



Knowledge, Attitude and Practices (KAP) of Parents Regarding Prevention of Early Childhood Caries (ECC) in Brunei Darussalam: A Cross-sectional Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Dental caries is widespread health alignment that effects the overall health and general well-being of both adult and children. Dental caries can be classified into many types based on aetiology, progression, anatomical site, extend, path of spread and involvement of surfaces. This study provides insight parents understanding regarding ECC as well as revealing any misconceptions concerning the disease.

Objectives: The aim of the study was to assess the knowledge, attitude and practices of Bruneian parents regarding the information and prevention of early childhood caries (ECC)

Methods and Materials: The study was carried out as a cross-sectional survey targeted towards parents whose children are in Pre-school, primary 1 and Primary 2. Online surveys were used in place of hardcopy surveys due to the ongoing pandemic. The validated questionnaire used in this study was developed and used in a similar study in Malaysia. Statistical analysis was conducted using R-software version 3.6. 2

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Results: 226 parents participated in the survey, the majority of which are mothers with 175 responses and 51 responses from fathers. Some questions were associated with education level. No association were seen in the results regards to the number of children or working status.

Conclusion: Parents showed good knowledge in certain areas of ECC prevention. However, good knowledge is not necessarily translated to better attitude or practices. Intervention should be given especially in areas of misconceptions especially those involving primary teeth as well as feeding/ dietary habits.

Keywords: Early childhood caries; parents; knowledge; attitude; practices.

1. INTRODUCTION

Dental caries is a world-wide health alignment that influences the overall health and general well-being of both adult and children [1]. Dental caries can be classified into many types based on aetiology, progression, anatomical site, extend, path of spread and involvement of surfaces. The American Academy of Paediatric Dentistry (AAPD) defines Early Childhood Caries as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. In addition to this, in children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages 3 to 5 years, one or more cavitated, missing (due to caries) or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing or filled (dmf) score of ≥ 4 (age 3), ≥ 5 (age 4) or ≥ 6 (age 5) surfaces constitutes S-ECC [2]. To add to that, ECC is also referred to as nursing bottle caries or baby bottle caries due to its aetiology being attributable to the frequent use of the baby bottle.

Despite being a largely preventable condition, ECC is viewed as a global pandemic that effects many children around the world particularly in Southeast Asia (SEA) which is home to about 600 million people or 9% of the world's total population. Multiple studies carried out between 2003 and 2012 have shown that certain SEA countries for example, Philippines, Vietnam and Laos suffers from high prevalence in children of aged 5-6 years old suffering from caries with a prevalence of 88%, 89% and 95% respectively when compared to other countries in Asia such as China (66%), Hong Kong (51%) and India (54%) or developed countries such as the United States (23%) and the United Kingdom (28%). However, certain countries of SEA particularly those with higher Gross national income; Brunei and Singapore have seen lower caries prevalence 59% and 49% respectively compared

to the SEA countries mentioned above [3]. This however is still far from the goals set by the World Health Organization (WHO) which aims to achieve a caries free percentage of 80% in 5-6-year-old children by 2020 [4].

Globally, oral disease is the fourth most expensive health alignment to treat. Hence a high prevalence of oral diseases like (ECC) is extremely detrimental to a country's economy. In addition to this, ECC has been shown to have a huge impact on a child's quality of life. A child with ECC may have trouble talking and eating due to significant pain caused by the decay. Speech production may also be affected as the anterior maxillary teeth are extracted leading to poor speech development [5]

1.1 Current Knowledge

ECC has been attributed to several pathogenic bacteria the most common of which are *S. Mutans* and *S. Sobrinus* [6]. Normally, the infant's oral cavity is sterile at birth and the majority of *S. Mutans* transmission is from parents to the child through acts such as kissing and sharing of food and utensils. This transmission mostly takes place within a certain age range called the window of infectivity. This window represents the length of time that the child is most susceptible to the colonization of *S. Mutans*. A study has shown that low infection levels in this window decreases the chance of developing caries as there is an increase of colonization of non-pathogenic bacteria in the mouth in place of *S. Mutans* [6].

