

Determinants of Tooth Brushing Practice among Medical and Health Sciences Students of University of Gondar, northwest Ethiopia

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SUBJECT AREAS

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KEYWORDS

Dental hygiene, Knowledge, Attitude, Tooth brushing practice, flossing

Abstract

Tooth brushing practice is an effective preventive measure for maintaining good individual oral health which is an integral part of one's general health. The current study aimed to assess determinant factors of practice of tooth brushing among Medical and Health sciences students in University of Gondar, Ethiopia. : Facility based cross-sectional study was conducted from January to March 2019 using simple random sampling technique and self- administered questionnaire was used to collect the data. Epi info was used for data entry and SPSS 22 was used for analysis. The adjusted odds ratio with 95% uncertainty interval and $p < 0.05$ was used to identify determinants of tooth brushing practice Of the study participants in this study 69.6% with 95% UI (65.0, 74.5%) had good tooth brushing practice. Being female AOR = 7.76, 95% UI (3.79, 15.88), good dental health knowledge AOR = 1.66, 95% UI (1.01, 2.75) and dental flossing AOR = 2.74, 95% UI (1.64, 4.59) were determinant factors of tooth brushing practice. : Improving the oral hygiene knowledge is important to substantially increase tooth brushing practice. Finally, this study was not without limitation. The aforementioned factors demand the attention of health sector stakeholders to improve dental health knowledge to substantially increase practice of tooth brushing.

Background

Oral health includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions without discomfort and craniofacial complex. It is influenced by the person's experiences, perceptions, expectations, and ability to adapt to circumstances [1].

Oral hygiene is the process of protecting the oral cavity and keeping it healthy and clean by various modalities like brushing and flossing in order to prevent tooth decay and gum diseases [2]. It is the method of keeping oral cavity free from pathological conditions that affect mouth like gum diseases, cavities, mouth sores and ulcers [3]. Good oral hygiene is the foundation for a healthy mouth and prevents 80% of all dental problems [4]. Poor oral hygiene and untreated oral diseases and conditions can have a significant impact on the quality of life [5]. Poor oral health can negatively affect how a young mouth develops and leads to more than 50 million school hours being lost each year [6].

Most people in the developed countries show great interest in oral hygiene and that 16% to 80% of boys in 32 countries in Europe and North America practiced tooth brushing more than once a day, whereas girls reported better oral hygiene practice 26–89% [7]. Oral hygiene practices are also prevalent in some developing countries. For instance, tooth brushing is practiced habitually by most Chinese, although a small proportion of elderly people do not brush their teeth at all [8]. While in India, only 69% of the population brushes their teeth [9]. In a study conducted in Ethiopia, about 57.6% of males and 52.5% of females scored highly in knowledge of caries and gingivitis was 49% and 44% of males and females respectively. [10].

Oral disease qualifies as major public health problems owing to their higher incidence and significant social impact [11]. Improvement in oral health-related knowledge is considered to be an essential precondition for improving oral health in a community[12]. The knowledge, attitude, and practices of the individual clearly have an impact on oral health. Studies have shown that there is an association between increased knowledge and better oral health. In another study conducted in Jeddah among school students, it was found that 87.1% knew that brushing teeth helps to prevent periodontal diseases [13]. Because of the fact that Health Science students are more knowledgeable and aware of health problems, we hypothesized that Health Science students would be able to practice appropriate oral hygiene particularly tooth brushing. It is important to assess their oral health knowledge, attitude, and practice because they are future professionals who will be responsible for managing and preventing oral health and related diseases. However, tooth brushing practice and contributing factors in University students were not investigated in Ethiopia. This study was, therefore, conducted to assess tooth brushing practice and its associated factors among University of Gondar students, northwest Ethiopia.

Methods

Study setting, design and period

Institution based cross-sectional study was conducted from January to March 2019 in University of Gondar Medical and Health Sciences students (no dentistry students involved). University of Gondar is located in Gondar city 748 km away from Addis Ababa and 180 km Bahir Dar.

Sample size determination and sampling techniques

The sample size was determined using single population proportion formula with the following assumptions; $P = 50\%$ (there is no previous study in the study area), 95% confidence interval, 5% margin of error (d), and 10% non-response rate. Therefore, the required minimum sample size was 384. Expecting a 10% non-response rate the final sample size was calculated to be 423. Simple random sampling technique was used to select study participants via proportional allocation in each department.

Population of the study

All regular students of University of Gondar College of Medicine and Health sciences in the academic year 2018/19 were included. Students who were severely ill and those with documented dental disease with treatment were excluded.

