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PREDICTORS OF ORAL HYGIENE PRACTICES AMONG PRIMARY SCHOOL CHILDREN OF ALZINTAN CITY, LIBYA

Al Trabelsi N.A[1]. Muhamad Hanafiah Juni*[1]. Huda BZ[1]

[1]Department of Community Health, Faculty of Medicine, Universiti Putra Malaysia 43400 UPM Serdang, Selangor, Malaysia.

*Corresponding author: Muhamad Hanafiah Juni[1]; email:hanafiah_juni@upm.edu.my.

ABSTRACT

Background:

Good oral health is essential for the well-being and development of young children. Preservation of good oral hygiene in children is important for the development of strong, healthy teeth and to decrease the possibility of dental caries. Oral health is maintained by regular eating and drinking, as well as daily mechanical and pharmacological cleaning of the mouth, for example, brushing teeth with fluoride toothpaste and flossing. The aim of the study is to determine oral hygiene practices among public primary school children in Al Zintan City, Libya.

Methodology

A cross sectional study was conducted in three public primary schools in Al Zintan City, Libya. A total of 100 school children aged 9-12 years old participated in the study. Random sampling method was used.

Result

Response rate was 92%. There was 53.3% of respondents who had correct practices on oral hygiene, and 46.7% of respondents had incorrect practices on oral hygiene. It was observed that statistically significant association was found between oral hygiene practices and different age groups of respondents (P = 0.04). There was no significant association between oral hygiene practices and other socio demographic characteristics (P > 0.05). No statistically significant association regarding oral hygiene practices between children with high and low knowledge, good and bad dietary habits, positive and negative dental history (P > 0.05). Oral hygiene practices are significantly associated with attitude toward oral hygiene among primary school children of Al Zintan City, Libya (P < 0.01).

Conclusion

Correct oral hygiene practices is better among school children of older age. In addition, school children whose father had higher education level have correct oral hygiene practices. Attitude towards oral hygiene is one of the important predictors of oral hygiene practices.

Keywords: Oral hygiene practices, associate factors, school children

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1.0 Introduction

Good oral health is essential for the well-being and development of young children (Malden et al., 2008). Preservation of good oral hygiene in children is important for the development of strong, healthy teeth and to decrease the possibility of dental caries. Oral health is maintained by regular eating and drinking, as well as daily mechanical and pharmacological cleaning of the mouth, for example, brushing teeth with fluoride toothpaste and flossing (Johnstone, 2010). In childhood, the child is prone to dental caries resulting from liquids, such as sweetened milk. Children's health and health care are usually affected by their parents' decision. Therefore, parents, together with physicians, play an essential role in order to achieve the best oral health outcomes for their young children (Whinnie, 2005). Therefore, baby teeth should be cleaned using a washcloth, and young babies should also have their teeth and tongues brushed with soft brushes on a regular schedule, it is responsibility of parents to teach children the correct way of brushing their teeth with fluoride toothpaste, to take them for dental check-ups, and eating food that will maintain optimal health (Lian et al., 2010).

Most oral diseases are directly related to poor oral hygiene. Oral disease can be considered a public health problem due to its high prevalence and significant social impact. Chronic oral disease typically leads to tooth loss, and in some cases has physical, emotional and economic impacts: physical appearance and diet are often worsened, and the patterns of daily life and social relations are often negatively affected. These impacts lead in turn to reduce quality of life. To minimize these negative impacts of chronic oral disease, there is thus a clear need to reduce harmful oral health habits. Such a reduction can be achieved through giving instructions regarding proper practice of oral hygiene (Smyth et al., 2007). However, in Libya there are several factors influencing dental health among school children such as exposure to fluoride, diet and intervention by the dental services (Huew, 2010). Correct oral hygiene practice is an important step towards good oral health (Arlene,2012). Improvement in oral hygiene practices among children becomes important due to factors such as irregular dental visits, fright gained by dental treatment, high costs of dental care, sugary intake, plaque control, fluoride exposure and lack of parental support among the children (Yabao et al., 2005).

