Oral Health Knowledge, Behaviour and Self-Reported Oral Health Conditions among Medical Students in Western Uganda.

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ABSTRACT
Objective: To assess the oral health knowledge, oral health behaviour, and self-reported oral health conditions among undergraduate medical students on clinical rotation in Dentistry.
Methods The study recruited 104 undergraduate medical students on clinical rotation in Dentistry at the Kampala International University – Western Campus dental clinic. Data was collected online using a structured questionnaire uploaded to a Google form for easy data collection while also controlling non-response. Data analysis was done using IBM SPSS version 26. A test for the association between the variables was done using Pearson's chi-square statistic. Statistical significance was considered to be p-value < 0.05.
Results: The majority (59.6%) of the respondents were male, aged between 22 and 25 years with a mean age of 22.20 ± 1.45. Findings showed that the majority of the respondents had basic knowledge of oral health and the prevention of oral disease. However, it was observed that 54.8% of respondents had not had a dental visit in the past year. The study also investigated self-reported oral health conditions, and it was observed that 83.7% of respondents reported having oral infections or diseases in the last year.
Conclusion: The level of knowledge on oral health among participants in the study did not consistently translate into appropriate oral health behaviour. There is a need to include oral health as part of the curriculum for medical students for practical orientation. Also, the students should be encouraged to adopt recommended oral health practices and guidelines to ensure that they are both knowledgeable and capable of maintaining good oral health for themselves and the communities they intend to serve.

Keywords: oral health, medical students, Uganda

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Received: 19-Jan, 2023
Revision: 29 may, 2023
Accepted: 7 June, 2023

Citation: Watitiu SK, Agholor CN, Amalimeh BE. Oral health knowledge, behaviour and self-reported oral health conditions among medical students in Western Uganda. Nig J Dent Res 2023; 8(2):62-70. https://dx.doi.org/10.4314/njdr.v8i2.4

INTRODUCTION

Oral health is historically defined as a disease-free oral condition that enhances a person's appearance and contributes to optimal mouth function.[1] However, oral health should be envisioned in a more diverse sense, incorporating the ability to smell, taste, chew, swallow, smile, speak and express in different facial experiences with confidence as well as without any form of discomfort, pain or disease.[2]

It is therefore multi-faceted; with determinants such as individual factors (age, sex, genes), oral health-related behaviour (diet, hygiene, smoking, alcohol, injury), social and community contexts (social norms, peer groups, social capital, cultural identity, religion), economic and environmental conditions such as poverty, housing, sanitation, leisure facilities, employment, work/ educational environment, income, policies and commercial advertising.[3,4]

Furthermore, there is an established link between certain oral health conditions and other systemic diseases such as; diabetes, digestive diseases, stroke, cardiovascular disease, metabolic syndrome, unfavourable pregnancy outcomes, and obesity.[5] These local and systemic disorders may be due to pro-inflammatory responses following the presence of oral disease.[6] On the other hand, some systemic illnesses are known to have oral manifestations and may predispose the development of certain oral health-related disorders.[7]

Oral health-related disorders are still one of the most common illnesses that influence a person's overall health. Periodontitis and dental caries are two of the most common oral diseases, affecting 60 and 36 per cent of individuals globally, respectively.[8] However, despite the high prevalence of oral disease and the importance of dental health in overall health, oral health care is consistently neglected.[9]

Based on the importance of oral health in overall health and the high frequency of oral disorders, a collaborative effort between dentists and doctors is critical and should be included as part of a complete health promotion strategy.[10] Furthermore, oral health professionals' cognition and behaviour reflect their awareness of oral preventative measures and practices, which significantly impact their delivery of oral health care and, as a result, patients' general health.

Therefore, dental and medical students need to have good oral health awareness as they will be significant providers of health services and be responsible for future public oral health promotion.[10] Compared with dental students, medical students are sometimes more likely to encounter underserved and vulnerable patients[11] and as primary healthcare providers for most patients, medical professionals are also expected to participate in oral health promotion. Consequently, medical students are expected to master optimal oral health knowledge and awareness to provide patients with necessary oral health instruction when needed.

Oral health knowledge, behaviour, and status are influenced by many factors, including culture, environment, and social customs.[12] In the East African setting, there has not been much focus on the involvement of medical students to help identify possible challenges and barriers to attaining optimal oral health as part of their training. Furthermore, knowledge, oral health behaviour and status of medical students have not been effectively assessed in developing countries like Uganda.