Data collection tool, procedure and control

A self-administered questionnaire was used to collect data. An English version questionnaire was adapted by reviewing different literature [10, 13]. The English version questionnaire was translated into Amharic, the local language. Tooth brushing practice is an outcome variable, while others like socio-demographic (age, sex, marital status, year of study, and department were collected as independent variables). The questionnaire have three sections with 47 questions. 19 questions evaluated the knowledge, 14 questions evaluated the attitude, and another 14 questions evaluated the practice of study participants regarding oral hygiene. Pretest was done among Aste Tewodros campus of University of Gondar on 30 students. Facilitators were MSc students of Environmental and occupational health and safety. Orientation was given for facilitators about the aim of the study, ethical considerations and related issues.

Statistical analysis

Data were entered using EPI-INFO version 7 and exported into SPSS version 22 for data checking, cleaning, and analysis. Descriptive statistics were expressed in median, interquartile range, frequencies, and percentages. Where, results were presented in text and tables.

Bivariable logistic regression analysis was used to choose variables for the multivariable logistic regression analysis and variables with p-value less than 0.2 during bivariable analysis were then analyzed using multivariable logistic regression for controlling the possible effect of confounders.

Finally, variables with $p < 0.05$ at 95% UI were declared as significantly associated factors for tooth brushing practice.

Operational definitions

Knowledge: Study participants were asked 15 knowledge questions (Cronbach's alpha of knowledge items = 0.71). Those who have answered the mean and above mean of the knowledge questions were considered as knowledgeable (having good knowledge).

Attitude: Study participants were asked 14 attitude questions with Likert scale (1-strongly agree, 2-agree, 3-neutral 4-disagree, and 5-strongly disagree) (Cronbach's alpha of attitude items = 0.85).

Study participants who scored mean and above mean of the attitudinal questions were considered as having desirable (good) attitude.

Practice: Tooth brushing practice was assessed by self-reported status of brushing teeth at least once per day.

Results

Socio-demographic characteristics of study participants

A total of 423 study participants targeted in this study. Of these 408 participants were recorded with response rate of 96.5%. The mean age of the study participants was 21.2 ± 1.77 (SD) years. A third of the study participants were females. Most of the respondents (94.1%) have heard about oral hygiene. School was the most reported primary source of information regarding oral hygiene (Table 1).

Students' oral hygiene knowledge and attitude were measured by several knowledge and attitude questions. Two hundred nineteen (53.7%) of the participants were knowledgeable about oral hygiene. Above half of the study participants (55.4%) had desirable attitude towards oral hygiene. Only 7.6% of the study participants visited dental clinic over the past 12 months. Majority (88.9%) of the study participants prefer tooth brushing in the morning session (Table 2).

Factors associated with tooth brushing practice

The multivariable analysis showed whether the study participants have ever heard about oral hygiene, being knowledgeable about oral hygiene and whether the study participants floss their teeth at least once per day were determinant factors for tooth brushing practice among the study participants.

The odds of tooth brushing practice among study participants who had ever heard about oral hygiene was 7.76 times (AOR = 7.76, 95% UI (3.79, 15.88)) more than their counterparts who had not heard of oral hygiene. Students who had good knowledge about oral hygiene were 1.66 times more likely to have better tooth brushing practice than students who had poor knowledge (AOR = 1.66, 95% UI (1.01, 2.75)). Students who floss their teeth at least once per day were 2.74 times more likely to brush teeth (AOR = 2.74, 95% UI (1.64, 4.59)) (Table 3).

Discussion

The teeth brushing practice in the current study was 69.6% [95% UI (65.0, 74.5%)]. This is higher than the tooth brushing practice among school pupil in southern Nigeria [14] but lower than tooth brushing practice level reported by a study conducted in Port Harcourt, Rivers State among university students [15], among medical students in India [16], among senior dental students in Nigeria [14], among mothers, fathers and children in sub-urban Nigeria [17], among University Students with access to free dental care [18], among nursing students at Kilimanjaro Christian Medical Centre teaching hospital in Tanzania [19]. The difference in the level of tooth brushing practice might be due to age, educational status, exposure to dental education, access to free dental care and the difference in the level of health services at the study sites. For example, dental education had a significant positive impact on the oral health and behaviour improvement [20].

Females, those with good level of oral hygiene knowledge and those who floss their teeth have better teeth brushing practice in the current study.

The odds of tooth brushing practice among female study participants was 7.76 times better than males. This is in line with previous studies [21–28]. This might be due to higher female concerns about body and facial image, that lets them to seek regular dental care and possess better oral health awareness [25]. But not in agreement with studies conducted among dental and technology students in Lithuania[20], among dental students at the University of Barcelona [29] among Mongolian dentists [30], among Australian and Japanese students [31] and among US students [32]. This difference has been explained by the role of professional education in overcoming such gender differences in oral hygiene behaviour [33].

