



## Toothbrush: Knowledge and Practice of Undergraduate Students of Dental Therapy in Enugu, Nigeria

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### Abstract

**Background:** The Dental therapist in Nigeria is trained among other things, to carry out prophylactic cleaning of the teeth of patients and to give oral hygiene instructions. This is important for good oral hygiene status of the patient.

**Objectives:** This study was designed to find out if the dental therapist has enough knowledge to carry out her functions in the oral health care management of patients and if she is putting to practice what she is learning.

**Method:** This is a descriptive cross-sectional questionnaire-based survey among 370 Dental therapy students at the Federal College of Dental Technology, Trans-Ekulu, Enugu State, Nigeria. The questionnaire was divided into three sections consisting of Biodata, Likert-scaled questions, and closed-ended questions to determine knowledge and practice. Data collected were analysed using SPSS statistical package, version 20.

**Results:** Most of the respondents, representing 74% (206) have a good knowledge of toothbrushing when compared with the 26% (74) whose knowledge is fair and 98.6% recommends changing of the toothbrush every 3 months. However, only 1.4% knew about decontamination of toothbrush using chlorhexidine gluconate or sodium hypochlorite. On the care of toothbrush, 96.4% reported that it is not recommended to keep toothbrush in the bathroom, while 100% completely disagreed with keeping toothbrush in a bathroom with attached toilet. The toothbrushing practice of respondents is good as shown by the 78.60% of the respondents.

**Conclusion:** This study shows that the knowledge of the dental therapy student in Enugu is good and can be said to be adequate. She is also putting that knowledge to practice in her personal life and dental practice.

**Keywords:** Toothbrush; Knowledge; Practice; Enugu

### Introduction

Toothbrush is the single most common oral care item found in most homes that can be used individually to maintain an accept-

able oral hygiene status and preventable oral infections, dental caries and periodontal diseases to mention a few [1]. However, while not discouraging the use of toothbrush, there is the believe

that toothbrush could be a pool where large amount of various oral microorganism populates freely and this can lead to serious oral infections [2]. These microorganism when present even in small quantity among healthy subjects, can contaminate a newly sterilized toothbrush immediately on first use and then increase proportionally on the same toothbrush with repeated use [3,4]. However, a good knowledge of the care of the toothbrush and the practice of changing the toothbrush every 3 - 4 months according to the recommendations of experts such as the American Dental Association [1] could lead to the prevention of these microorganism accumulating on the toothbrush.

The dental therapist in Nigeria is trained among other things, to give oral hygiene instructions, demonstrate the effective use of the toothbrush to the patient and carry out prophylactic cleaning of the teeth through scaling and polishing; these functions are similar to the training and functions of the dental hygienist in American [5,6]. Toothbrushes are divided into three types according to the texture of their bristles which are soft, medium and hard bristles. Effective use of the toothbrush according to the American dental association for at least twice daily can reduced plaque in the teeth to a clinically significant level [7]. Acceptable oral hygiene practices such as the regular and effective use of the toothbrush, proper care of the toothbrush, when taught to children at an early age, prevents dental caries and periodontal diseases [8]. Furthermore, it has been reported that sufficient knowledge and education on the benefits of the use of toothbrush would motivate the populace in carrying out regular toothbrushing [8]. On the other hand, when this knowledge is lacking as reported in India [8], due to inadequate public enlightenment on the health benefits of good oral hygiene practices, children who are the most vulnerable have resorted to the use of traditional oral health practices instead of the toothbrushing [8]. The dental therapist in Nigeria like her counterpart in the United States of America has a 4 years training and works under the supervision of the dental surgeon [9].

**Objectives of the Study**

Is the dental therapist training in Nigeria is adequate to equip her to carry out the functions of educating patients on acceptable oral hygiene practices such as the regular and effective use of the toothbrush?

Secondly, this research seeks to find out if the dental therapist is putting into practice her knowledge in her daily life since she must believe in it to be able to motivate her patients?

It is the believe of the authors that answers to these questions would be used to adjust the training of the dental therapist and motivate her on the important role she plays in oral health care management.

**Materials and Methods**

This a descriptive cross-sectional questionnaire-based survey among 370 students in third- and fourth-year Dental therapy students at the Federal College of Dental Technology, Trans-Ekulu, Enugu State, Nigeria. Ethical clearance was obtained from the federal capital territory Health, research and ethics committee. The questionnaire was made up of three sections with the first section, Section A consisting of the biodata such as age, sex and marital status of the student; section B consist of five Likert-scaled questions which was used to determine the knowledge of the respondents while the final part Section C consist of close-ended questions to determine if respondents were putting knowledge to practice.