Thus, this study assesses the oral health knowledge, oral health behaviour, and self-reported oral health conditions among undergraduate medical students on clinical rotation at the dental clinic at Kampala International University – Western Campus.

MATERIALS AND METHODS

This study was conducted at Kampala International University, Western Campus, located in Western Uganda from June to July 2021.

A total of 104 undergraduate medical students on clinical rotation in Dentistry at Kampala International University – Western Campus participated in the study. Data was collected online using a structured questionnaire uploaded to a Google form for easy data collection while also controlling non-response.

The data collection process began after approval was granted from the Ethics and Research Committee of the Faculty of Clinical Medicine and Dentistry, Kampala International University Western Campus, Ishaka in protocol number KIU/ERC/A/VOL.II/1269. Following the approval, the researchers shared the link with medical students on clinical rotation in Dentistry. The link shared contained the consent and the research questionnaire. Only those who consented were directed to the main questionnaire. Those who declined participation were re-routed to exit the study. The IP address of each computer or phone used to fill the questionnaire was recorded, and double-entry using the same computer or smartphone was not allowed to prevent data duplication. The online data collection tool closed automatically once the sample size was achieved.

The questionnaire was divided into four sections. Nine questions relating to oral health knowledge and

six regarding behaviour were included in the questionnaire. Also included was a question on self-reported oral health conditions.

A pre-test was done at Kampala International University among 20 randomly selected medical students before the data collection. This pilot test helped familiarize the study setting, the data collection process, and testing the research tool.

The data analysis included descriptive analysis of the filled questionnaires. Data were analyzed using SPSS version 26 software and presented using frequencies and percentages as well as graphs and charts. A test for association between the variables was done using Pearson's chi-square statistic. Statistical significance was considered to be p-value < 0.05.

RESULTS

A total of 104 respondents were recruited for the study. All completed and forwarded the questionnaires and were included in the analysis representing a 100% response rate.

The majority of participants were male (59.6%) and aged between 22 to 25 years (55.8%). [Table 1]

The majority of respondents 62.5% identified plaque microorganisms as a major aetiological factor in dental caries. However, only 25% of study participants knew the influence of plaque in relation to the aetiology of both dental caries and periodontal disease. Findings also showed that 98.1% of respondents identified the need for fluoride while 71.2% acknowledged the importance of dietary modification in the prevention of dental caries.[Table 2]

More than half of the respondents, 53.8% (n =56), stated that they brush their teeth twice daily. Also, the majority of participants 47.1% (n =49) replace their toothbrushes twice a year. Findings also revealed that 54.8% of the respondents has never visited a dentist. Findings also revealed that almost all respondents (96.2%) used additional oral hygiene methods besides tooth brushing [Table 3]

As regards self-reported oral health conditions, it was observed that the majority (83.7%) of respondents reported having oral disease conditions/infections within the last year [Figure 1]

Self-reported oral infection/disease among study participants in the past year showed dental caries (38.7%) and toothache (25.9%) [Figure 2].

The association between health behaviour and self-reported oral health condition revealed that the frequency of replacing toothbrushes was significantly associated with a self-reported oral health condition (p=0.008) [Table 4]

Table 1: Demographic Characteristics of Study Participants

	Frequency(n)	Percent(%)
Course Pursued		
Bachelor of Medicine and Surgery	97	93.3
Bachelor of Clinical Medicine	7	6.7
Age of respondents		
18-21	4	3.8
22- 25	58	55.8
Above 25	42	40.4
Gender of respondents		
Male	62	59.6
Female	42	40.4
Total	**104**	**100**

Table 2: Knowledge about oral health among participants

Variable	Frequency(n)	Percent (%)
What is a major cause of dental caries?		
Worms	4	3.9
The natural process of ageing	23	22.1
Plaque microorganisms	65	62.5
Genetic anomalies	10	9.6
Do not know	2	1.9
Causes of gingival bleeding during tooth brushing		