Development of caries during the primary dentition often results into caries development in the permanent and mixed dentition as well. Those aged 6 to 11 years old are at the mixed dentition stage; therefore, it is imperative to study this age group in order to develop necessary intervention and education in the area of oral health (Kassawara et al., 2010). Good oral hygiene can prevent a number of diseases in the mouth and is a key to the overall health (Relf et al., 2009; Naidoo & Myburgh, 2007). Good knowledge, correct practices and positive attitudes about oral hygiene and oral health care among students could make it possible to improve oral health and bring quality of life for children (Quandt, 200; Ranganathan & Hemalatha, 2006; Wårdh et al., 2008; Nicolas et al., 2007). Learning brushing techniques and adapting to oral hygiene in early life course guarantees the effectiveness of these practices in preventing major dental and periodontal disease in one's lifetime (Jabarifar et al., 2011; Weeks & Fiske, 2006). In order to perform healthy practice regarding oral hygiene, the assessment of factors associating with practice on oral hygiene is essential. Considering that oral health is linked to overall health, oral hygiene is important to the overall wellbeing . Preservation of correct oral hygiene can prevent many problems which can interfere with eating, speaking, daily activities and self-esteem of individuals (Parasd et al., 2010).

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2.0 Methodology

2.1 Study sample

A cross sectional study was conducted in three public primary schools in Al Zintan City, Libya. A total of 100 school children aged 9-12 years old invited participate in the study. The inclusion criteria for this study were primary school children, resident in Al Zintan City, Libya. Primary school children registered in the three primary schools in Al Zintan City, Libya during time of study aged 9 to 12 years old and were present on the day of study. Sampling method was based on stratified random sampling from proportions of primary school children in each school.

2.2 Data collection

A self-constructed questionnaire was used in this study, which comprised of five sections: Section A: Socio-demographic characteristics consisted of nine questions including age, gender, level of parent's education and role of parents in oral health care of their children. Section B: Oral hygiene practices consisted of ten questions each with yes, no, and I do not know responses. Oral hygiene practice has been categorized into correct practices and incorrect practices based on the mean of distribution curve of the responses (Dakhili et al., 2014). Section C: Knowledge regarding oral hygiene consisted of ten questions each with yes, no, and I do not know responses (Smyth, 2009). Section D: Attitude toward oral health care consisted of nine questions each with five points based on Likert scale (Smyth, 2009). Section E: Dietary habit consisted of ten questions each with yes, no, and I do not know responses (Mafuvadze, 2012). Section F: Dental history of child consisted of six questions each with yes, no, and I do not know responses (Lian et al., 2010). Oral hygiene practice is defined as practice which is routinely done toward prevention of oral diseases. In this study, oral hygiene practice has categorized into correct practices and incorrect practices based on the mean of distribution curve of the responses that determined by distribution of data based on the responses to ten questions each with yes, no, I don't know answer (Dakhili et al., 2014). Independent variables include knowledge regarding oral hygiene, attitude toward oral hygiene, dietary habits and dental history of child. The questionnaire has given to supervisory committee and one dental professional who are experts in the field for assessment of content validity.

2.3 Data analysis

Data that were collected was analyzed by using Statistical Package of Social sciences SPSS for version 22 software. The level of significance in this study has been set at $P < 0.05$. Univariate analysis which is descriptive analysis was used to illustrate the socio- demographic characteristics of respondents, prevalence of oral hygiene practices and determination of factors influencing oral hygiene practices. Bivariate analysis was used to test the difference and association between study variables. The test involved in bivariate analysis was Chi square test to illustrate the association between dependent and independent variables. Multivariate analysis, the multiple logistic regression tests was conducted to determine the main predicting variables that influence oral hygiene practices. This study was conducted after receiving ethical approval from Ethics Committee for Research Involving Human Subject, University Putra Malaysia. Permission obtained from the principal of education in Al

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Zintan city, Libya for conducting and supervising this study. Consent letter has been sent to parents to get their consent for their children to participate in this study. Pupils have been given some explanations about the objectives of study.

3.0 Result

3.1 Response rate

Primary schoolchildren of both genders attending 3 primary schools in Al Zintan City were invited to participate in the study. Total of 92 children out of the 100 children have completed the questionnaire thus giving a response rate of 92%. The main reasons for non-responses in the 8 children who did not take part were lack of parental consent and absence of the school children from school on the day of questionnaire distribution.