Data collected were entered, cleaned, and analysed using SPSS statistical package, version 20. Summary statistics and frequency tables were done for all variables. Chi-square test was used to investigate associations between variables.

**Results**

**Socio-demographic characteristics of respondents**

Socio-demographic Characteristics (N = 280)	Frequency	Percentage
<b>Gender</b>		
Male	74	26.4
Female	206	73.6
<b>Age</b>		
≤ 25 years	172	61.4
> 25 years	108	38.6
<b>Ethnicity</b>		
Ibo	186	66.4
Yoruba	42	15.0
Hausa	36	12.9
Others	16	5.7
<b>Marital status</b>		
Single	132	94.3
Married	8	5.7

**Table 1:** Socio-demographic characteristics of dental therapist. Mean age 24.93 ± 2.597 years.

The socio-demographic characteristics of the respondents are presented in table 1. Results showed that most of the participants were aged 25 years and below (61.4%) with the mean age of 24.93 ± 2.597 years. Majority of them were female (73.6%) and single (94.3%). Many were of Ibo ethnicity (66.4%).

**Knowledge of tooth brushing of dental therapist**

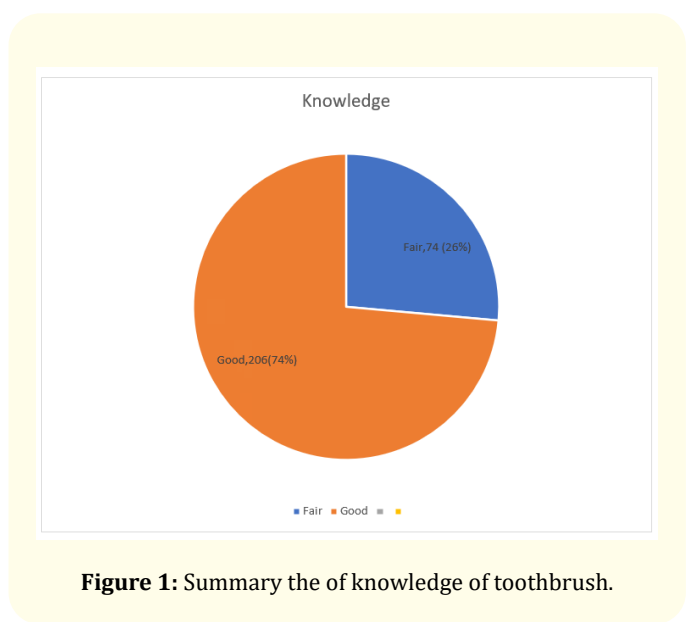
Characteristics (N= 280)	Good Knowledge	Fair Knowledge
Toothbrush to be changed every three months	280 (100)	0
Hard toothbrush could injure the gums	204 (72.9)	76 (27.1)
Toothbrushing twice daily	280 (100)	0
Best toothbrushing habit is first before meals in the morning and last thing after dinner	4 (1.4)	276 (98.6)
Toothpaste recommended for children is not harmful when swallowed	280 (100)	0
Toothbrushing in children begin immediately after first milk teeth appear	276 (98.6)	4 (1.4)
Toothbrush should be kept upright to dry-air	280 (100)	0
It is not recommended to keep toothbrush in the bathroom	270 (96.4)	10 (3.6)
Bathroom with attached toilet is also not recommended to keep toothbrush	280 (100)	0
<b>Knowledge</b>		
Poor		
Fair	74	26.4
Good	206	73.6

**Table 2:** Knowledge of tooth brushing by dental therapist.

All the participants in the study correctly agreed that toothbrush should be changed every three months. Majority of them

(98.6%) agreed that toothbrushing in children should begin after milk teeth appear, however only 2 (1.4%) of them correctly agreed that the option of using the brushing first before breakfast and last thing after dinner was the best toothbrushing habit.

Most of the study participants (72.9) agreed that the toothbrush with hard bristle could injure the gums and all the participants agreed with the idea of placing the toothbrush upright to air-dry, that is not covered. Additionally, 270 (96.4%) agreed that it is wrong to keep toothbrush in the bathroom, while 100% would not recommend keeping toothbrush in a bathroom with attached toilet.



**Figure 1:** Summary the of knowledge of toothbrush.

Majority of the students of Dental therapy in Enugu, representing 74% (206) have good knowledge of toothbrushing when compared with the 26% (74) that have fair knowledge. There was none with a poor knowledge signifying that their training was effective.

**Tooth brushing practice of dental therapy**

Students training as Dental therapist were demonstrating to the children they meet in their training, the effective use of toothbrush and motivating the children with dental education. However, only a very a few of the respondents (1.4%) practice the decontamination of toothbrush with Chlorhexidine gluconate while, the entire number that participated in this study changed their toothbrush every 3 months and they also recommended same practice to their patients.

