseases					
	Male		Female		#Total		Male		Female		#Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Form 1-2	32	42.1	28	37.3	60	39.7	23	63.9	17	44.7	40	54.1
Form 3-4	44	57.9	47	62.7	91	60.3	13	36.1	21	55.3	34	45.9
Total	76	100	75	100	151	100	36	100	38	100	74	100

\* $\chi^2$  test,  $p=0.549$ , \*\* $\chi^2$  test,  $p = 0.098$ , and #  $\chi^2$  test,  $p = 0.042$

Most of the subjects (87.3%) were aware of the benefits of using toothpaste during tooth brushing and were almost equal in proportion between males (49.5%) and females (50.5%). Inquiry on the source of information as related to periodontal diseases, it was found that most of the participants (60%) acquired the information from radio/television; parents (53.3%), teachers (42.2%), friends (28.4%) and others such as books/newspapers (33.7%).

**Discussion**

The study was conducted only in the government secondary schools, which were currently available in the district, which may have different kinds of teaching strategies and social economic status of students' parents compared to private secondary schools in the district. Therefore the findings of this study might not be as representative of all schools in the district. The participants in this study, both males and females were aged between 12-21 years and almost equal proportions of both sexes with a male: female ratio of about 1:1. However, a big proportion of study participants were from form-I and form-III, with very few form-II. The explanation for this was that at the time of data collection most of form-II students were out of the school for their fieldwork activities. For this reason, the analyses involving class-level was dichotomized (form I-II and form III-IV).

In this study it was observed that much more than three quarter of the study participants were aware that lack of tooth brushing predisposes an individual to periodontal diseases. These results

are comparable to other findings whereby subjects believed that failure to brush was the main cause of gingival bleeding (21). There were few study participants aware of the role of plaque and calculus in the development of periodontal disease. This can be explained by the fact that the proportion of study participants who had at least seen plaque/calculus either on their own teeth or on the teeth of their friends were less than one third of all the participants. Of these about two third or more were aware of the effect of plaque and calculus in relation to periodontal diseases and the findings are in accord to what was reported by d'Almeida (15). Hamilton and Coworkers reported lack of clear understanding among the school children between plaque and calculus and their role in development of periodontal diseases (20). These findings suggest the need for oral health education to improve the understanding and awareness of periodontal disease as related to risk factors, causes and prevention. Most of the participants were aware that HIV/AIDS is one of the predisposing factors for periodontal diseases and the awareness was similar in all age groups. The possible explanation for this could be due to the national wide AIDS mass media campaign programs (24).

Tooth brushing was the most identified preventive measure for periodontal diseases whereas mouth rinsing and use of toothpicks were the least identified preventive measures in this study. However, regular dental visits for checkup were also thought to be important in about two thirds of all the study participants.

Such proportion of awareness is lower than the eight seven percent reported elsewhere by Roberts-Thompson and Coworkers (23). About eighty percent of the study participants were aware of the importance of using toothpaste during tooth brushing and this could probably be attributed to the nowadays-increased commercial advertisement for toothpaste done by various toothpaste manufacturing companies such as Whitedent, Aha and Colgate through mass media.

Half of subjects reported to have had experienced gingival bleeding during tooth brushing. However, only about a quarter of the participants were aware that tooth brushing was an important aspect in the prevention of gingival bleeding. The findings shows low awareness concerning gingival bleeding prevention compared to the study done by Taani (22).

Table 5: Distribution of study participants according to knowledge on AIDS predisposes to periodontal diseases by age and sex

Age group (years)	*Aware of periodontal diseases						**Not aware of periodontal diseases					
	Male		Female		#Total		Male		Female		#Total	
	n	%	n	%	n	%	n	%	n	%	n	%
12-16	23	29.1	51	56.7	74	43.8	11	33.3	9	39.1	20	35.7
17-21	56	70.9	39	43.3	95	56.2	22	66.7	14	60.9	36	64.3
Total	79	100	90	100	169	100	33	100	23	100	55	100

\* $\chi^2$  test,  $p < 0.001$ , \*\* $\chi^2$  test,  $p = 0.656$ , and #  $\chi^2$  test,  $p = 0.288$

Radio, television and the parents were the most mentioned source of information on knowledge on predisposing factors and preventive measures for periodontal diseases. About one third of all the study participants claimed to have received the information from other sources as dentists, toothpaste promotion posters and books. These findings suggest the importance of news media in disseminating oral health information to the community and the need to incorporate parents as agents through which oral health education can reach young people. Hamilton and Coulby reported that children with the best oral health knowledge claimed that their source of information was through a dentist and school (20). Brook et al reported that the student's knowledge as regards to prevention of oral diseases stemmed mainly from their dentist, parents and the media, and only 2.6% learned anything from formal school teaching (19). Findings from the present study population are in accord to Brook's, while it differs from Hamilton and Coulby's findings (19, 20). However, in the present study population there was no sex difference in relation to the awareness on causes, risk factors and prevention of periodontal diseases, and it is thus in contrary to what had been reported before in other countries showing that females are more aware than males (16).

### Conclusion

Overall assessment on the awareness on causes, risk factors and preventive measures for

periodontal diseases among the study participants indicated that most were aware that lack of tooth brushing was an important predisposing factor for periodontal diseases. However, only few participants were aware of the role of plaque and calculus in the development of periodontal diseases. In addition, over half of participants had experienced gingival bleeding on tooth brushing, but most of them did not know how it could be prevented. In this study population, the findings suggest that the awareness on causes, risk factors and prevention of periodontal diseases is still low.

### Recommendations

One, news media such as newspapers, radio, televisions and posters in public centers should be properly utilized to raise awareness by imparting knowledge and skills on causes, risk factors and preventive measures for periodontal diseases to secondary school students, two; incorporate school teachers in disseminating oral health education to the students, and three; students should be encouraged to have regular dental visits for check up, at least once a year to identify those at risk and in need for intervention.

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