3.2 Characteristics of respondents

The socio demographic characteristics of the school children are shows in Table 1. In this study there were 92 participants, whereby all of them are primary school children resident in Al Zintan city, Libya. There were 48 (52.2%) respondents who fall under young age group and 44 (47.80%) of respondents from old age group. This study involved both male and female respondents which comprised of 45 male respondents with percentage of 48.90% and 47 females' respondents with the percentage of 51.10%. There were 3 (3.30%) of mothers with primary education level, 45 (48.90%) of mothers with secondary education level and 44 (47.80%) of respondents their mothers from tertiary education level. There were 5 (5.40%) of fathers with primary education level, 29(31.50%) fathers with secondary education level and 58 (63%) of respondents whom their father had tertiary education level. In addition, There were about 38 (41.30%) of respondents who their parents with good role towards oral health care and 54 (58.70%) of respondents who their parents with bad role toward oral health care.

Table 1: Characteristics of respondents

Variable	Frequency (n)	%
Age		
Young	48	52.20
Old	44	47.80
Gender		
Male	45	48.90
Female	47	51.10
Level of mother education		
Primary	3	3.30
Secondary	45	8.90
Tertiary	44	47.80
Level of father education		
Primary	5	5.40

Secondary	29	31.50
Tertiary	58	63.00
Role of parents in oral health care		
Good role	38	41.30
Bad role	54	58.70

3.3 Prevalence of oral hygiene practices among respondents

3.3.1 Total oral hygiene practices score of the respondents

Table 2 shows the distributions of respondents according to their oral hygiene practices scores .This study revealed that 53.3% (n = 49) of respondents had correct oral hygiene practices, and 46.7% (n = 43) of respondents have incorrect oral hygiene practices.

Table 2: Total distribution of oral hygiene practices among respondents (n = 691)

	n (%)
Total practices score	
Correct practices	49(53.3)
Incorrect practices	43(46.7)

3.3.2 Prevalence of oral hygiene practices according sociodemographic characteristics among respondents

Table 3 :Prevalence of oral hygiene practices among respondents according sociodemographic characteristics (n = 92)

School children characteristics	**Prevalence of oral hygiene practices**	
	Correct practices %(n)	**Incorrect practices %(n)**
Age		
Young	42.9(21)	62.8(27)
Old	57.1(28)	37.2(16)
Gender		
Male	46.9(23)	51.2(22)
Female	53.1(26)	48.8(21)
Mothers education level		
Primary	6.1(3)	0(0)
Secondary	42.9(21)	55.8(24)

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Tertiary	51.0(25)	44.2(19)
Fathers education level		
Primary	2.0(1)	9.3(4)
Secondary	40.8(20)	20.9(9)
Tertiary	57.1(28)	69.8(30)
Role of parents in oral health care		
Good	49.0(24)	32.6(14)
Bad	51.0(25)	67.4(29)

*** Significant at P< 0.05**

Table 3 presented the prevalence of oral hygiene practices among primary school children in Al Zintan City, Libya. From descriptive analysis, about n = 21(42.90%) of young age respondents had correct oral hygiene practice. However, approximately n = 27 (62.8%) of respondents of the same age had incorrect oral hygiene practices. About n = 28 (57.1%) of school children of old age respondents reported correct oral hygiene practices while n = 16 (37.2%) of respondents of the same age group were practicing incorrect oral hygiene. About n = 23 (46.9 %) of male respondents reported correct oral hygiene practices and n = 22 (51.2%) of male respondents reported incorrect oral hygiene practices. However, about n = 26 (53.1%) of female respondents had correct oral hygiene practices and n = 21 (48.8%) of female respondents had incorrect oral hygiene practices. Prevalence of correct and incorrect oral hygiene practices among school children whose their mothers with primary level of education was n = 3 (6.1%) and none respectively, among children whose their mothers with secondary education level was n = 21 (42.9%) and n = 24 (55.8%) respectively.