Study Participants who had good level of knowledge had better self-reported tooth brushing practice than those who had poor knowledge score. This is in line with previous studies [14,17,34,35]. This might be due to the fact that knowledge about oral health and hygiene may increase the sensitivity towards oral health practice and health seeking behaviour. It is assumed that oral health knowledge influences oral health literacy which is supposed to positively affect the oral hygiene behaviour [36]. In the current study participants who reported to floss their teeth at least once per day have better self-reported tooth brushing practice than those who do not floss. This may be because flossing initiates the participants to remember tooth brushing.

Conclusion

In the current study, the self-reported tooth brushing practice among university students was found to be high. Study participants who ever heard about oral health, those with good self-reported knowledge of oral hygiene and those with tooth flossing practice had better tooth brushing practice. Improving the oral hygiene knowledge is important to substantially increase tooth brushing practice. Finally, this study was not without limitation.

Limitations of the study

Since the study was self-reported it may be affected by social desirability bias. Comparing results was difficult as there were limited studies on tooth brushing practice among University students. On top of that, the nature of the study design fails to establish cause-effect relationship.

List Of Abbreviations

AOR: Adjusted Odds Ratio *COR*: Crude Odds Ratio *UI*: Uncertainty Interval

EPI Info: Epidemiological Information *SPSS*: Statistical Package for Social Sciences

Declaration

Ethical approval and consent to participate

Ethical approval was obtained from Ethical Committee of Environmental and Occupational Health and Safety department. After explaining the purpose of the study, written consent was obtained from each study participants. Any potential identifiers were eliminated to ascertain confidentiality.

Consent for publication

Not applicable

Availability of data and materials

The dataset is available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no conflict of interest

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Author's contribution

BD (MSc), HD (MSc) and ZA (MSc) prepared the proposal, participated in statistical analysis and manuscript write-up. All authors reviewed and approved the final manuscript.

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Tables

Table 1. Socio-demographic characteristics of participants, among College of Medicine and Health Sciences students in University of Gondar, Ethiopia 2019 (n=408)

Variables		Frequency (n)	Percent
Age in years (n=359)	18-20	142	39.6
	21-28	217	60.4
Sex	Male	274	67.2
	Female	134	32.8
Marital status	Single	391	95.8
	Married	7	1.7
	Divorced	7	1.7
	Widowed	3	0.7
Department	Medical laboratory	71	17.4
	Medicine	86	21.1
	Health Officer	32	7.8
	Environmental and Occupational health and Safety	34	8.3
	Pharmacy	36	8.8
	Midwifery	50	12.3
	Psychiatry	43	10.5
	Physiotherapy	56	13.7
Year of study	1 st	58	14.2
	2 nd	107	26.2
	3 rd	111	27.2
	4 th	132	32.4
Religion	Orthodox	330	80.8
	Muslim	26	6.4
	Protestant	47	11.5
	Others	5	1.2
Ever heard about oral hygiene	Yes	384	94.1
	No	24	5.9
Source of information	Internet	86	21.1
	Television	61	15.0
	Dentist	24	5.9
	Friends	48	11.8
	School	139	34.1
	Others	26	6.4
Ever used tobacco	Yes	27	6.6
	No	381	93.4
Average monthly pocket money in ETB (n=269)	25-300	84	31.2
	301-500	91	33.8
	501-1000	55	20.4
	1001-4780	39	14.5

Variables	Frequency(n)
Tooth brushing at least once per day	
Yes	284
No	124
Dental flossing at least once per day	
Yes	209
No	199
Dental visit (in past 12 month)	
Yes	31
No	377
Frequency of changing tooth brush at least once every three month	
Yes	242
No	166
Tooth brushing method used (n=386)	
Horizontal (Horizontal charter)	131
Circular (Fones method)	34
Vertical(Leonard's method)	80
Combined (Scrub brush)	141
Dental health Knowledge	
Good	219
Poor	189
Attitude towards dental hygiene	
Desirable	226
Undesirable	182
Preferred tooth brushing time (n=374)	
Morning	325
Before going to bed	48
After each meal	49
Frequency of changing tooth brush (n=374)	
At least once in every three month	242
Not with in three months	132