Natural physiological phenomenon	8	7.7
Periodontal disease	52	50
Brushing with non-fluoridated toothpaste	18	17.3
Systemic disease	22	21.2
Do not know	4	3.8
Influence of dental plaque on oral disease?		
Affects appearance of teeth only	18	17.3
Inducing dental caries only	12	11.5
Inducing periodontal disease only	45	43.3
Induces dental caries and periodontal disease	26	25
Do not know	3	2.9
Certain systemic diseases may be linked to oral disease		
Yes	97	93.3
No	2	1.9
Do not know	5	4.8
Use of tobacco affects oral health		
Yes	86	82.7
No	15	14.4
Do not know	3	2.9
Does alcohol consumption affect oral health		
Yes	84	80.8
No	8	7.7
Do not Know	12	11.5
Is fluoride important for prevention of dental caries		
Yes	102	98.1
No	2	1.9
Do not know	0	0.0
Is dietary modification important for the prevention of dental caries		
Yes	74	71.2
No	23	22.1
Do not know	7	6.7
Measures that prevent gum disease		
Topical application of fluoride	7	6.7
Pits and fissure sealing	12	11.6
Tooth scaling	80	76.9
Do not know	5	4.8
Total	**104**	**100**

Table 3: Oral hygiene practices among participants

Variable	Frequency(n)	Percentage (%)
Frequency of daily tooth brushing		
Once	37	35.6
Twice	56	53.8
Thrice	7	6.7
After meals	4	3.9
Duration of tooth brushing		
One Minute	25	24.0
Two Minutes	41	39.4
More than 2 minutes	35	33.7

Less than 1 minute	3	2.9
Frequency of replacing tooth brush		
Once a year	16	15.4
Twice a year	49	47.1
Three times a year	33	31.7
Not sure	6	5.8
Frequency of visiting the dentist		
Once a year	47	45.2
More than once a year	0	0.0
Never	57	54.8
Method of tooth brushing		
Modified Bass technique	39	37.5
Horizontal scrub	19	18.3
Irregular	30	28.8
Vertical scrub	13	12.5
Fones technique	3	2.9
Oral hygiene methods besides tooth brushing		
Dental floss	6	5.8
Mouth wash	21	20.2
Sugar free chewing gum	28	26.9
Toothpick	45	43.3
None	4	3.8
Total	**104**	**100**