Children whose mothers of tertiary education level was n = 25 (51 %) have correct oral hygiene practices and n = 19 (44.2%) had incorrect oral hygiene practices. Regarding prevalence of oral hygiene practices among school children of different education level of fathers, there were n = 1(2.1%) of respondents whose their fathers were primary education level reported correct oral hygiene practices and n = 4 (9.3%) of respondents of the same education level of fathers reported incorrect oral hygiene. However, prevalence of correct oral hygiene practices was n = 20 (40.8%) among children whose fathers of secondary education level while n = 9 (20.9%) of school children of same education level of fathers reported incorrect oral hygiene practices. On other hand, there were n = 28 (57.1%) of respondents where their fathers are of tertiary education level practicing correct oral hygiene and n = 30 (69.8%) of respondents whose also their fathers of tertiary education level but practicing incorrect oral hygiene practices. Prevalence of correct oral hygiene was n = 24 (49%) among school children with good role of parents in oral health care of their children and n = 14 (32.6%) incorrect oral hygiene practices were shown among school children whose their parents had good role toward oral health care. Correct oral hygiene practices among school children with bad role of their parents toward oral health care was n = 25 (51%) and incorrect

oral hygiene practices among school children of bad role of their parents toward oral health care was n = 29 (67.4%).

3.4 Association between socio demographic characteristics and oral hygiene practices among respondents

Bivariate analysis has been conducted to find the association between socio demographic characteristics and practices on oral hygiene. According to Table 4 socio demographic characteristics involved were age, gender, level of mother education, level of father education and role of parents in oral health care. It was observed that statistical association was found between oral hygiene practices and age groups of respondents (P = 0.04).

There was no significant association (P = 0.16) between gender and oral hygiene practices with more female children (53.1 %) in comparison with male children (46.9 %) have proper oral hygiene practices. Regarding level of mothers education, there was no significant association between different oral hygiene practices and level of mother education with high percentage of school children who's their mother from tertiary education level (51%) practicing correct oral hygiene practices (P =0.16).

There was significant association between father education level and oral hygiene practices (P < 0.05), most children who had good oral hygiene practices were their fathers from tertiary education level education level (57.1%). It was observed that there was no significant association between role of parents in oral health care and oral hygiene practices (P = 0.08).

Table 4: Association between socio demographic characteristics and oral hygiene practices among respondents

Variable	Oral hygiene practices		χ^2	P value
	Correct practice n (%)	Incorrect practice n (%)		
Age			3.64	0.04*
Young	21(42.9)	27(62.8)		
Old	28(57.1)	16(37.2)		
Gender			0.16	0.42
Male	23(46.9)	22(51.2)		
Female	26(53.1)	21(48.8)		
mother education level			3.64	0.16
Primary	3(6.1)	0(0)		
Secondary	21(42.9)	24(55.8)		
Tertiary	25(51)	19(44.2)		
Father education level			5.67	0.05
Primary	1(2.0)	4(9.3)		
Secondary	20(40.8)	9(20.9)		
Tertiary	28(57.1)	30(69.8)		

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Role of parents in oral health care			2.54	0.08
Good role	24(49)	14(32.6)		
Bad role	25(51)	29(67.4)		

*** Significant at P< 0.05**

3.5 Association between oral hygiene practices and its influencing factors (knowledge, attitude, dietary habits, and dental history)

Table 5 shows the distribution of oral hygiene practices and its associated factors (knowledge, attitude, dietary habits, and dental history). Bivariate analysis revealed no statistical significant association regarding oral hygiene practices between children with high and low knowledge (P = 0.18). Oral hygiene practices are significantly associated with attitude toward oral hygiene among primary school children of Al Zintan City, Libya (P < 0.01). There was no significant association between oral hygiene practices and dietary habits of respondents (P = 0.17). However, oral hygiene practices are not significantly associated with dental history of respondents (P = 0.89).

Table 5: Association between oral hygiene practices and its influencing factors (knowledge, attitude, dietary habits, and dental history)

Variable	**Oral hygiene practices**		χ^2	**P value**
	Correct practice n (%)	**Incorrect practice n (%)**		
Knowledge			1.76	0.18
High	24 (49.0)	27 (62.8)		
Low	25 (51.0)	16 (37.2)		
Attitude			7.54	0.006
Positive	19 (38.8)	29 (67.4)		
Negative	30 (61.2)	14 (32.6)		
Dietary habits			1.86	0.17
Good	24(49)	15 (34.9)		
Bad	25 (51.0)	28 (65.1)		
Dental history			0.016	0.89
Good	21 (42.9)	19 (44.2)		
Bad	28 (57.1)	24 (55.8)		

*** Significant at P< 0.05**

χ^2 Chi square test

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3.6 Predictors of oral hygiene practices among respondents

