Knowledge on Toothbrush Contamination and Disinfection Practice among Students of a Dental Institution in Nepal

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ABSTRACT

Introduction: Toothbrush is the most common oral hygiene aid used by millions of people all around the world. Toothbrushes can either be discarded at an interval of three months or can be disinfected by different methods.

Objective: This study was conducted to assess the knowledge on toothbrush contamination and practice of disinfection among dental students and interns of a dental institution of Kathmandu, Nepal.

Methods: A descriptive cross-sectional study was conducted among 212 undergraduate dental students and interns of Kathmandu Medical College, Duwakot, Nepal using a self-administered questionnaire. Mean, standard deviation, percentage were calculated for descriptive statistics.

Results: Mean age of the study participants was 21.28±1.897 years. Most of the interns 18 (69.2%) had some knowledge regarding toothbrush cleaning and disinfection. Majority of the participants 186 (87.73%) reported bacteria as most susceptible microorganisms causing toothbrush contamination and sharing the toothbrush as common mode of transmission of infection. Most of them, 147 (69.34%) did not have any idea about toothbrush disinfection methods for general population. However, they felt it necessary in special needs patients.

Conclusion: This study concluded that there is variable knowledge regarding toothbrush contamination and disinfection practice among undergraduate dental students and interns due the difference in their academic level and experience in the clinical work.

Keywords: Contamination; disinfection; knowledge; practice; toothbrush.

INTRODUCTION

Toothbrush is the most commonly used oral hygiene aid but improper storage of toothbrush leads to its contamination.[1,2] If toothbrush is not properly stored and maintained, it may lead to many dental as well as systemic diseases like septicemia, respiratory, cardiovascular, gastrointestinal and renal problems.[3,4]

American Dental Association recommends that toothbrushes should be replaced approximately every three to four months.[4] Toothbrush can also be disinfected by various methods like chemical agents, herbs, microwaves, ultraviolet radiation and sterile tap water or boiling water.[5,6]

There are many researches published on toothbrush disinfection.[7] However, it has not been considered by oral health professionals and there is need of proper understanding of how it can be easily implemented.[8] Dental health professionals are role models for patients and should have adequate knowledge so that they can advise for daily practice of disinfecting toothbrushes.[9] Therefore, this study was conducted to assess the knowledge of dental students and interns on toothbrush contamination and their practice of disinfection.

METHODS

A descriptive cross-sectional study was conducted among 212 undergraduate dental students and interns of Kathmandu Medical College, Duwakot, Nepal. Census method was applied for selecting study population meeting the eligibility criteria for the study. A proposal was submitted to the Institutional

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Review Committee of Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal and ethical clearance was obtained before conducting the study. Informed consent was obtained from the study participants prior to data collection.

A set of self-administered standard questionnaire validated from previous literature was used as the main tool for data collection.[9] Internal consistency was checked using Cronbach's alpha which was excellent (0.917).

Pretesting was done among nine first batch interns. Self-administered questionnaire was distributed twice in the interval of two weeks. Some modifications in the questions were made as needed, based on the invalid or unwanted response realised in pretesting. The study population were divided into three caterories: Preclinical group (BDS I and II year), Clinical group (III, IV, V year) and Interns. Then, the standard questionnaires were distributed and filled by all dental students and interns.

Data were entered in Microsoft Excel sheet and analysis was done in statistical package of social sciences (SPSS) version 16 software. Mean, standard deviation, percentage were calculated for descriptive statistics.

RESULTS

Among total of 264 eligible participants, 212 (80.30%) completed the questionnaire among which 26 (12.26%) were interns and 186 (87.73%) were undergraduate dental students. The mean age of the participants was 21.28±1.897 years and male/female ratio was 1:4. Most of the study participants 147 (69.3%) were unaware of toothbrush contamination and disinfection.

Total of 19 (73.07%) of interns brushed their teeth twice a day whereas in the pre-clinical group, 54 (68.35%) did the same. Most of the females, 126 (74.55%) brushed twice daily than males.

Distribution of participants according to their toothbrush use, knowledge regarding toothbrush contamination and their practice of disinfection are presented in Table 1, 2, 3 and 4. Most of the participants from all groups kept their toothbrushes in the bathroom with head either being covered or without cap together in a toothbrush holder shared with other family members. However, all the interns and most of the participants from preclinical and clinical groups felt that contact between toothbrushes is an important issue. Majority of the students from pre-clinical group felt that contact with other toothbrushes placed in same holder was the most common source of toothbrush contamination; whereas students from clinical group thought it to be from skin contact or contact in oral cavity and most of the interns stressed it to be because of the external environment.

