

# Tongue Hygiene: Knowledge and Practice among School Children in Ajman, UAE

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## Research Article

Received: 20/04/2017

Accepted: 12/05/2017

Published: 16/05/2017

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**Keywords:** Dental hygiene, Oral hygiene, Interdental cleaning

## ABSTRACT

**Background:** Level of oral health knowledge and practice attributes to good oral health.

**Objectives:** The knowledge and practice of school children regarding tongue hygiene and its association with socio-demographic variables are assessed and reported in this article.

**Materials and methods:** This research was conducted among children in one school of grades 6-9 in Ajman, UAE. Data was collected after obtaining permission from the parents and respective school. A self-administered questionnaire was used to collect data from the participants. SPSS version 21 was used for analysis. Inferential statistics was performed to express the association between variables.

**Results:** A total of 175 students from grade six to nine participated in this research, 89 (50.9%) were in the age group 13 years. Among the total number of participants (N=175), 139 (79.4%) supported the importance of cleaning tongue, majority of them (74, 42.3%) believed that the tongue should be cleaned twice daily and 49.1% and 38.9% respectively mentioned that tooth brush and opposite side of the tooth brush should be used for tongue cleaning respectively. Regarding the practice of tongue hygiene 155 (88.6%) were practicing the same, among which 64 (41.3%) reported they clean their tongue twice daily and it was also seen that toothbrush (79, 51.0%) and opposite side of tooth brush (56, 36.1%) were the main materials used for cleaning their tongue. Association of participants' age and grade with their knowledge was not found to be statistically significant. In the case of participants practice on tongue hygiene, its association with age and gender found to be statistically non-significant. Using Fisher's exact tests and Pearson chi-square test, a statistically significant association was found between their knowledge and practice on each statement related to tongue hygiene with p value  $\leq 0.001$ .

**Conclusion:** In conclusion, good knowledge had an impact on their practice. Association between knowledge and practice shows that, there is a need to improve the knowledge of school students on tongue hygiene as it will finally lead to a good practice on oral health

## INTRODUCTION

Oral health is highly associated to one's knowledge and practice. Maintaining good oral hygiene is essential for good oral health. Oral hygiene comprise of brushing, flossing, tongue cleaning and rinsing the mouth. Tongue is considered as the most uncleaned area in the mouth or mostly neglected area in the oral cavity. It is important to have good tongue hygiene to prevent the

occurrence and recurrence of most of the systemic and local diseases. Lack of tongue hygiene leads to lose of taste and affects the taste buds. Clean tongue also reduces or prevents halitosis [1].

There are different ways and tools to clean the tongue. While brushing the teeth one can clean the tongue using the same brush. Tongue scraper may also be used to clean and it helps to remove the bacteria and the debris present on the surface of the tongue. It is important to have a positive attitude to practice healthy oral hygiene behaviour to gain a better physical, social and mental health [2].

Childhood age has been identified as ideal period for inculcating healthy habits. Those children who have a good knowledge and practice regarding oral hygiene will have a better oral health practice and better physical, social and mental health in the later life than others who do not have knowledge and practice [3,4].

School going age is an ideal period to teach them healthy habits which will be retained through adulthood to elderly. Hence, it is imperative to assess the tongue hygiene behaviour among school going children.

### MATERIALS AND METHODS

This cross-sectional survey was conducted among children studying from grade six to nine in one school in Ajman, UAE. All the children who agreed to participate in the research were included. Ethics and Research committees’ approval from the institute was sought. After obtaining informed consent from the parents, a self-administered questionnaire was distributed among the participants. The self-administered questionnaire had socio-demographic characteristics, knowledge on tongue hygiene, importance of tongue hygiene and their practice related to tongue hygiene especially the tools used to clean the tongue.

