

Oral Health Knowledge, Attitude and Practice of Parents, and Frequency of Cariogenic Food Intake among Their Non Syndromic Cleft Lip with or without Cleft Palate Children in North-east Peninsular Malaysia

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ABSTRACT

Introduction: Appropriate oral health knowledge is essential to enable parents to be responsible for the oral health care of their children especially those with special needs. This study aimed to determine the oral health knowledge, attitude and practice (KAP) of parents and cariogenic food intake of their non-syndromic cleft lip with or without cleft palate children (NSCLP) compared to non-cleft children. **Methods:** A comparative cross-sectional study was conducted on randomly selected parents with children aged 1 to 6 years at Hospital Universiti Sains Malaysia and Kota Bharu Dental Clinic. A face-to-face interview using a validated questionnaire on oral health KAP and cariogenic food intake of their children was done. Data were analysed by using IBM SPSS version 22.0. **Results:** Sixty-four Malay parents with NSCLP (n=33) and non-cleft (n=31) children were recruited. The mean (SD) percentage score of oral health knowledge of parents in both groups (NSCLP and non-cleft) was fair, 59.5% (11.85) and 62.0% (15.00), $P=0.4722$; oral health attitude was good, 78.0% (9.30) and 80.2% (15.40), $P=0.504$; but oral health practice was poor 33.8% (5.94) and 36.1 (8.44), $P=0.220$. The cariogenic food frequency score was significantly higher in non-cleft children; 40.2(10.32) compared to NSCLP children, 34.8(9.46), $P=0.032$. **Conclusions:** Parents of both groups had fair knowledge and good attitude but poor oral health practice. Cariogenic foods were consumed more by the non-cleft children. Oral health awareness among the parents needs to be strengthened towards good oral health attitude and practice and non-cariogenic food choices for the betterment of oral health status of their children.

Key words : Awareness, attitude, cleft lip, cleft palate, diet, knowledge

INTRODUCTION

Cleft lip with or without cleft palate is an abnormal oral condition whereby the lip and or palate are not normally fused together during the early stage of fetal development resulting in a defect in that area. The non-syndromic cleft lip with or without cleft palate (NSCLP) being isolated from any anomalies was reported as approximately 70% of all cleft lip with or

without cleft palate cases compared to the syndromic cleft lip with or without cleft palate (Murray, 2002).

NSCLP children may present with various oral anatomical structures such as palatal fistula, dental anomalies, severe malocclusion, tense or hard surgically repaired upper lip, and small repaired maxillary arch (Cheng, Moor & Ho, 2007; Normastura *et al.*, 2009). These problems

may complicate mechanical plaque control through tooth brushing reflected in a significantly higher plaque score (Parapanisiou *et al.*, 2009; Perdikogianni *et al.*, 2009). A previous study reported higher dental caries and periodontal disease among this group of children (Perdikogianni *et al.*, 2009; Richards *et al.*, 2015). According to the Stephen Curve theory, increased frequency of carbohydrate consumption will increase oral acidity to low levels, contributing to caries development (Stephan & Miller, 1943).

Prabhu *et al.* (2013) stated that parents or guardians play a central role in enforcing proper oral hygiene and a preventive regime that includes the dietary habits of these preschool children. Therefore, appropriate oral health knowledge is essential in order to ensure that parents are aware, understand and modify their attitude towards oral health care of the children. As shown by Naidu & Davis (2008), low parental knowledge and poor attitudes toward oral health are associated with higher caries experienced in infants and young children.

Therefore, this study aimed to identify difficulties faced by parents in taking care of the oral health of their children and assess oral health knowledge, attitude and practice of parents as well as the cariogenic food intake of their children. This information is beneficial to ensure that the oral health awareness of such parents can be addressed accordingly.

METHODS

A comparative cross-sectional study was conducted on mothers or fathers (parents) of NSCLP children and non-cleft children from February to March 2016. The inclusion criteria for this study were parents with operated and non-syndromic CLP children aged one to six years old. There were several justifications of including this age group. The deciduous teeth start to erupt by the age of six to ten months (ADA, 2012).