Variables	Practice		COR (95% UI)	AOR
	Good (%)	Poor (%)		
Sex				
Male	163 (59.5)	111(40.5)	1	1
Female	121(90.3)	13(9.7)	6.34(3.41,11.79)	7.76
Ever heard about oral hygiene				
Yes	271(70.6)	113(29.4)	2.03 (0.88,4.66)	-
No	13(54.2)	11(45.8)	1	
Dental health Knowledge				
Good	165(75.3)	54(24.7)	1.80(1.17,2.75)	1.66
Poor	119(63)	70(37)	1	1
Attitude towards dental health				
Poor	116(63.7)	66(36.3)	1	1
Good	168(74.3)	58(25.7)	1.65(1.08,2.52)	-
Year of study				
1 st	37(63.8)	21(36.2)	1	1
2 nd	77(72)	30(28)	1.46 (0.74, 2.88)	-
3 rd	83(74.8)	28(25.2)	1.68(0.85,3.34)	-
4 th	87(65.9)	45(34.1)	1.10(0.58,2.09)	-
Age in years (n=359)				
18-20	108(76.1)	34(23.9)	1.45(0.90,2.34)	-
21-28	149(68.7)	68(31.3)	1	1
Ever used tobacco products				
Yes	24(88.9)	3(11.1)	3.72(1.10,12.60)	4.22
No	260(68.2)	121(31.8)	1	
Dental visit at least once per year				
Yes	26(83.9)	5(16.1)	2.40(0.90,6.40)	
No	258 (68.4)	119(31.6)	1	
Flossing at least once per day				
Yes	166(79.4)	43(20.6)	2.65 (1.71, 4.11)	2.74
No	118(59.3)	81(40.7)	1	1

*p<0.05, ***p<0.001, COR=Crude odds ratio, UI=Uncertainty interval, AOR= Adjusted odds ratio

Table 2. Oral hygiene related factors among College of Medicine and Health Sciences students in University of Gondar, Ethiopia 2019, 2019 (n=408)

Variables	Frequency(n)
Tooth brushing at least once per day	
Yes	284
No	124
Dental flossing at least once per day	
Yes	209
No	199
Dental visit (in past 12 month)	
Yes	31
No	377
Frequency of changing tooth brush at least once every three month	
Yes	242
No	166
Tooth brushing method used (n=386)	
Horizontal (Horizontal charter)	131
Circular (Fones method)	34
Vertical(Leonard's method)	80
Combined (Scrub brush)	141
Dental health Knowledge	
Good	219
Poor	189
Attitude towards dental hygiene	
Desirable	226
Undesirable	182
Preferred tooth brushing time (n=374)	
Morning	325
Before going to bed	48
After each meal	49
Frequency of changing tooth brush (n=374)	
At least once in every three month	242
Not with in three months	132

Table 3. Associated factors of tooth brushing practice among College of Medicine and Health Sciences students in University of Gondar, 2019 (n=408)

Variables	Practice		COR (95% UI)	AOR
	Good (%)	Poor (%)		
Sex				
Male	163 (59.5)	111(40.5)	1	1
Female	121(90.3)	13(9.7)	6.34(3.41,11.79)	7.76
Ever heard about oral hygiene				
Yes	271(70.6)	113(29.4)	2.03 (0.88,4.66)	-
No	13(54.2)	11(45.8)	1	
Dental health Knowledge				
Good	165(75.3)	54(24.7)	1.80(1.17,2.75)	1.66
Poor	119(63)	70(37)	1	1
Attitude towards dental health				
Poor	116(63.7)	66(36.3)	1	1
Good	168(74.3)	58(25.7)	1.65(1.08,2.52)	-
Year of study				
1 st	37(63.8)	21(36.2)	1	1
2 nd	77(72)	30(28)	1.46 (0.74, 2.88)	-
3 rd	83(74.8)	28(25.2)	1.68(0.85,3.34)	-
4 th	87(65.9)	45(34.1)	1.10(0.58,2.09)	-
Age in years (n=359)				
18-20	108(76.1)	34(23.9)	1.45(0.90,2.34)	-
21-28	149(68.7)	68(31.3)	1	1
Ever used tobacco products				
Yes	24(88.9)	3(11.1)	3.72(1.10,12.60)	4.22
No	260(68.2)	121(31.8)	1	
Dental visit at least once per year				
Yes	26(83.9)	5(16.1)	2.40(0.90,6.40)	
No	258 (68.4)	119(31.6)	1	
Flossing at least once per day				
Yes	166(79.4)	43(20.6)	2.65 (1.71, 4.11)	2.74
No	118(59.3)	81(40.7)	1	1

*p<0.05, ***p<0.001, COR=Crude odds ratio, UI=Uncertainty interval, AOR= Adjusted odds ratio