Data were collected from the participants when they were in the classrooms and during their free time. Investigators were present in the classroom at the time of completion of the questionnaire to answer any questions raised by the participants. Later the data were fed onto Excel spread sheet and analysed using SPSS version 21. Descriptive statistics was used to describe the data. Inferential statistics was used to test the association between variables. Statistical significance was set at  $p \leq 0.05$ .

### PROPOSED SOLUTION

A total of 175 students from grade six to nine participated in this research, 89 (50.9%) were in the age group 13 years. The participant’s age ranges between 11 and 15 years. All participants were Arab nationals.

**Table 1.** Distribution of knowledge on tongue hygiene.

Knowledge on Tongue hygiene	Groups	No.	%
Importance of cleaning the tongue	Yes	139	79.4
	No	9	5.1
	Don't know	27	15.4
Frequency of cleaning the tongue	once daily	51	29.1
	twice daily	74	42.3
	once weekly	5	2.9
	twice weekly	1	0.6
	after brushing	44	25.1
Material to be used to clean the tongue	tooth brush	86	49.1
	opposite side of tooth brush	68	38.9
	tongue cleaner	19	10.9
	fingers	2	1.1

Among the total number of participants (N=175), 139 (79.4%) supported the importance of cleaning tongue and 27 (15.4%) were not aware of tongue hygiene; 9 (5.1%) did not give any importance for tongue hygiene. Majority of them (74, 42.3%) believed that the tongue should be cleaned twice daily and only 1(0.6%) reported twice weekly; 49.1% and 38.9% respectively mentioned that tooth brush and opposite side of the tooth brush should be used for tongue cleaning respectively (Table 1).

Distribution of students’ knowledge on tongue hygiene shows that almost three fourth of the participants were aware of the importance of tongue hygiene; more than one fourth of them aware of importance of cleaning the tongue once daily and half of the participants suggesting use of tooth brush as the suitable material to clean the tongue.

**Table 2.** Distribution of practice on tongue hygiene.

Practice on Tongue Hygiene	Groups	No.	%
Do you clean your tongue?	Yes	155	88.6
	No	20	11.4
Frequency of cleaning the tongue	once daily	47	30.3
	twice daily	64	41.3
	once weekly	3	1.9
	twice weekly	3	1.9
	after brushing	38	24.5
Material used to clean the tongue	tooth brush	79	51.0
	opposite side of tooth brush	56	36.1
	tongue cleaner	19	12.3
	fingers	1	.6

Regarding the practice of tongue hygiene described in **Table 2**, 155 (88.6%) were practicing the same, among which 64 (41.3%) reported they clean their tongue twice daily and 47(30.3%) once daily. It can also see that one fourth of the participants performing tongue hygiene after each brushing. It was also seen that toothbrush (79, 51.0%) and opposite side of tooth brush (56, 36.1%) were the main materials used for cleaning their tongue. Tongue cleaners are widely available in the market for the mentioned purpose even if it is not advisable, only 19 (12.3%) students found to be depending on the same for tongue hygiene.

Distribution of practice on tongue hygiene shows a major portion of the students care about tongue cleaning and practices it, of which more than one fourth of them correctly practicing once daily and half of the participants clean their tongue using an material such as toothbrush.

**Table 3.** Distribution of correct and incorrect knowledge on tongue hygiene.

Knowledge questions on Tongue Hygiene	Correct Knowledge		Incorrect Knowledge	
	No.	%	No.	%
Is it important to clean the tongue (Yes)	139	79.4	36	20.6
How often tongue should be cleaned (once daily or after brushing)	95	54.3	80	45.7
What should be used to clean the tongue(Tooth brush)	86	49.1	89	50.9

Correct and incorrect knowledge on tongue hygiene is disseminated by giving a score of one for their correct knowledge and zero for incorrect knowledge. Participants’ knowledge was considered as correct if they gave importance to tongue hygiene and cleaned the tongue once daily/after brushing using tooth brush. If they chose statements other than the correct ones, the sum of those point to their incorrect knowledge on tongue hygiene.