Hence, by the age of one, eight deciduous teeth would have already erupted and an effective tooth brushing method is needed under the supervision of parents. Therefore, parents should be aware of the importance of oral health care and impart appropriate brushing skills and ensure a healthy diet to their children. For both groups, children with other disabilities such as cerebral palsy, handicapped in one or both hands, Down Syndrome and other physical disabilities were excluded in this study because the physical conditions affect parental oral health care extended towards these children.

By the age of six years, permanent teeth will start to erupt (ADA, 2012). Children with a good understanding of oral hygiene practice skills can perform tooth brushing independently and effectively. In addition, by the age of eight years, alveolar bone graft will be done to facilitate closure of the oro-nasal fistula, raise the alar base of nose and stabilise the maxillary arch (Lilja, 2009). Therefore, it is crucial for children aged one to six years to have healthy dentition as the permanent teeth are still developing, the first molars and incisors start to erupt while still on the surgical treatment of the cleft. Inclusion criteria for the non-cleft group were parents with normal children aged one to six years. The exclusion criteria for both groups were non-citizens and parents who could not read and understand both English and Malay languages.

Parents of operated NSCLP children at Combine Cleft Clinic, Kota Bharu Dental Clinic were selected by using simple random sampling based on their registration list using the table of random numbers. On the other hand parents for non-cleft children from the outpatient dental clinic Hospital Univeristi Sains Malaysia (HUSM) were selected by systematic random sampling method. The sampling began with the selection of a parent with non-cleft children aged one to six years and attending the clinic by using simple random sampling followed by other eligible parents.

Data collection was conducted at Kota Bharu Dental Clinic and HUSM for two months from 1 February 2016 to 3 March 2016. Interviewer guided questionnaire (face-to-face interview) was conducted by a single interviewer using a validated questionnaire that was compiled from previous studies. The questionnaires consisted of the demographic profile, difficulties encountered during tooth brushing, oral health knowledge, attitude and practice (Haliza *et al.*, 2016; Zaihan *et al.* 2015) and frequency of cariogenic food intake (Habibian *et al.*, 2001; Ruhaya *et al.*, 2012). Data on sex of child, age of the child and their parents, ethnicity, educational level and gross monthly household income of parents were obtained. The oral health knowledge, attitude and practice questionnaire sought information on the etiology, signs and prevention of dental caries and periodontal diseases while cariogenic food intake questionnaire obtained information on the frequency of cariogenic food intake by the children.

The scoring for knowledge, attitude and practice domain was based on the formula by Habib Khan *et al.* (2014). In 'Knowledge' domain, there were seven items and 45 sub-items. '1' mark was given to each correct answer and '0' mark to each wrong or 'Do not know' answer. Hence for seven items which contained 45 sub-items, the total score ranged from 0-45. Positive attitudes such as 'Agree' and 'Strongly agree' were given '1' and '2' marks respectively while a neutral response (Not sure) was given '0' mark. Negative attitudes such as 'Not agree' and 'Strongly not agree' were given -1 and -2 marks respectively. Therefore, for seven items of the 'Attitude' domain for the NSCLP group and six items (Questions on "Children with cleft prone to get dental caries" were not asked of the non-cleft group) for non-cleft group, the total score of every parent ranged from -14 to 14 and -12 to 12 respectively.

In 'Practice' domain which had 8 items, each correct practice was given

'1' to '5' marks based on the frequency (for example, Item 4: Frequency of daily tooth brushing) and the most favourable practices (for example, Item 6: use of fluoridated toothpaste). While '0' mark was given to the responses of 'Never', 'Do not know' and 'None'. This gave a total score ranging from 0 to 57 for every parent in CLP group and 0 to 55 for non-cleft group (questions on "frequency of dental visit due to cleft appointment" and "reason for last dental visit due to cleft review" was not asked of the non-cleft group). The total maximum score for the 'Knowledge' domain (45), 'Attitude' domain (14) and 'Practice' domain (57) was 116 for the CLP group. While for the non-cleft group, the total maximum score for the 'Knowledge' domain (43), 'Attitude' domain (12) and 'Practice' domain (55) was 110. The total scores were further categorised and interpreted as poor (0 to 50%), fair (51 to 69%) and good (70 to 100%) oral health knowledge, attitude and practice (Habib Khan *et al.*, 2014).