Table 6: Predictors of oral hygiene practices among respondents

Predictor	B	S.E	P value	Adjusted OR	95% CI	
					Lower bound	Upper bound
Age						
Young				1		
Old	0.76	0.45	0.09	2.14	0.87	5.24
Fathers education level						
Primary				1		
Secondary	1.53	1.21	0.20	4.64	0.42	50.31
Tertiary	0.54	0.52	0.29	4.58	0.21	1.60
Attitude toward oral hygiene						
Positive				1		
Negative	1.14	0.47	0.01*	3.15	1.24	8.01

*** Significant at P< 0.05**
S.E = Standard error

In multivariate analysis, logistic regression was used to predict correct oral hygiene practices by using only those variables that were significantly associated with oral hygiene practices in bivariate analysis. The reference groups were young age, primary education level of fathers, and positive attitude toward oral hygiene.

According to Table 6 old age respondents were 2.14 more times likely to be with correct oral hygiene practices compared with young age respondents (OR = 2.14, 95% CI: 0.87-5.24) but the difference were not significant (P = 0.09).

There was no significant association between oral hygiene practices and education level of fathers (P = 0.29). Respondents whose fathers had secondary education level were 4.64 times more likely to have correct oral hygiene practices compared with those who had primary education level of fathers (OR = 4.64, 95% CI: 0.42-50.31) and respondents who fathers had tertiary education level were 4.58 times more likely to have correct oral hygiene practices compared with those who had primary education level of fathers (OR = 14.58, 95% CI: 0.21-1.60).

In terms of attitude toward oral hygiene, table 6 shows that respondents who had negative attitude toward oral hygiene 3.15 more likely to have correct oral hygiene practices compared with those who have positive attitude toward oral hygiene practices (OR =3.15, 95% CI: 1.24-8.01) with significant association (P = 0.01).

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Discussion

The difference observed between the prevalence of oral hygiene practices in this study and in other studies might be due to the different criteria used in the various studies to measure oral hygiene practices. In addition, different numbers of study populations in these studies with different socio demographic characteristics of subjects and difference in oral health education and knowledge may have influenced the prevalence of oral hygiene practices. The findings of this study revealed significant association between age of respondents and oral hygiene practices ($P = 0.04$) which in the same line with study by Al-Omirie et al., (2006). In addition, Study by Priya et al., (2013) among school children in India found the age is important associating factor with correct oral hygiene practices among school children and oral hygiene practices are better received with an increased age of children ($P < 0.01$). A higher experience of oral hygiene practice was observed amongst female than male in the present study. This difference was not statistically significant ($P = 0.16$). Similar results, with correct oral hygiene practices, were reported in Malaysia among primary school children according to the study by Lian, (2010) ($P < 0.01$). In addition, study by Baranya et al., (2014) in India found the same results of more female practicing correct oral hygiene practices than males ($P = 0.04$).

Furthermore, a study conducted in India among primary school children gives the same results of correct oral hygiene practices observed more among female than males. This study was in line with another study conducted among school children in India which revealed significant association between oral hygiene practices and gender of respondents ($P < 0.05$) (Prasad et al., 2010). In addition study by Kakkad et al., (2015) have shown same results of significant association between gender and oral hygiene practices with more female practicing correct oral hygiene than males ($P = 0.02$). As well, study conducted in Saudi Arabia revealed the same results with more prevalence of poor oral hygiene among males than females (Bhayat, 2011). In contrast, Joshi et al., (2005) reported that boys had better oral hygiene practices than girls. However, the results of study conducted in Nigeria among school children revealed no significant association between gender and oral hygiene practices ($P = 0.39$) (Abiola et al., 2009).This condition may be explained on the basis that females usually care more about their body and appearance. They would thus be more concerned about visiting the dentist and would tend to be more educated about their oral health. Parental education level has been shown to contribute and associated with oral hygiene practices (Hallett & O'Rourke, 2006). Comparing the association between level of mother education and practices of oral hygiene findings in this study with the findings of other studies conducted among school children found that, no significant association between level of mother education and oral hygiene practices ($P = 0.16$) and significant association between level of educations of fathers and oral hygiene practices ($P < 0.05$).