**Table 3** is regarding the correct and incorrect knowledge of participants on the tongue hygiene where 139 (79.4%) of the participants correctly found it important to clean the tongue, there was wrong knowledge reported by 36 (20.6%) participants on the same. Knowledge about frequency of cleaning the tongue was incorrect for 80 (45.7%) participants stating twice daily/once or twice weekly. Regarding the material to be used to clean the tongue, almost same percentage of students (50%) reported correctly and incorrectly as tooth brush and other methods.

**Table 4.** Distribution of correct and incorrect practice on tongue hygiene.

Practice on tongue hygiene	Correct Practice		Incorrect Practice	
	No.	%	No.	%
Do you clean your tongue (Yes)	155	88.6	20	11.4
How often do you clean your tongue (once daily or after brushing)	85	54.8	70	45.2
What do you use to clean your tongue (Tooth brush)	79	51.0	76	49.0

Correct and incorrect practice on tongue hygiene is expressed by giving a score of one for their correct practice and zero for incorrect practice. Participants’ practice was considered as correct if they perform tongue cleaning once daily/after brushing with tooth brush. If their choice of statements was wrong, sum of these gave their incorrect practice on tongue hygiene.

**Table 4** describes the practice of tongue hygiene by the 175 participants where 155 (88.6%) of the participants had a correct practice of doing tongue hygiene and improper practice is seen in 20 (11.4%) students. Among the students who clean the tongue, 45.2% did not follow the appropriate number of times to clean the tongue as once daily or after brushing. Nearly half of the participants (76, 49%) were not using tooth brush to clean the tongue as part of correct practice.

**Table 5.** Distribution of knowledge and practice score on tongue hygiene.

Knowledge and Practice score on tongue hygiene	Groups	No.	%
Knowledge on Tongue Hygiene	Score ≤ 2	132	75.4
	Score >2	43	24.6
Practice on Tongue Hygiene	Score ≤ 2	141	80.6
	Score >2	34	19.4

Correct and incorrect knowledge/practice are grouped to compute their total score on tongue hygiene in terms of knowledge and practice. As there are three statements each to measure their knowledge level and practice, their score ranging from zero to three where zero gives an impression of no correct knowledge/practice and if they obtained three, participants knowledge is complete or following proper practice of tongue hygiene.

The **Table 5** is regarding knowledge and practice of tongue hygiene where participants' score is divided as below average score (≤2) and above average score (>2). It was found that 132 (75.4%) participants scored below average and 43 (24.6%) scored all three correctly by mentioning correct knowledge on the number of times tongue should be cleaned and the material to be used. When it comes to their practice on tongue hygiene, almost same result could be seen with 80.6% having a below average score and 19.4% with a good score by following the correct way of cleaning the tongue as a part of oral hygiene. It was also observed that 7(4%) participants had no knowledge on tongue cleanliness and 20(11.4%) were not practicing proper tongue hygiene measures.

**Table 6.** Association between socio-demographic characteristics and knowledge on tongue hygiene.

Socio-demographic Characteristics	Groups	Knowledge on Tongue Hygiene				P value
		Score >2		Score ≤ 2		
		No.	%	No.	%	
Age	<13 years	22	25.6	64	74.4	NS
	≥ 13 years	21	23.6	68	76.4	
Grade	6th	17	27.9	44	72.1	NS
	7th	11	33.3	22	66.7	
	8th	9	22.0	32	78.0	
	9th	6	15.0	34	85.0	
Nationality	Arabs	43	24.6	132	75.4	--
	Non-Arabs	--	--	--	--	

As level of knowledge varies with respect to our age, level of education and the place of living, **Table 6** compares students' socio-demographic characteristics like age, grade and nationality with their knowledge score on tongue hygiene. Regards to the age categorization, almost equal number of participants (25%) from each group scored correctly for all three questions on knowledge part and majority of both the groups (75%) obtained below average score. When it comes to point of influence of grade on their knowledge, it is noticed that 11(33.3%) of 7th grade scored all three statements correctly whereas from 6th grade it was 27.9% and, 22% and 15% from 8th and 9th grade respectively. In terms of nationality, all students were Arabs and most of the students (132, 75.4%) scored below the average level. Association of participants' age and grade with their knowledge was not found to be statistically significant.