Furthermore, ECC is known as a multifactorial disease. When the primary teeth (host) start to erupt, the enamel on the surface of the teeth provides a hard surface for plaque and bacteria (agent) to adhere. Prolonged breast feeding and/or bottle feeding and sleeping with a bottle (environment) has been shown to result in acidogenic conditions and softening of enamel

[7]. Increasing the frequency (time) per day that fermentable carbohydrates are available is the most significant factor in shifting the remineralization equilibrium toward demineralization resulting in weakening of the tooth structure and hence increasing the risk of caries. [8]

Furthermore, the spread of ECC follows a common typical pattern. At around 1 year of age, ECC usually begins as a lesion on the labial surfaces of primary central maxillary incisors followed by the primary lateral incisors. At around 2 years of age, the teeth most affected by ECC are the maxillary incisors followed by the first lower molars. At around 3 and 4 years of age, ECC spreads to affect the second lower molars. At around 5 years of age the most affected tooth is the lower second molars followed by the first lower molars, second upper molars and upper incisors which are all effected in the same way [9]. The lower incisors are not commonly affected by ECC due to abundance of salivary flow in that area in addition to the cleaning action of the tongue.

1.2 Knowledge Gap and Benefits of Study

As mentioned before, ECC is a complex multifactorial disease that effects toddlers and young children. The risk of developing ECC and the outcome of the disease largely depend on the parents of the child especially at younger ages as the child cannot fully and independently take measures to prevent ECC. Therefore, it is the parent's responsibility to ensure the child is taught the appropriate oral hygiene and feeding techniques (practices) in addition to habits that may increase risk of developing ECC. This, however, relies on the parent's knowledge regarding ECC and measures to prevent against it. The knowledge and attitude of parents largely varies owing to factors such as socio-economic backgrounds, education level, race, ethnic and religion. As a result, there is paucity of literature on the knowledge, attitudes and practices regarding ECC among Bruneian parents. This study will be able to assess their knowledge, attitude and behaviour of Bruneian parents related to ECC and whether or not these practices are carried out appropriately to prevent ECC. In addition to that, the study may also play a role in the identification of groups which lack knowledge on ECC and therefore, appropriate intervention can be given to these group to help lower the ECC prevalence in Brunei.

1.3 Literature Review

The questionnaire used in the study is a validated questionnaire from a study carried out by Ann, *et al* [10] in Malaysia. This questionnaire was deemed most appropriate for the study as both countries were more similar in terms of demographics, culture and location when compared to a country like India. Furthermore, this questionnaire was also used in a study carried out by Hugar *et al* [11] at Belagavi city in India with albeit a few modifications. Both studies presented the individual scores of each question. This allows any researches to identify common misconceptions regarding ECC within the Bruneian population.

There have not been many studies that focuses on the knowledge, attitude and practices of parents with regards specifically with regards to early childhood caries. In addition. to that, there have been studies that assess the knowledge attitude and practices of healthcare professionals regarding the prevention and causes of early childhood caries [12]

2. MATERIALS AND METHODS

2.1 Study Design and Population Selection

This study was carried out as a cross sectional design conducted from September 2020 to April 2021. The target population mainly consisted of parents of children who are in Pre-school, primary 1 and Primary 2. The ages of children involved in the study are between the range of 3 years old and 7 years old. Parents with children attending both government and private primary schools in Brunei-Muara district acted as the source population. The inclusion criteria included all Parents both local and non-local living in Brunei Darussalam, regardless of age, ethnicity or religion, whilst the exclusion criteria included those that were not primary caretakers of the child (maids, relatives), parents of children studying in schools which are not in the Brunei Muara district. Due to the current pandemic, online surveys were used in place of hardcopy surveys. The online surveys are given to the teachers at the school via WhatsApp to be distributed to the parents of primary school children after getting approval from the relevant authorities (school principal, MOE).

Inclusion Criteria: Local and non-local parents living in the Brunei Muara district of Brunei Darussalam whose children attends the selected primary schools regardless of age, ethnicity or religion.

Exclusion Criteria: Those that were not primary caretakers of the child (maids, relatives), parents of children studying in schools which are not in the Brunei Muara district

2.2 Sampling and Sample Size

Proportionate sampling was employed to randomly select both government and private schools from a total of 85 primary schools in Brunei. A total of 10 primary schools were randomly selected for the study. The selected primary schools are presented below.

Government Schools:

1. Sekolah Rendah Beribi Telanai
2. Sekolah Rendah Hj Mohd Jaafar Maun Kiulap
3. Sekolah Rendah Sengkurong
4. Sekolah Rendah Dato Marsal
5. Sekolah Rendah Sultan Abdul Bubin, Sg Besar

Private Schools:

1. Bakti Dewa School Cawangan Jerudong
2. Learning Tree School
3. Stella's School
4. Sunshine School
5. Seri Mulia Sarjana School Cawangan Kampung Jangsak

The following formula was used to calculate sample size for estimating a proportion of primary school parents in an infinite (unknown) population.