Figure 1:Self-reported oral health condition among study participants

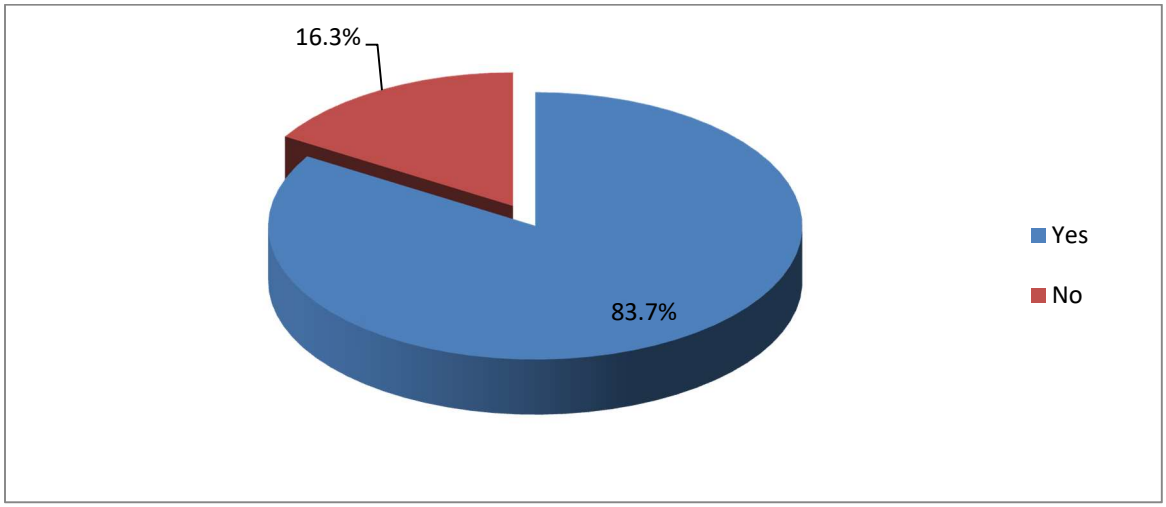

Figure 2: Self-reported oral infection/disease among study participants

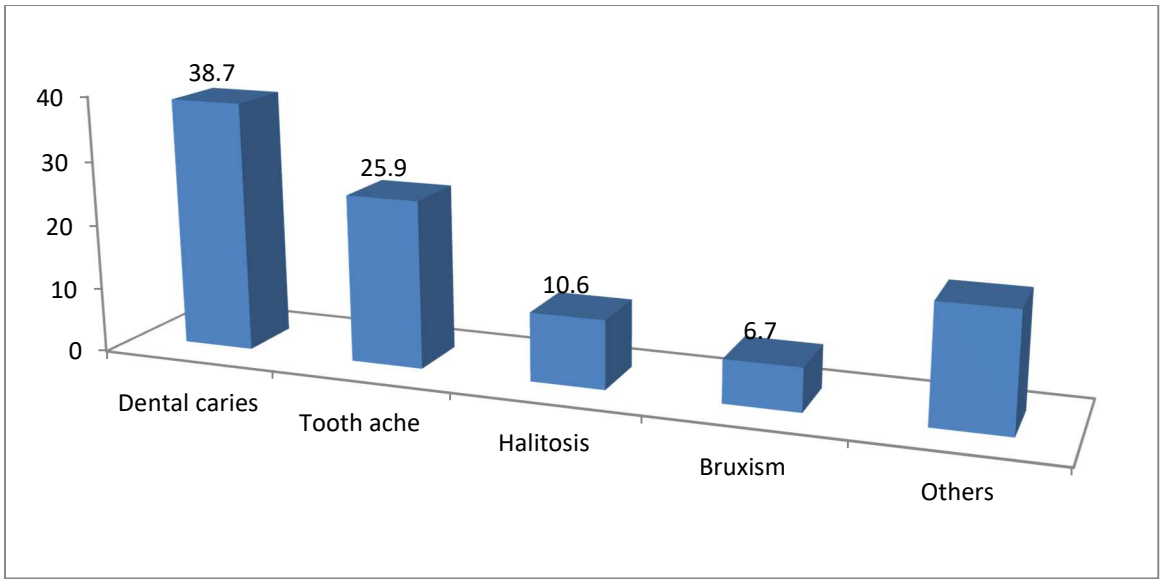

Table 4: Association between health behaviour and self-reported oral health condition among study participants

		Oral infection/disease or implant in the last year?			Chi-square
		Yes n (%)	No n(%)	Total n(%)	
Frequency of daily tooth brushing?	Once	32(86.5)	5(13.5)	37(100.0)	
	Twice	44(78.6)	12(21.4)	56(100.0)	x^2=3.424,
	Thrice	7(100.0)	0(0.0)	7(100.0)	p=0.331
	After meals	4(100.0)	0(0.0)	4(100.0)	
Duration of Tooth brushing?	One Minute	20(80.0)	5(20.0)	25(100.0)	
	Two Minutes	32(78.0)	9(22.0)	41(100.0)	x^2=3.319,
	More than 2 minutes	32(91.4)	3(8.6)	35(100.0)	p=0.345
	Less than 1 minute	3(100.0)	0(0.0)	3(100,0)	
Frequency of replacing toothbrush	Once a year	16(100)	0(0.0)	16(100.0)	
	Twice a year	6(12.2)	43(87.8)	49(100.0)	x^2=11.866,
	Three times a year	11(33.3)	22(66.7)	33(100.0)	p=0.008
	Not sure	6(100.0)	0(0.0)	6(100.0)	
Frequency of visiting the dentist	Once a year	41(87.2)	6(12.8)	47(100.0)	x^2=0.804,
	More than once a year	0(0.0)	0(0.0)	0(0.0)	p=0.266
	Never	46(80.7)	11(19.3)	57(100.0)	
Method of tooth brushing	Modified Bass technique	34(87.2)	5(12.8)	39(100.0	
	Horizontal scrub	16(84.2)	3(15.8)	19(100.0)	x^2=6.544,
	Irregular	26(86.7)	4(13.3)	30(100.0)	p=0.162
	Vertical scrub	10(76.9)	3(23.1)	13(100.0)	
	Fones technique	1(33.3)	2(66.7)	3(100.0)	

DISCUSSION

This study investigated the level of knowledge, oral behaviour, and oral health conditions among undergraduate medical students on clinical rotation at the dental clinic at Kampala International University – Western Campus. The results found that most of the respondents were male, 59.6% compared to 40.4% female. These findings are consistent with Ahmad et al.[2] in a study conducted in Malaysia which found a male preponderance in the study population. However, these findings contrasted with a study conducted in India, which found that most respondents were female medical students.[13] The difference could be associated with the mode of data collection and sampling method that was employed. In their study, they adopted purposive sampling, while it was done randomly online in our study. The findings from the present study also revealed that 55.8% of the students were aged between 22 and 25 years. These findings are consistent with Farsi et al. [14] in a study conducted in Saudi Arabia.