The frequency of cariogenic food intake questionnaire consisted of twelve domains of different types of food listed (53 sugary foods), adopted from Habibian *et al.* (2001) and defined as cariogenic food by Ruhaya *et al.* (2012). This questionnaire assessed how frequently a subject consumed the cariogenic food for the past one month. Parents were asked to recall how many times a day, a week, or months that their children usually consumed the cariogenic food. The food intake frequencies were categorised into a 7-point scale rating, with '1' representing never or rarely response, '2' once a month, '3' two to three times a month, '4' once a week, '5' two to three times a week, '6' once daily and '7' representing two to three times daily (Ruhaya *et al.* 2012). Information on the frequency of cariogenic food intake of each food item in the list was used to calculate the cariogenic food frequency score of the subjects. A higher score indicates a higher cariogenic food intake. The formula used

was based on Chee *et al.* (1996) as given below:

$$\text{Food consumption frequency score} = \frac{(R_1S_1 + R_2S_2 + R_3S_3 + R_4S_4 + R_5S_5 + R_6S_6 + R_7S_7)}{7}$$

$R_1 - R_7$: Percentage of subjects selecting a rating

$S_1 - S_7$: Scale ratings

7 : Maximum scale rating

The food consumption frequency scores were then divided into three categories: highly consumed (80.0% to 100%), moderately consumed (30.0% to 79.9%) and less consumed (0% to 29.9%) (Chee *et al.*,1996).

Data were entered and analysed in IBM SPSS version 22.0. Descriptive analysis was carried out to obtain frequencies and percentages for categorical variables (sex, ethnicity, parents' educational level) whereas mean and standard deviation for normally distributed or median and interquartile range for non-normal data were used for continuous variables (age and income). Independent *t*-test was carried out for data which were normally distributed and fulfilled the Levern's test for homogeneity to compare the mean score of oral health knowledge, attitude and practice as well as mean cariogenic food frequency score based on the type of food consumed between parents of NSCLP and non-cleft group. The significant level was set at $P < 0.05$.

Ethical approval to conduct this study was obtained from the Human Research Ethics Committee of Universiti Sains Malaysia (USM/JEPeM/15120534) and the National Medical Research Register, Ministry of Health Malaysia (NMRR-15-1966-28478-IIR).

RESULTS

A total of 33 parents of NSCLP children (51.6%) and 31 parents of non-cleft children (48.4%) participated in this study.

All parents were Malays with seven (10.9%) being the fathers of the children. Most of them were girls, 21(63.6%) with a significantly younger mean (SD) age, 3.4 (1.13) among the NSCLP children, compared to 4.8 (0.94) years among the non-cleft children ($P < 0.001$). In terms of education of the non-cleft group, 74.2% of mothers and 58.1% of fathers had a tertiary level of education compared to 30.3% mothers and 21.2% of the fathers of the NSCLP group.

More parents from the non-cleft group (61.3%) claimed having problems during tooth brushing compared to the NSCLP group (51.5%). More parents in both groups faced problems of uncooperative children (39.4% in NSCLP group and 61.3% in non-cleft group) compared to difficulty in spitting (12.1% in NSCLP group and 22.6% in non-cleft group). Twelve percent of parents with NSCLP children claimed that their children's lips were tense and hard during tooth brushing.

With regard to oral health knowledge (Table 1), more parents in both groups knew about the causes of dental caries (item 1). More (78.8%) parents in NSCLP group and 64.5% of parents in non-cleft group thought that calculus was the predisposing factor for dental caries. More parents in the NSCLP group agreed that morphology of the tooth is one of the causes for dental caries (36.7%) and gingivitis-item 2 (27.3%). Among parents of NSCLP children, 33.3% knew that NSCLP is a predisposing factor for dental caries (item 1) and 24.2% knew that it is also a predisposing factor for gingivitis (item 2). For other causes of gingivitis (item 2), most parents of NSCLP children answered correctly compared to parents of non-cleft children. More than half of NSCLP (75.8%) and non-cleft parents(58.1%) thought that bleeding gums was a sign of dental caries (item 3). However, most of them (72.7% NSCLP parents and 77.4% non-cleft parents) knew that bleeding gums was one of the signs of gingivitis (item