Majority of the study participants felt that disinfection of toothbrush is necessary but very few practised it themselves regularly. Most of them felt that toothbrush disinfection was only necessary for immuno-compromised or hospitalised patients. Most of the participants from all three groups suggested patients and relatives for changing toothbrush in every three months; some of them suggested for proper storage and disinfection of toothbrush as well.

Table 1: Questions regarding toothbrush use n (%).

Question	Options	Preclinical group	Clinical group	Intern
How often do you brush your teeth?	≤Once a day	22 (27.8)	28 (26.2)	7 (26.9)
	Twice a day	54 (68.4)	7 (72.0)	19 (73.1)
	More than two times a day	3 (3.8)	2 1.9)	-
How often do you change your tooth-brush?	Before three months	12 (15.2)	5 (4.7)	17 (21.5)
	Once in every three months	50 (63.3)	63 (58.9)	39 (36.4)
	After three months or more	17 (21.5)	22 (84.6)	3 (11.5)

Table 2: Questions regarding toothbrush storage n (%).

Question	Options	Preclinical group	Clinical group	Intern
Where do you store your toothbrush?	In bathroom, with brush head not being covered	27 (34.2)	45 (42.1)	10 (38.5)
	In bathroom, with brush head being covered	10 (12.7)	7 (6.5)	4 (15.4)
	Outside the bathroom, with brush head being covered	32 (40.5)	50 (46.7)	8 (30.8)
	Outside the bathroom, with brush not being covered	10 (12.7)	5 (4.7)	4 (15.4)
How do you store your toothbrush?	In a toothbrush holder, shared with other family members	44 (55.7)	72 (67.3)	19 (73.1)
	Separately from toothbrush of other family members	35 (44.3)	35 (32.7)	7 (26.9)

Table 3: Questions regarding toothbrush contamination n (%).

Question	Options	Preclinical group	Clinical group	Intern
In your opinion, is contact between toothbrushes an important issue?	Yes	66 (83.5)	88 (82.2)	26 (100)
	No	13 (16.5)	19 (17.8)	-
In your opinion, which is the most common source of toothbrush contamination?	Oral cavity / Skin contacts	15 (19.0)	48 (44.9)	3 (11.5)
	External environment	29 (36.7)	36 (33.6)	12 (46.2)
	Contact with other toothbrush	35 (44.3)	23 (21.5)	11 (42.3)
In your opinion, which microorganisms are capable of causing toothbrush contamination?	Bacteria	68 (86.1)	94 (87.9)	24 (92.3)
	Fungi / Virus	5 (6.3)	4 (3.7)	1 (3.8)
	Do not know	6 (7.6)	9 (8.4)	1 (3.8)
In your opinion, which is the common mode of transmission of infection from toothbrush?	Sharing the toothbrush	73 (92.4)	97 (90.7)	2 (84.6)
	Sharing the same toothbrush holder	4 (5.1)	7(6.5)	3 (11.5)
	Sharing the tooth paste	-	2 (1.5)	-
	Use of frayed bristled toothbrush	2 (2.5)	1 (0.9)	1 (3.8)

Table 4: Questions regarding toothbrush disinfection n (%).

Question	Options	Preclinical group	Clinical group	Intern
Do you have knowledge about toothbrush cleaning and disinfection?	Yes	20 (25.3)	27 (25.2)	18 (69.2)
	No	59 (74.7)	80 (74.8)	8 (30.8)
If yes, what is your source of information regarding toothbrush contamination and disinfection?	Curriculum	7 (35.0)	13 (48.1)	2 (11.1)
	Scientific journals	2 (10.0)	1 (3.7)	7 38.9)
	Continuing Dental Education	7 (35.0)	5 (18.5)	3 (16.7)
	Media	4 (20.0)	8 (29.6)	6 (33.3)
In your opinion, is toothbrush disinfection necessary?	Yes	77 (97.5)	99 (92.5)	26 (100)
	No	2 (2.5)	8 (7.5)	-
If yes, for whom is toothbrush disinfection necessary?	Everybody	68 (88.3)	74 74.7)	24 (92.3)
	Patients having dental problems/diseases	7 (9.1)	11(11.1)	-
	Special patient groups such as immuno suppressed individuals, hospitalised patients and children	2 (2.6)	14 (14.1)	2 (7.7)
Do you disinfect your own toothbrush?	Yes	15 (19.0)	7 (6.5)	5 (9.2)
	No	64 (81.0)	100 (93.5)	21 (80.8)
Do you advise your patients regarding how often they should change their toothbrushes, where and how their toothbrushes should be stored and how their toothbrushes should be disinfected?	I only make suggestions about frequency of changing their toothbrushes	14 (17.7)	64 (59.8)	20 (76.9)
	Yes, I make suggestions about frequency of changing their toothbrushes and also about toothbrush storage	23 (29.1)	17 (15.9)	1 (3.8)
	Yes, I make suggestions about frequency of changing their toothbrushes and also about toothbrush storage and disinfection	27 (34.2)	21 (19.6)	5 (19.2)
	I make no suggestions at all	15 (19.0)	5 (4.7)	-