**Table 7.** Association between socio-demographic characteristics and Practice on tongue hygiene.

Socio-demographic Characteristics	Groups	Practice on tongue hygiene				P value
		Score >2		Score ≤ 2		
		No.	%	No.	%	
Age	<13 years	17	19.8	69	80.2	NS
	≥ 13 years	17	19.1	72	80.9	
Grade	6th	12	19.7	49	80.3	NS
	7th	9	27.3	24	72.7	
	8th	8	19.5	33	80.5	
	9th	5	12.5	35	87.5	
Nationality	Arabs	34	19.4	141	80.6	--
	Non-Arabs	--	--	--	--	

Since age, education qualification and the living place has a valuable influence on our practice of tongue hygiene, **Table 7** describes participants' practice score according to their socio-demographic characteristics. Related to age, majority of the students scored below the average level and found that only 17 (19%) participants of each age group mentioned their correct practice of tongue cleaning as once daily and tooth brush as the material for performing tongue hygiene. It was also observed

that 7th grade students of 27.3% had a good practice on tongue hygiene compared to 12.5% of 9th grade, almost 20% of 6th and 8th grade respectively. Although 19.4% of Arabs followed good practice, most of the Arabs (80.6%) scored on practice of tongue hygiene on the below average level. In the case of participants practice on tongue hygiene, its association with age and gender found to be statistically non-significant.

**Table 8.** Association between knowledge and practice on tongue hygiene.

Knowledge on Tongue Hygiene	Group	Practice on Tongue Hygiene				P value
		Correct Practice		Incorrect Practice		
		No.	%	No.	%	
Importance of clean the tongue	Correct Knowledge	134	96.4	5	3.6	p≤0.001 (by Fishers exact test)
	Incorrect knowledge	21	58.3	15	41.7	
Frequency of tongue cleaning	Correct Knowledge	39	41.1	56	58.9	p≤0.001
	Incorrect knowledge	11	13.8	69	86.3	
Material to be used to clean the tongue	Correct Knowledge	70	81.4	16	18.6	p≤0.001
	Incorrect knowledge	9	10.1	80	89.9	

This study is mainly concerned with students’ knowledge and practice on oral hygiene and almost all of them admitting tongue hygiene is a part of oral hygiene indicates the importance of association between their knowledge and practice on tongue cleanliness. Hence it is seen that 134 (96.4%) students with correct knowledge on the importance of tongue hygiene follows correct practice, 70 (81.4%) have correct knowledge on the material to be used for cleaning the tongue who practices correctly with tooth brush and 39 (41.1%) with a correct knowledge on the number of times to be cleaned the tongue, correctly practices once daily/after brushing (**Table 8**).

Using Fisher’s exact tests and Pearson chi-square test, a statistically significant association was found between their knowledge and practice on each statement related to tongue hygiene with p value ≤ 0.001.

## DISCUSSION

It has been reported that the derbis in the mouth are responsible for 90% of oral malodor [5] and it is also stated that about 50% of this oral malodor due to poor tongue hygiene [6]. Unless the tongue is cleaned properly, the resultant organisms in the tongue contribute halitosis, tooth decay and enormous plaque scores on the mouth [7,8]. Regarding the importance of tongue hygiene, majority of our study participants (139, 79.4%) were well aware and 155 participants (88.6%) were cleaning their tongue in their daily life.

A research conducted on oral health knowledge, attitude and practice among school students and teachers revealed that almost all teachers cleaned their tongue regularly; 84% of them use tongue cleaner to clean their tongue and 67% of the teachers used mouthwash in addition to regular brushing [3]. In the present study, 96.1% of the participants practice on a daily basis in terms of once/twice daily or after brushing; only 12.3% of them use tongue cleaner as a tool for cleaning the tongue and 53.5% participants depend on mouth wash along with daily brushing.