Table 1. Parent’s oral health knowledge (n = 64)

<i>Items</i>	<i>NSCLP Group (n=33)</i>	<i>Non-Cleft Group (n=31)</i>
1. Causes of dental caries		
Bacteria in mouth	26 (78.8)	27 (87.1)
Dental plaque	23 (69.7)	25 (80.6)
Calculus	26 (78.8)	20 (64.5)
Shape of tooth	12 (36.4)	3 (9.7)
Crowded teeth	19 (57.6)	6 (19.4)
NSCLP ^c	11 (33.3)	-
Amount of sugary food intake	30 (90.9)	29 (93.5)
Frequency of sugary food intake	30 (90.9)	28 (90.3)
2. Causes of gingivitis		
Bacteria in mouth	26 (78.8)	24 (77.4)
Dental plaque	23 (69.7)	13 (41.9)
Calculus	20 (60.6)	13 (41.9)
Shape of tooth	9 (27.3)	3 (9.7)
Crowded teeth	13 (39.4)	9 (29.0)
NSCLP ^c	8 (24.2)	-
Amount of sugary food intake	24 (72.7)	15 (48.4)
Frequency of sugary food intake	24 (72.7)	15 (48.4)
3. Signs of dental caries		
Tooth cavity	32 (97.0)	31 (100)
Tooth pain	32 (97.0)	29 (93.5)
Bleeding gum	25 (75.8)	18 (58.1)
Abscess	26 (78.8)	23 (74.2)
4. Signs of gingivitis		
Tooth cavity	4 (12.1)	17 (54.8)
Tooth pain	2 (6.1)	11 (35.5)
Bleeding gum	24 (72.7)	24 (77.4)
Abscess	29 (87.9)	25 (80.6)
5. Role of fluoride		
Cleaning teeth	3 (9.1)	11 (35.5)
Strengthening teeth	30 (90.9)	22 (71.0)
Caries prevention	30 (90.9)	30 (96.8)
6. How to prevent dental caries		
Regular tooth brushing	33 (100)	30 (96.8)
Use of floss	27 (81.8)	25 (80.6)
Use of mouth rinse	27 (81.8)	25 (80.6)
Rinse after eat	28 (84.8)	27 (87.1)
Reduce sugary food intake	31 (93.9)	31 (100)
Eat healthy food	27 (81.8)	27 (87.1)
Use fluoridated toothpaste	30 (90.9)	29 (93.5)
Take vitamin	23 (69.7)	17 (54.8)
Visit dentist	32 (97.0)	30 (96.8)

Table 1. Continued next page

Table 1. Continued

Items	NSCLP group (n=33)	Non-cleft group (n=31)
7.How to prevent gingivitis		
Regular tooth brushing	30 (90.9)	7 (87.1)
Use of floss	25 (75.8)	18 (58.1)
Use of mouth rinse	29 (87.9)	23 (74.2)
Rinse after eat	31 (93.9)	26 (83.9)
Reduce sugary food intake	31 (93.9)	19 (61.3)
Eat healthy food	29 (87.9)	23 (74.2)
Use fluoridated toothpaste	31 (93.9)	19 (61.3)
Take vitamin	24 (72.7)	21 (67.7)
Visit dentist	33 (100)	28 (90.3)
Total knowledge score (%) ^a	59.5 (11.85) ^b	62.0 (15.00) ^b

^a mean (SD); P= 0.472

^b total knowledge score categorised and interpreted as Levels of KAP: Good (70-100%) Fair (51-69%) Poor (0-50%)

^c this sub-item was not asked of the non-cleft group

Table 2. Parent's positive attitude towards oral health (n = 64)

Items	NSCLP group (n=33)	Non-cleft group (n=31)
Child has a good oral health	15 (45.5)	16 (51.7)
Child's teeth and gum need to be cleaned everyday	32 (97.0)	28 (90.3)
Fluoridated toothpaste is good for child's teeth	28 (84.9)	25 (80.7)
Sugary food and drink need to be avoided	30 (90.9)	25 (80.7)
Children with NSCLP prone to get dental caries ^c	17 (51.6)	-
Deciduous teeth need to be treated	31 (94.0)	24 (77.4)
Regular dental visits are needed for my child	31 (94.0)	27 (87.1)
Total attitude score (%) ^b	78.0 (9.30) ^a	80.2 (15.40) ^a