In line with this findings, study by Al Hussyeen, (2006) in Saudi Arabia shows no significant association between oral hygiene practices of children and level of education of their mothers ($P = 0.81$). However, study by Shamta et al., (2012) revealed strong association between correct oral hygiene practices and level of mother's education ($P = 0.01$). This result was in line with the study conducted by Syhail, (2013) in Pakistan ($P < 0.01$). Role of parents in oral health care was not associated with oral hygiene practices in this study ($P = 0.08$). The findings were similar to the results reported among Jordan school children who revealed no significant association between role of parents in oral health care of their children and correct oral hygiene practices (Al-Omirie et al., 2006). Similar to these results, study by Mani et al., in Malaysia reported no significance association between oral hygiene practice and good

parent's role in oral health care of their children. The findings of this study revealed no association between correct practices on oral hygiene and oral hygiene knowledge among primary school children in Al Zintan City, Libya (P = 0.18). This result was opposite to some previous studies that revealed strong association between knowledge and practices on oral hygiene (P < 0.01) (Dakhali, 2014). In addition, study by Baranya, (2014) among school children in India found that children with low knowledge have incorrect oral hygiene practices with strong association between knowledge and practices on oral hygiene (P < 0.01). Furthermore, studies by Kuppswmy et al., (2014) revealed strong association between oral hygiene practices and oral health knowledge (P < 0.01).In addition, study by Karaman et al., (2014) revealed positive correlation between oral hygiene practices and knowledge toward oral hygiene. This contrast may be attributed to younger age of participants in this study and the lack of educational programs toward oral hygiene practices among school children in Al Zintan city, Libya.

In accordance with previous studies, the findings of this study revealed an association between correct oral hygiene practices and attitude of school children towards oral hygiene (P = 0.006). Same results have shown by Priya et al., (2013) in India (P < 0.05). In addition, the results other studies results revealed that most participants whose practicing correct oral hygiene have positive attitude toward oral hygiene (Al-Omirie et al., 2006 ; Brukiene et al., 2009). However, Irregularity in dental visits has also been reported among respondents. This could be explained by many reasons, such as access to oral health services, socioeconomic factors and attitudes for oral health (Adeleke & Danfillo, 2005).The present study revealed no significant association between correct oral hygiene practices and good dietary habits of school children (P = 0.17). These findings were opposite to the finding of the study for school children in Zimbabwe which illustrated strong association between oral hygiene practices and dietary habits of the study population (P < 0.05) (Mafuvadze, 2012). In addition, study by Rehaman, (2008) in Arabic Emirates have given same results of this study. However, no association between oral hygiene practices and good dietary habits have reported in study by Kuppswamy et al., (2014) (P = 0.98). Visiting dentist benefits a child's oral health, and it is recommended to visit the dentist twice a year to protect oral health (Hagan et al., 2008). However, the results of this study have shown no significant association between correct oral hygiene practices and dental history of participants (P = 0.89). These results are opposite to the previous studies which revealed significant association between dental history and oral hygiene practices (P < 0.05) (Kuppuswamy et al., 2014). In addition, study by Baryana, (2014) among school children in India and study by Lian et al., (2010) among Malaysian school children revealed significant association between correct oral hygiene practices and dental history of the child (P< 0.05). This could be due to younger age of study population and lack of awareness for dental care treatments. However, studies have been found that poor oral hygiene more prevalent among young and older children who avoided dental appointments due to dental anxiety and behavioral management during the scheduled appointments (Bedi et al., 2006).

This resulted in parents avoiding and cancelling their children's dental appointments (Wigen et al., 2009) which lead to the child of not having adequate dental attention. The results of this study have shown that the main predictors of oral hygiene practices were old age , secondary and tertiary educational level of fathers and negative attitude toward oral hygiene and good dietary habits with association between these predictors and oral hygiene practices (P < 0.09, P = 0.29, P = 0.01) respectively. These results are opposite to the results of study conducted by Smyth, (2007) among school children in Spain, the main predictors of oral hygiene

practices was knowledge toward oral hygiene. This could be due to the contrast in education advancement between the study populations of both studies.

Conclusion

Correct oral hygiene practices is better among school children of older age. In addition, School children whose their fathers had higher education level are correctly practicing oral hygiene practices. Attitude toward oral hygiene is one of the important predictors of oral hygiene practices.

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Declaration

Author(s) declare that the article mentioned above has not been published or submitted for publication in any other journal.

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