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

Where

n = sample size

Z = Z statistic for a level of confidence

P = Expected prevalence or proportion

d = Precision

A sample size of at least 385 participants is required to achieve precision of 5% (d=0.05) with

expected proportion of 50% at 95% confidence level [13]. Accounting for attrition and non-response bias, a minimum of 500 participants will be expected. However, the sample size achieved during the study is 226. Since the minimum sample size of 385 was not reached, precision and power of the study is re-calculated as limitation of study.

2.3 Research Instrument

For the research, we used a validated questionnaire that was used in a study conducted by Ann, *et al* [10]. This questionnaire consists of 30 questions which are categorized into specific themes: 10 questions each for knowledge, attitude and practice. These questions are randomized and are in no particular order. Permission to use the questionnaire was obtained by the main author of the study above who sent both English and Malay versions. The development of the research instrument involved a paediatric specialist and a community dental health specialist to conduct the 2012 study. The questionnaire was first developed in English and later translated to the Malay language and then back translated to English.

2.4 Data Analysis

Statistical analysis would be carried out using R-software version 3.6. 2. (for Mac).

The data collected will be stored in a password-locked computer only accessible by researchers. Furthermore, no individual information of the participants will be shown in any reports. Participants are free not to participate or free to withdraw any time before submitting the survey. However, participants cannot withdraw after survey has been submitted since they are collected anonymously. The questionnaire, forms, and data files will be destroyed and deleted after five years of completion of the study.

3. RESULTS

A total of 226 participants joined this study (55.1% response rate). Table 1 shows the demographic characteristics of the participants. About half of the respondents (54.6%) are between the ages of 30-40. Majority of the respondents (77.1%) are female working (77.1%) and of Malay ethnicity (88.0%). Regarding

education level, the respondents what have primary education is the lowest among the 3 with (7.9%) whilst for secondary and tertiary education are (43.2%) and (48.9%) respectively.

Table 2 shows the knowledge level of parents' regarding early childhood caries. Parents are most familiar with the importance of brushing their baby's teeth on their oral health, the main types of food causing tooth decay as well as the importance of cleaning their baby after feeding with 100%, 99.1% and 96.4% of parents scoring on these items respectively. However, parents are least familiar that about whether or not filling are necessary in baby's teeth, the age of which their child will have a full set of milk teeth as well as the time of which they should start using fluoride toothpaste to clean their child's teeth at 13.7%, 57.5% and 54.2% respectively.

There is significant association between education level and importance of fluoride in toothpaste. Those with primary, secondary and tertiary level scored 72.2%, 96.9% and 97.3% on this item, respectively. We observed that who's with higher education level showed higher perception in the importance of fluoride of toothpaste ($P=0.002$). In addition to that, the study also shows a significant association between education level and the awareness of

doing filling in baby's teeth. Those with primary, secondary and tertiary level scored 11.1%, 14.3% and 13.6% on this item respectively. We observed that an increase in education level generally leads to a higher awareness of doing filling in the baby's teeth ($P=0.02$). We observed that there is an association between education level and the knowledge regarding the age of which their child will have a complete set of 20 milk teeth ($P=0.03$). Those with primary, secondary and tertiary level education scored 50.0%, 68.4% and 49.1% on this question respectively.

Table 3 illustrates the attitude of parents related to Early Childhood caries. Most parents (91.9%) agreed that a balanced diet is beneficial for the growth of teeth. Majority of parents (82.3%) also agree that brushing teeth as soon as they erupt is important. Furthermore, 74.9% of parents agrees that pacifier use can affect the normal development of their children's teeth. However, many parents were unaware of the dangers of swallowing toothpaste on health with only 20.3% of parents agreeing to the statement. In addition to that, about half (48.9%) of parents agrees that the child should brush his or her teeth on their own. Furthermore, less than half (44.4%) of parents agrees that sharing of utensils can cause transmission of bacteria that leads to tooth decay.