^a mean (SD); P= 0.504

^b total knowledge score categorised and interpreted as Levels of KAP: Good (70-100%) Fair (51-69%) Poor (0-50%)

^c this sub-item was not asked of the non-cleft group

4). As for the role of fluoride (item 5) in prevention of dental caries, more parents of the non-cleft group (96.8%) had the knowledge compared to 90.9% in parents of NSCLP group. However, the majority of parents in both groups thought that fluoride can strengthen and clean teeth. Generally, most of the parents knew about the prevention of dental caries (item 6) and gingivitis (item 7). There were no

significant differences in mean oral health knowledge between NSCLP (59.5%) and non-cleft (62.0%) groups ($P= 0.472$). Based on the total knowledge score, parents of both groups can be categorised into having a fair oral health knowledge.

More parents in both groups exhibited a positive attitude towards oral health (Table 2). In item 1, less than half of the NSCLP parents (45.5%) and slightly more

than half the non-cleft parents (51.7%) perceived their children's oral health as good (strongly agree and agree). More parents in both groups agreed that the children's teeth need to be cleaned every day (item 2), fluoridated toothpastes were good for their children's teeth (item 3), and agreed that sugary foods and drinks need to be avoided (item 4). Slightly more than half of the parents (51.6%) in the NSCLP group agreed that children with NSCLP are prone to dental caries (item 5). More (94.0%) parents in the NSCLP group agreed that deciduous teeth need treatment (item 6) compared to 77.4% in parents of non-cleft group and that regular dental visits are needed (item 7) for their children (94.0% in NSCLP group and 87.1% in non-cleft group). There were no significant differences in mean oral health attitude between NSCLP (78.0%) and non-cleft groups (80.2%); ($P=0.504$). Based on the total attitude score, parents of both groups can be categorised as having a good oral health attitude.

Table 3 shows that 97% of parents in NSCLP group visited dental clinics during their appointment (item 1) for cleft review (item 2) but 61.3% of parents in the non-cleft group visited the dental clinic for tooth pain (items 1 and 2). More parents in the NSCLP group (45.5%) started brushing their children's teeth (item 3) before the age of one compared to the non-cleft group (35.5%), and their teeth were mostly brushed by mothers (item 7) with children's toothbrush (item 8). More parents in both groups reported that daily tooth brushing (item 4) was at least twice daily (72.8% in NSCLP group and 67.7% in non-cleft group), especially in the morning and before sleeping at night with a fluoridated toothpaste (item 6) (81.8% in NSCLP group and 77.4% in non-cleft group). About 15.2% of parents reported that the tooth brushing sessions (item 5) for their children lasted for 2 minutes or more compared to 38.7% parents in the non-cleft group. There were

no significant differences in mean oral health practices between parents of NSCLP (33.8%) and non-cleft group (36.1%); ($P=0.220$). Based on the total practice score, both of the parents may be categorised as having poor oral health practices for their children.

Table 4 shows that more types of cariogenic foods were consumed moderately by the non-cleft children compared to the NSCLP children. In addition Table 5 shows significant differences between the cariogenic food frequency scores between groups with NSCLP children consuming less cariogenic food compared to non-cleft children ($P=0.032$). It was also found that the cariogenic food frequency score for the pre-sweetened cereals, juice, dessert and other cariogenic foods such as honey and jam spread were significantly higher in the non-cleft children compared to the NSCLP children ($P<0.05$).

DISCUSSION

A total of 33 parents of NSCLP and 33 parents of non-cleft children were recruited into this study. However, two parents of non-cleft children submitted an incomplete questionnaire that caused them to be removed from the study leaving a total of 31 parents in the non-cleft group. The mean age of NSCLP children was significantly younger since the Combined Cleft Clinic in Kota Bharu Dental Clinic usually scheduled appointments for the cleft children from birth for thorough treatment planning by various disciplines. Our study demonstrated that more parents in the non-cleft group had a tertiary level of education compared to the NSCLP group. These findings reflect our results which showed a significantly lower monthly household income for the NSCLP group.