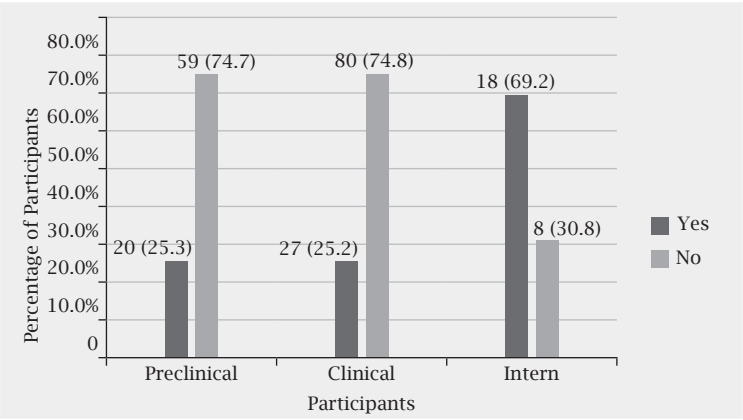

Figure 1: Knowledge about toothbrush cleaning and disinfection n (%).

DISCUSSION

Dental students are the future oral health care providers and educators. It is of utmost importance for dental students to have an idea about toothbrush contamination and disinfection so that they will be in position to make general public aware of the same. Therefore, the present study was conducted to assess the knowledge of dental students and interns of Kathmandu Medical College, Duwakot, Kathmandu regarding toothbrush contamination and their practice of disinfection.

The study results showed that dental interns had better knowledge regarding oral hygiene practice than preclinical and clinical groups. There are many studies reporting that toothbrush bristles are the susceptible region for the growth of the microorganisms. They have also stated that the practice of placing the toothbrush in the bathroom with head being covered lead to the growth of microorganisms.[10,11] American Dental Association recommends the storage of toothbrush in an upright position in an open air separated from contact of other toothbrush to prevent cross contamination.[12] On contrary, majority of the participants of this study stored their toothbrush in the bathroom with head either being covered or without cap in a toothbrush holder shared with other toothbrushes.

Almost all the study participants from all three groups were aware about microorganisms being susceptible for toothbrush contamination and bacteria (Streptococcus mutans) being the major causative agent. This is similar to a study stating Streptococcus mutans as the most viable microorganism to get accumulated in the used toothbrush.[13] Most of the study participants from preclinical and clinical group and all of the interns reported contact between toothbrushes is an important issue. In this study, most of the study participants thought that contact between toothbrush and toothbrush being exposed in the external environment were the common sources of contamination. This finding was similar to a study conducted in India for assessing perceptions of dental students regarding toothbrush contamination and disinfection.[9]

Most of the study participants felt that disinfection of toothbrush is necessary for everyone but neither of them followed nor practised in their daily life. There are many studies suggesting that disinfection of the toothbrush can be done by UV radiation or by using chemical or natural methods to decrease the bacterial load in the toothbrush.[14-17] Therefore, toothbrush disinfection should be made a habitual regular routine so that there would be minimal chance of toothbrush contamination.

The study has few limitations. Since the study was conducted only in a single dental college of Nepal, the results cannot be generalised to the dental students and interns studying in all dental colleges of Nepal. Meanwhile, the students and interns may not be completely truthful in answering the questions.

The study showed that dental students are not fully aware of toothbrush contamination and disinfection. Knowledge about toothbrush disinfection should be included in the curriculum and should be practised in the regular basis.

CONCLUSION

This study has concluded that there is variability in knowledge regarding toothbrush contamination and disinfection among undergraduate dental students and interns due the difference in their academic level and experience in the clinical work. Very few dental students and interns practised toothbrush disinfection themselves and suggested others for the same.

Conflict of Interest: None

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