Table 1. Sample characteristics of primary school parents (n = 226)

	Frequency	Percentage
Age(years)		
<30	52	22.9
30-40	123	54.6
>40	51	22.5
Gender		
Female	175	77.1
Male	51	22.9
Education level		
Primary	18	7.9
Secondary	98	43.2
Tertiary	110	48.9
Occupational status		
Working	175	77.1
Non-working	52	22.9
Ethnicity		
Malay	199	88.0
Chinese	16	7.1
Others †	11	4.6

† Iban, Dusun, Filipino, Indonesian, Murut, Tamil, English

Table 2. Knowledge related to Early Childhood Caries by Parents' education level (n=226)

KNOWLEDGE ITEMS	Primary		Secondary		Tertiary		Total		P-value ^a
	n	%	n	%	n	%	n	%	
1. Brushing your baby's teeth is important for oral health.	18	100.0	98	100.0	110	100.0	226	100.0	-
2. The main types of food that can cause tooth decay are foods with sugar/starchy foods	17	94.4	98	100.0	109	99.1	224	99.1	.07
3. Cleaning your baby's mouth after each feeding should begin even before the teeth erupts	17	94.4	96	98.0	104	94.5	217	96.4	.53
4. Fluoride in toothpaste is important for preventing tooth decay.	13	72.2	95	96.9	107	97.3	215	95.6	.002
5. When does the first baby tooth appear in the child's mouth?	16	88.9	90	91.8	106	96.4	212	93.8	.30
6. Weaning from a baby bottle to a sipping cup should be planned when the child is 1 year old	12	66.7	63	64.3	81	73.6	156	69.0	.43
7. Caries can affect infants below 2 years old	8	44.4	61	62.2	73	66.4	142	63.4	.60
8. Your child will have a complete set of 20 milk teeth by the age of 2-3 years old	9	50.0	67	68.4	54	49.1	130	57.5	.03
9. You should start using toothpaste with fluoride for cleaning your child's teeth:	8	44.4	53	54.1	61	55.5	122	54.2	.16
10. It is not necessary to do fillings in baby's teeth.	2	11.1	14	14.3	15	13.6	31	13.7	.02

a Fisher's exact test n Frequency % Percentage

Table 3. Attitude related to early childhood caries by parents' education level (n=226)

ATTITUDE ITEMS	Primary		Secondary		Tertiary		Total		P-value ^a
	n	%	n	%	n	%	n	%	
1. Do you think tooth decay is caused by bacteria that are transmitted from mother to child by sharing feeding utensils (e.g.: spoons)?	6	33.3	46	46.9	48	43.6	100	44.4	.53
2. Do you think balanced diet (rice, vegetables, milk and meat) is essential for the healthy growth of your baby's teeth?	17	94.4	86	87.8	102	92.7	205	91.9	.19
3. Do you think feeding before bedtime and night-time bottle feeding/breast feeding can cause tooth decay?	11	61.1	55	56.1	80	72.7	146	65.2	.05
4. Do you think frequent and prolong breast/bottle feeding can cause tooth decay?	3	16.7	47	48.0	63	57.3	113	50.4	.009
5. Do you think you need to brush your child's teeth as soon as they erupt?	14	77.8	77	78.6	90	81.8	181	82.3	.91
6. Do you think the child should brush his/her teeth himself/herself?	7	38.9	38	38.8	64	58.2	109	48.9	.02
7. Do you think swallowing toothpaste while brushing may cause any health problems to your child?	4	22.2	24	24.5	17	15.5	45	20.3	.21
8. Do you think it is important for your child to visit the dentist before 2 years of age?	15	83.3	85	86.7	100	90.9	200	90.1	.75
9. Do you think the prolonged use of the pacifier can affect the normal development of a child's teeth?	12	66.7	67	68.4	88	80.0	167	74.9	.20
10. When do you think you should take your baby for a dental check-up after the tooth erupts?	9	50.0	60	61.2	67	60.9	136	66.0	.57

^a Fisher's exact test n Frequency % Percentage

The table shows that there is a significant association between education level and the attitude of parents regarding the fact that prolonged breast/bottle feeding can cause tooth decay. 16.7%, 48.0% and 57.3% of parents with primary, secondary and tertiary education respectively agreed that prolonged breast/bottle feeding can cause tooth decay. We observed that higher education level led to the awareness that prolonged breast/bottle feeding can cause tooth decay ($P=0.009$). In addition to that, there is also a significant association between education level and attitude of parents regarding whether or not their children should brush their teeth on their own. 38.9%, 38.8% and 58.2% of parents with primary, secondary and tertiary education respectively agreed that their children should brush their teeth on their own ($P=0.02$). It is given that 'Young children below 5 years need assistance with toothbrushing. Children do not have the manual dexterity to properly brush their own teeth until they can tie their own shoelaces (about 7 years of age) [14]

Table 4 the practices of parents regarding Early childhood caries (ECC). A small minority of parents' (7.7%) always bite food into smaller pieces before giving it to the child. The majority of parents (64.1) regularly examined their child's mouth. Almost half (51.1%) of parents give plain water to the child after each feed. We observed that this practice becomes more prevalent with higher education level ($P=0.02$). Furthermore, the majority of parents' (74.0%) sometimes buy sweetened food for their children. This practice is also observed to be more prevalent with increasing education level ($P=0.04$). In addition to that, less than half of the parents (45.9%) started semisolid foods for their child in 6 months. We observed that, parents with higher education level tend to give semisolid foods to their child at a younger age ($P<0.001$). Furthermore, the majority of parents (91.5%) never give their children a pacifier dipped in sweet liquid.