It was observed that the majority of respondents were knowledgeable about the role of plaque microorganisms in the aetiology of dental caries as well as other risk factors associated with oral disease and prevention of common oral disease conditions. The findings in this study are comparable to that of Mulla and Omar[15] in Saudi Arabia, who found that 94% of the medical students had good oral health knowledge. Findings in this study however contrasted with a study done in Nigeria[10] which found that the level of knowledge on oral health among medical, nursing and pharmacy students was slightly greater than 50%. This variance may be due to the difference in the sample population. The higher level of knowledge among respondents in this study is likely due to respondents being on rotation in Dentistry as opposed to those in the Nigerian study which had students from nursing, pharmacy as well as medical students.

The oral health behaviour of participants was also assessed as part of this study, where varied components were investigated. It was found that over half of the respondents brush their teeth twice a day, while about 4% brush their teeth after every meal. The findings further revealed that 39.4% of the respondents brush their teeth for approximately two minutes. This is in contrast with a previous study by Haridas[13] in India, who found that around 50% of the respondents brushed their teeth twice a day while the majority brushed their teeth for at least 2 minutes. This reflects varying oral health behaviour among different populations. The study findings also revealed that almost half of the respondents replaced their toothbrushes twice per year, while 36% replaced them once a year. While brushing teeth after every meal may be considered excellent oral health behaviour, it is believed that brushing teeth twice daily is sufficient for optimal oral health as recommended by the American Dental Association (ADA). They recommended brushing teeth twice a day in the morning and the evening using a soft-bristled brush for at least two minutes.

With regards to the utilization of oral health care services, more than half of respondents (54.8%) stated they have never had a dental appointment, while 45.2% visited a dentist once in the past year. This showed poor oral health-seeking behaviour among the study participants. These findings differed from Yao et al, [16] who found that the respondents in their study had good oral health-seeking behaviour. This may be due to peculiarities in the different study populations and their perceptions of the importance of routine oral health checks.

Furthermore, it was found that 83.7% of the respondents in this study reported having some type of oral disease condition/ infection in the last year. The prevalent oral condition reported included dental caries (38.7%), toothache (25.9%), halitosis (10.6%) and bruxism (6.7%). These findings were similar to a study conducted in Egypt[17] in which majority of respondents reported pain or discomfort in their teeth or mouth during the past twelve months. Yao et al.[16] in investigating oral health among medical and dental students also found that 64% of medical students had periodontal disease using gum bleeding as a self-reported diagnostic criterion.

Associations between oral health behaviour and self-reported oral health disease were investigated as part of this study. Findings from our study revealed that the frequency of replacing toothbrushes was associated with self-reported oral health conditions. Thus, respondents who indicated replacing their toothbrushes twice or three times per year reported having better self-reported oral health status. These findings are consistent with a study conducted in Saudi Arabia which found that respondents who replaced their toothbrushes once every three months had good oral health status compared to those who did not.[14]

Also, studies suggest that higher levels of knowledge of oral health may influence dietary choices, oral hygiene practices and utilization of oral health care services.[1,2,8] Therefore, dental and medical students need to have good oral health awareness as they will be significant providers of health services and be responsible for future public oral health promotion in the communities in which they serve.

Study Limitations

One of our study limitations could be selection bias and unmeasured confounding bias. These biases arise because the medical students were engaged in their dental rotation; hence their knowledge level may be higher and not representative of a similar population who may not be in the dental rotation. The study also only included only respondents who had access to WhatsApp and Internet. Future studies could consider pre-and post-training assessments to measure the impact of the course on the knowledge, behaviour and subsequent status of the medical students.

CONCLUSION

The level of knowledge on oral health among participants in this study did not consistently translate into appropriate oral health behaviour. Also, the utilization of oral health services among the respondents in this study was poor.

There was an association between certain oral health behaviour (frequent change in toothbrush use) with good oral health status among the respondents. The findings from this study can be applied to improving the curriculum for undergraduate medical students and give insight to lecturers teaching the course. This study, therefore, recommends the need to incorporate oral health as part of the curriculum for medical students as well as the development of quality assurance checklists in dental instruction.

Also, there is a need to emphasize adopting recommended oral health practices and guidelines to ensure that medical students are both knowledgeable and capable of maintaining good oral health for themselves and the communities they intend to serve.

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