Our study found a significant difference between the NSCLP and non-cleft groups in relation to problems during brushing of their children's teeth and fear of brushing

Table 3. Parent's oral health practices (n = 64)

<i>Items</i>	<i>NSCLP group (n = 33) n (%)</i>	<i>Non-cleft group (n = 31) n (%)</i>
1. Frequency of dental visit		
Every 6 to 12 months	4 (12.1)	9 (29.0)
Occasionally	2 (6.1)	11 (35.5)
cleft clinic appointment ^c	32 (97.0)	-
When child has tooth pain	5 (15.2)	19 (61.3)
During school dental service	3 (9.1)	9 (29.0)
Never	-	-
2. Reason for last dental visit		
Cleft review ^c	32 (97.0)	-
Tooth pain	1 (3.0)	21 (67.8)
Advice from family / friends	-	1 (3.2)
Advice from dentist / dental nurse	-	3 (9.7)
Others	-	6 (19.4)
3. Start brush/clean teeth		
Never	-	1 (3.2)
Less than 1 years old	15 (45.5)	11 (35.5)
1 to 2 years old	15 (45.5)	15 (48.4)
3 to 4 years old	3 (9.1)	4 (12.9)
5 to 6 years old	-	-
4. Frequency of daily tooth brushing		
Not everyday	2 (6.1)	3 (9.7)
Once	6 (18.2)	7 (22.6)
Twice	24 (72.8)	21 (67.7)
5. How long do you/your child brush his/her teeth		
Less than 2 minutes	27 (81.8)	19 (61.3)
2 minutes and more	5 (15.2)	12 (38.7)
6. Use of fluoridated toothpaste		
Yes	27 (81.8)	24 (77.4)
No	1 (3.0)	-
Do not know	5 (15.2)	6 (19.4)
7. Who brushes child's teeth		
Child	18 (54.5)	19 (61.3)
Mother	27 (81.8)	28 (90.3)
Father	8 (24.2)	17 (54.8)
Caretaker	3 (9.1)	11 (35.3)
Others	1 (3.0)	-
8. Type of tooth brush		
Children's toothbrush	29 (87.9)	29 (93.5)
Modified toothbrush	-	-
Electronic toothbrush	-	2 (6.5)
Others	3 (9.1)	-
Total practice score (%) ^b	33.8 (5.94) ^a	36.1 (8.44) ^a

^a mean (SD); P= 0.220

^b total knowledge score categorised and interpreted as Levels of KAP: Good (70-100%) Fair (51-69%) Poor (0-50%)

^c this sub-item was not asked of the non-cleft group

Table 4. Types of cariogenic foods based on levels of frequency

NSCLP group (n = 33)	Score (%)	Non-cleft group (n = 31)	Score (%)
Moderately consumed food (Score : 30.0 – 79.9)		Moderately consumed food (Score : 30.0 – 79.9)	
1. Non-carbonated drink	77.93	1. Non-carbonated drink	81.14
2. Ice-cream	61.90	2. Ice-cream	62.77
3. Biscuit	52.90	3. Biscuit	55.41
4. Chocolate	49.41	4. Chocolate	53.06
5. Sweets	49.41	5. Others (honey and jam spread)	52.55
6. Cake	46.39	6. Sweets	51.11
7. Raisin	42.89	7. Pre-sweetened cereals	50.77
8. Juice	31.21	8. Raisin	43.90
		9. Juice	37.77
		10. Dessert	35.07
		11. Cake	33.77
Least consumed food (Score : 0 – 29.9)		Least consumed food (Score : 0 – 29.9)	
1. Dessert	29.11	1. Carbonated drinks	17.53
2. Pre-sweetened cereals	29.01		
3. Others (honey and jam spread)	21.63		
4. Carbonated drink	19.87		

the cleft area This study showed that only 12.1% of parents with NSCLP children claimed that their children's lips were tense and hard during tooth brushing. They reported that more than 60% of the patients scored pliability and 65% of the patients scored thickness of cleft scars that differed from normal skin (Frans *et al.*, 2012). Therefore, we hypothesised that those patients would claim the lips of their children were tense and hard during tooth brushing. However, the underlying causes were not further investigated in the previous study, particularly whether it could be due to the increase in scar pliability or the parents getting used to the thickness of the lip scar and the oral anatomy of their NSCLP children. As for the non-cleft children, more parents claimed having the problems of an uncooperative child. A study among Down syndrome children also reported similar findings where

parents faced problems of brushing their children's teeth due to children turning their head away (73.3%) and closing their mouth (50%) (Zaihan *et al.*, 2015).