Characteristics (N= 280)	Good Practice N (%)	Fair Practice N (%)
Use toothbrush and toothpaste for patients	254 (90.7)	26 (9.3)
Teach Horizontal brushing techniques for children	234 (83.6)	46 (16.4)
Children toothpaste is different from adult toothpaste	0	280 (100)
Store toothbrush upright to air-dry after use	256 (90)	24 (10)
Will not store toothbrush enclosed in a can	280 (100)	0
Unacceptable practices for care of toothbrush	280 (100)	0
Water to clean toothbrush after use	276 (98.6)	4 (1.4)
Use of Chlorhexidine gluconate or Sodium Hypochlorite for contamination control in toothbrush	4 (1.4)	276 (98.6)
Recommendation for changing toothbrush	280 (100)	0
Effective use of toothbrush in children	280 (100)	0

**Table 3:** Tooth brushing practice of dental therapy.

The toothbrushing practice of respondents was good as shown by the 78.60% that did it regularly as against the 21.40% that were fair. This signifies that the students are putting knowledge to practice in their daily life, and they are thus in a better position to educate and motivate their patients.

**Association between respondents’ sociodemographic characteristics and knowledge of toothbrushing**

Socio-demographic Characteristics	Toothbrushing knowledge		X <sup>2</sup>	P value
	Good	Fair		
<b>Gender</b>				
Male	52 (70.3)	22 (29.7)	0.282	0.595
Female	154 (74.8)	52 (25.2)		
<b>Age</b>				
≤ 25 years	130 (75.6)	42 (24.4)	0.463	0.496
> 25 years	76 (70.4)	32 (29.6)		
<b>Ethnicity</b>				
Igbo	140 (75.3)	46 (24.7)	11.086	0.011*
Yoruba	38 (90.5)	4 (9.5)		
Hausa	6 (44.4)	20 (55.6)		
Others	12 (75)	4 (25)		
<b>Marital status</b>				
Single	194 (73.5)	70 (26.5)	0.009	1.000
Married	12 (75)	4 (25)		

**Table 4:** Association between respondents’ sociodemographic characteristics and knowledge of toothbrushing.

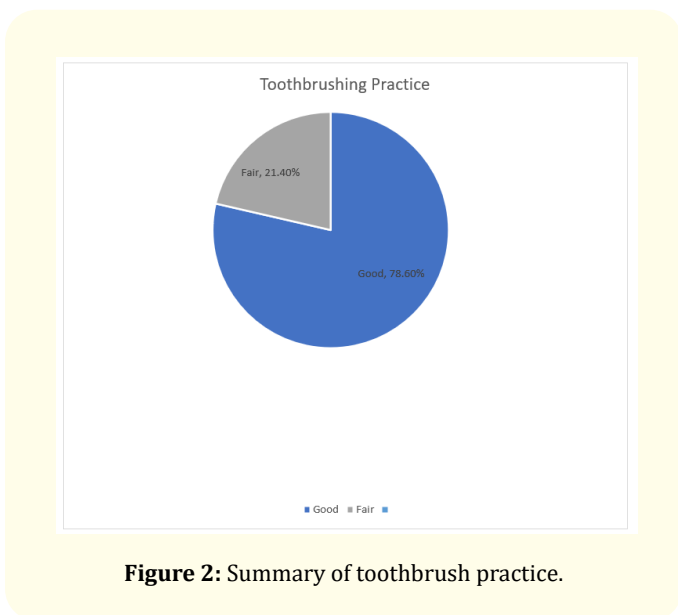
\*: Level of statistical significance.

Results showed that only ethnicity was statistically significantly associated with knowledge of toothbrushing (P < 0.05).

Other socio-demographic characteristics including gender, marital status and age were not statistically significantly associated with knowledge of toothbrushing (P > 0.05).

**Association between respondents’ sociodemographic characteristics and toothbrushing practice**

Results showed that none of the sociodemographic characteristics were statistically significantly associated with toothbrushing practices (P > 0.05).