Another study reported that tongue cleaning is an important element in maintaining proper oral hygiene and among their study participants, 81% of school children were practicing tongue hygiene [9]. In the current study among secondary school students, it was found as 88.6%.

A descriptive study conducted among secondary school students in Iringa municipality reported that most of their participants believed that poor oral hygiene causes bad breath and it can be treated by proper tooth and tongue hygiene [10]. Our study results also reports that most of the participants (139, 79.4%) are aware about the importance of tongue hygiene as an oral hygiene measure and practices in their daily life.

A study conducted in Saudi Arabia concluded that there is a need to emphasize on tongue hygiene measures when oral hygiene instructions are given [11]. In our study, 31 (20%) participants who practice tongue cleaning reports bad breath may be attributable to improper oral hygiene.

Another article says tongue cleaning is a practice which is not highly discussed within the dental community and tongue cleaning has become an integral part of oral care in the regions such as Africa, Arabia, India; very less in minds of United States. It is also pointed out that practicing tongue cleaning can complement oral care without replacing daily brushing and flossing [12]. In the present study result shows that more than three fourth of the participants are well aware (79.4%) and among them (88.6%) practicing in their day today life.

In a study conducted in New York found that 80%-90% of bad breath is due to bacteria on the tongue [13]. In the present study, 30 (20%) participants who practice tongue cleaning admit that bad breath is attributable to inappropriate oral hygiene.

Another study reported that tongue is the largest niche for microorganisms in the oral cavity and area for accumulating oral debris <sup>[14]</sup>. In the present study 79.4% participants possess correct knowledge on tongue hygiene and only 5.1% not giving importance to tongue cleaning practice.

Another study reported that brushing twice a day and use of toothbrush with a built in tongue scraper for cleaning the tongue can eliminate chronic bad breath <sup>[15]</sup>. In the current study, majority of them (79, 51%) using toothbrush as the suitable tool for cleaning the tongue which was identified as the correct practice and 56 (36.1%) uses back side of the toothbrush as a tool for tongue hygiene.

Another study conducted in India reported that 77% of their participants cleaned their tongue either by tongue cleaner (55%), tooth brush (18%) or finger (4%) and a few (23%) never cleaned their tongue <sup>[16]</sup>. According to the present study, majority used tooth brush and back side of tooth brush for cleaning the tongue, followed by tongue cleaner, and only one used finger to clean the tongue.

In a research conducted to promote evidence based practice in the assessment and intervention of oral and dental health recommend to perform oral hygiene including brushing the tongue using a soft toothbrush, at least twice daily and perform physical examination of teeth, tongue, lips to have better oral health <sup>[17]</sup>. The present study also found that most of the participants used toothbrush or backside of toothbrush to clean their tongue. Majority brush their tooth twice daily for better oral health.

According to one research conducted regarding daily biofilm control and oral health, it was reported that about 67% of intraoral surfaces are not reached and cleaned by brushing, tongue cleaning, flossing or any other interproximal devices and can be colonized by pathogenic microorganisms <sup>[18]</sup>. This shows proper oral hygiene cannot be attained even if most of the participants followed a correct practice along with the correct knowledge as presented in the present study. Hence, a continuous effort is necessary on cleaning teeth, tongue and mouth by implementing appropriate dental hygiene techniques and life style behaviors.

## **CONCLUSION**

In conclusion, the tongue hygiene knowledge and practice of secondary school students was adequate, but further improvements can be encouraged through well planned school based oral health education programs. This would lead to enhancement of the oral hygiene practices from the childhood itself. Association between knowledge and practice shows that, there is a need to improve the knowledge of school students on tongue hygiene as it will finally lead to a good practice on oral health. This can be achieved by conducting regular oral health education as a basic start and can be extended to large number of community based oral health camps.

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