Both groups of parents in this study had fair oral health knowledge. This finding is supported by Castilho *et al.* (2006) who reported 92.8% of NSCLP parents had knowledge about prevention of dental caries. However, some of the parents thought that calculus is dental plaque and they did not know that the teeth had various morphologies such as deep fissure, germinated teeth and malformed teeth which could also contribute to the development of dental caries. Several studies have also demonstrated the positive association between NSCLP and dental caries (Chopra *et al.*, 2014; Habib *et al.*, 2014), as well as between NSCLP and periodontal diseases (Chopra *et al.*, 2014; Nagarajan, Nur Hidayah & Syafawati,

Table 5. Cariogenic food frequency scores of NSCLP and non-cleft children based on types of foods (n = 64)

Types of foods	NSCLP group (n = 33)	Non-cleft group (n = 31)	Mean difference (95% CI)	t- statistic (df = 62)	P value
	Mean (SD)	Mean (SD)			
Cake	3.2 (2.02)	2.4 (1.76)	-0.888 (-1.836, 0.061)	-1.870	0.066
Biscuit	3.7 (1.91)	3.9 (2.09)	0.174 (-0.827, 1.175)	0.348	0.729
Chocolate	3.3 (2.10)	3.7 (2.16)	0.376 (-0.689, 1.442)	0.706	0.483
Sweets	3.5 (2.24)	3.6 (2.14)	0.126 (-0.970, 0.947)	0.230	0.819
Pre-sweetened cereals	2.0 (1.57)	3.6 (1.96)	1.518 (0.632, 2.404)	3.425	0.001
Non-carbonated drink	5.4 (2.00)	5.7 (1.11)	0.314 (0.5, 1.128)	0.770	0.444
Carbonated drink	1.2 (0.66)	1.2 (0.76)	0.017 (-0.373, 0.340)	-0.093	0.926
Juice	1.9 (1.35)	2.7 (1.66)	0.797 (0.42, 1.552)	2.110	0.039
Dessert	1.7 (1.21)	2.5 (1.63)	0.755 (0.40, 1.469)	2.111	0.039
Raisin	3.0 (2.12)	3.1 (2.02)	0.065 (-0.971, 1.100)	0.125	0.901
Ice-Cream	4.3 (1.78)	4.4 (1.59)	0.054 (-0.790, 0.898)	0.127	0.899
Others (Honey and Jam spread)	1.5 (1.40)	3.7 (1.89)	2.162 (1.337, 2.988)	5.236	<0.001
Total	34.8 (9.46)	40.2 (10.32)	5.436 (0.495,10.377)	2.199	0.032

2009). Parents had less knowledge about periodontal disease and misinterpreted the swollen gingiva or gingival abscess as a sign of dental caries. With regard to caries prevention, parents in both groups knew the role of fluoride. Nagarajan, Suhairah & Noridawati (2010) found that parents of below 6-year-old children used the fluoridated tooth paste without knowing its importance to oral health. Therefore,

they suggest that although the majority (95%) of respondents were educated above secondary level, awareness of fluoride's role in caries prevention is still needed.

Half of the parents in NSCLP and non-cleft groups perceived their children's oral health as good. According to Gomes *et al.* (2015), the parents perception of their children oral health status is associated with their children's history of tooth

pain. A study done in the Malaysian urban population aged two to twelve years, reported tooth pain having the highest frequency as reason for dental visits (MOH, 2005). In our local scenario, the NSCLP children were scheduled for dental appointments in a multidisciplinary combined NSCLP clinic that clearly indicated that the reason for their dental visit was for the multidisciplinary clinic appointment. Wyne (2003) in his study of Saudi children on early childhood caries reported that the mean age of first dental visit in these children was much higher than the recommended age for the first dental visit with the majority visiting dentists due to dental problems. The American Academy of Paediatric Dentistry (2002) recommended that the first dental visit should range from as soon as the first teeth erupt to one year of age.