**Figure 2:** Summary of toothbrush practice.

Socio-demographic Characteristics	Toothbrushing knowledge		X <sup>2</sup>	P value
	Good	Fair		
<b>Gender</b>				
Male	56 (75.7)	18 (24.3)	0.250	0.644
Female	164 (79.6)	42 (20.4)		
<b>Age</b>				
≤ 25 years	134 (77.9)	38 (22.1)	0.058	0.809
> 25 years	86 (79.6)	22 (20.4)		
<b>Ethnicity</b>				
Ibo	148 (79.6)	38 (20.4)	5.944	0.114
Yoruba	26 (61.9)	16 (38.1)		
Hausa	30 (83.3)	6 (16.7)		
Others	16 (100)	0		
<b>Marital status</b>				
Single	208 (78.8)	56 (21.2)	0.064	0.680
Married	12 (75)	4 (25)		
<b>Knowledge</b>				
Good	162 (78.6)	44 (21.4)	0.001	0.973
Fair	58 (78.4)	16 (21.6)		

**Table 5:** Association between respondents’ sociodemographic characteristics and toothbrushing practice.

**Discussion**

The strategic position the dental therapist in Nigeria occupies in the country’s Health care system is such that their knowledge and practice can impart positively on their patients when the knowledge is adequate and the practice is of acceptable level. This descriptive study was done among 280 dental therapist students which consisted of 26.4% male and 73.6% female. The school is located in eastern Nigeria and this probably explains the reason why 66.4% of the respondents are of the Igbo ethnicity, the people who are mainly in eastern Nigeria. The Igbos as a people are known to practice business apprenticeship where a male in the family spend time under the mentorship of an older family member or a friend from the same community, learning a trade over a period, after which he celebrates “freedom” and starts his own trade [10]. This might explain why this study has more females than males who might have left home early in age to learn a trade or engage in some form of commercial business [10].

The knowledge of the use of toothbrush was found to be good among respondents, with females reporting a better knowledge at 74.8% compared to their male counterparts. In this study, changing of toothbrush every 3 months was accepted as the best practice by 98.6% of the participants and this is in consonance with Kumar, *et al.* who recommended in their study that the replacement of the tooth brush should be done periodically [11]. The importance of this habit is to reduce the quantity of microorganism that contaminates the toothbrush resulting in a poor oral hygiene status [12-14]. In addition, 98.6% of the students in this study recommended that toothbrushing should start early in age and this too is in line with the study of Leal, *et al.* who agreed in their research which was done in Brazil stating that children were able to learn different toothbrushing techniques which resulted in adequate plaque control, although children above 5 years of age are believed to exhibited better toothbrush dexterity and were able to learn more toothbrushing techniques [15]. It was also noticed in this study that the association between respondents’ sociodemographic characteristics and knowledge of toothbrushing was high among the Igbos and was statistically significant. However, this cannot be conclusive since the study was done among a predominately Igbo population in Eastern Nigeria, which is their hometown. This assertion is evident in the study of Akinyamoju, *et al.* on oral health knowledge and practice which was carried out in a predominately Yoruba population in Ibadan, Western Nigeria, the hometown of the Yoruba and as expected, the Yoruba ethnic group were in the majority in that study and reported to have better oral health Knowledge and practice than other ethnic groups [16].

While not favouring one toothbrushing techniques over the other, 83.6% of the respondents agreed that children can be taught a variety of toothbrushing methods early in age so that toothbrushing, as a habit, is ingrained in them early. Muller-Bolla and Courson believed while the horizontal method was the most favourable for children up to the ages of 6 to 7 years of age, there was no statistical difference in its effectiveness to reduce plaque when compared with other techniques [17]. Nevertheless, the emphasis is on teaching children below 5 years old, a simple and effective toothbrushing method which they can perform easily due to their age and this can be improved on as they grew older [15]. Proper practice of storing the toothbrush in an open area environment, standing upright to air-dry was done by 90% of respondents, although Naik, *et al.* disagrees that this practice alone is not sufficient to decontaminate the toothbrush [18]. Furthermore, respondents did not practice

or recommend the storing the toothbrush in the toilet or a toilet with attached bathroom environment because of the high presence of pathogens that are deleterious to the oral health that would contaminate the toothbrush in these environment [18]. Practices such as not using the toothbrush at least twice daily [19,20], not changing the toothbrushing every 3 months [11] and not using a toothbrush with a toothpaste [19] were unacceptable practices to all (100%) the respondents. Using water to rinse the toothbrush was the frequent practice to clean the toothbrush for 98.6% of the respondents since the use of any chemical decontaminate like chlorhexidine gluconate or Sodium hypochlorite diluted in water [18] was only known to 4% of the respondents.

### Conclusion

This study was conducted among the dental therapist students in Enugu, Nigeria and has shown that the dental therapist's training has equipped her with sufficient knowledge of the toothbrush and she is putting that knowledge to practice. Thus, she is in prepared to effect a positive change by impacting that knowledge to her patient which would go a long way to improving preventive dentistry and behavioral change in her patient. However, to keep up with current changes in Dentistry, continuous dental education by attending conference and update lectures is highly recommended and of paramount importance. It would be interesting to find out if these knowledge and practise is the same in other dental schools in Nigeria.

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