The findings also revealed that more parents in the NSCLP group started brushing their children's teeth before the age of one compared to the non-cleft group. The other parents were considered as in the 'practice late' because more than eight deciduous teeth had already erupted at that age (American Academy of Paediatric Dentistry, 2012). Even though there were more parents reporting that the children brushed their teeth at least twice daily with fluoridated toothpaste, very few of the parents reported that the tooth brushing sessions for their children lasted for more than two minutes. Therefore, the parents should be concerned about the oral health of their children as early as day one of life to ensure that they, as well as their children, habituate the practice and then start the effective twice-daily tooth brushing of two minutes duration before the age of one (Zero, Marinho & Phantumvanit, 2012). These findings show that the oral health knowledge and attitude of the NSCLP and non-cleft groups might not being translated into practice, which is in agreement with a study by Castilho *et al.*

(2006). Therefore, engaging with the family through motivational interviewing for the parents during a home visit by dental personnel such as the dental nurses would be beneficial for long lasting changes in oral health knowledge, attitude and practice of the parents and the children with the condition that there is enough manpower for the home visit. It is suggested that the role of dental nurses be extended to focus on the oral health care of these high risk group of patients.

In relation to cariogenic food intake, a study in Tumpat and Pasir Mas, Kelantan reported that the mean cariogenic food frequency score for the children was 41.4% (Ruhaya *et al.*, (2012), a higher score compared to our findings for the NSCLP group (38.6%). More parents for both groups in our study had a tertiary level of education, while there were more parents with secondary level of education in the study by Ruhaya *et al.* (2012). These findings are supported by a study in Lithuania, Europe by Petrauskiene, Zaltauske & Albaviciute (2015) who reported that those in the lower income group provided sugary and unhealthy foods for their children due to healthier foods such as fruits and vegetables being more expensive. The higher cariogenic food intake observed among the non-cleft children in our study was supported by the findings of Noor (2002) who concluded that lifestyle factors such as fast food intake especially by those who live in the urban areas could have contributed to this dietary pattern.

The findings show that NSCLP children consumed less cariogenic food compared to non-cleft children. The reason for lower cariogenic food intake by the NSCLP children might be due to the sample of NSCLP children being significantly younger than the non-cleft children in this study. In fact, the younger children consumed relatively less sugary food due to their frequency of meals being less

compared to the older children (Buyken *et al.*, 2008). Another reason might be due to sensory disturbances of the NSCLP children which caused a refusal of variety of foods due to smell, taste and appearance of the food which indirectly lowered their food intake and consequently their cariogenic food intake as well (Bryant-Waugh *et al.*, 2010; Idris *et al.*, 2014)

The cariogenic food frequency score for pre-sweetened cereals, juice, dessert and other cariogenic foods was significantly higher in the non-cleft group compared to the NSCLP group. A study by Zainal Badari *et al.* (2012) reported that the pre-sweetened cereals were mostly consumed by children whose parents had a higher monthly income which could be the reason for higher cariogenic intake by the non-cleft children in our study. A high caries risk is not only for those with complicated oral structures such as the NSCLP children, but also for those with a higher cariogenic food intake. Therefore, the advice for parents should emphasise the replacement of sugar-containing foods with non-cariogenic sweeteners such as xylitol, and modified carbohydrates such as isomalt. Tax for the sugar substitutes and modified carbohydrates should also be exempted in order to increase the accessibility of these products to these parents.

CONCLUSION

In conclusion, the present study revealed that parents of both groups had fair knowledge and a good attitude but poor oral health practice. Cariogenic foods were consumed more by the non-cleft compared to NSCLP children. It is recommended that oral health awareness among the parents needs to focus on a change in oral health attitude and practice including the non-cariogenic food choice for the betterment of the oral health status of their children. As stated by Decker & Loveran (2003), sugars and oral health are integrally related and dietary guidelines for health professionals

need to be referred to in managing the intake of sugars for the prevention of dental caries.

Since the questionnaire was adapted from a previous study, a cross-cultural adaption is needed in future studies to best suit Malaysian children.

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Conflict of interest

The authors declare no conflict of interest.

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