4. DISCUSSION

All parents that participated in the study know that brushing is important for good oral hygiene yet only 82.3% of parents agreed that it is important to brush their child's teeth as soon as they erupt. Furthermore, less than half (45.9%) of the parents always brushed their child's teeth. This discrepancy is also reported by Ann *et al*, [10] and Hugar *et al*. [11]. The authors of this study concluded that good knowledge was not

necessarily adequately translated to better practices of parents. Furthermore, despite having knowledge on the importance of tooth brushing parents may be pre-occupied with other events and activities such as jobs and may forget to brush their child's teeth. In addition to that, 90.1% of parents agreed that it is crucial for the child to visit the dentist before 2 years. Furthermore, 66.0% of parents thought that the child should see the dentist 1 year after the first tooth erupt. This finding is similar to Ann *et al*, [10] but higher than a study done by Mileva & Kondeva [15] in Bulgaria. This can be attributed to the Brunei toddler dental program that includes a handbook that highlights the crucial ages of which the children should see the dentist as well as the follow up ages whilst there are no such guidelines/programs in Bulgaria. Furthermore 15.5 % of parents only opted for the child to see the dentist when there is a problem like pain. This may be explained by the fact that parents may associate pain with disease and hence are unlikely to seek intervention for their children in the absence of pain.

Furthermore, almost all parents (99.1%) knew which types of food caused dental caries, yet majority of parents (96.4%) bought sweetened foods for their children. In addition to that, about half of parents (49.1%) give sweetened liquids to their children using a bottle. These findings are similar in Ann *et al*, [10] and Begzati, Bytyci, Meqa Xhemajli & Berisha [16] who reported that a high percentage of parents frequently buys sweetened food for their children. Despite having good dental knowledge regarding diet and dental caries, parents may not be aware regarding hidden sugars in foods given to their children. In addition to that, a study by Chi and Scott [17] found significant correlations between parent sugar intake and child sugar intake. Hence parents who have a diet high in sweet foods and beverages may influenced the diet of their children. Furthermore, the authors also found that children were naturally drawn to sweet foods when compared to foods such as vegetable and those with a bitter taste. As a result, parents may tend to feed their children sweet foods more often in order to prevent force feeding [18]. Parents may also tend to use sweet foods as rewards for good behaviour, leading to the overconsumption of them.

In addition, 69.0% of parents knew that weaning from a bottle to a Sippy cup should start when the child is about a year old. This is lower than that found in the study by Ann *et al*, [10].

Table 1. Practice related to early childhood caries by parents' education level (n=226)

PRACTICE ITEMS	Primary		Secondary		Tertiary		Total		P-value ^a
	n	%	n	%	n	%	n	%	
1. Do you bite the food into small pieces before giving it to your child?									
Always	0	0.0	6	6.1	11	10.0	17	7.7	.30
Frequently	0	0.0	7	7.1	5	4.5	12	5.4	
Sometimes	9	50.0	32	32.7	45	40.9	86	38.7	
Never	7	38.9	52	53.1	48	43.6	107	48.2	
2. How often do you do mouth examination on your baby?									
Always	3	16.7	18	18.4	18	16.4	39	17.5	.83
Frequently	9	50.0	44	44.9	51	46.4	104	46.6	
Sometimes	4	22.2	30	30.6	38	34.5	72	32.3	
Never	1	5.6	5	5.1	2	1.8	8	3.6	
3. How often do you buy sweetened food for your child?									
Always	0	0.0	2	2.0	4	3.6	6	2.7	.04
Frequently	2	11.1	11	11.2	31	28.2	44	19.7	
Sometimes	15	83.3	79	80.6	71	64.5	165	74.0	
Never	0	0.0	5	5.1	3	2.7	8	3.6	
4. How often do you give sweetened liquid or juice to baby in bottle?									
Always	1	5.6	1	1.0	2	1.8	4	1.8	.37
Frequently	2	11.1	7	7.1	7	6.4	16	7.2	
Sometimes	5	27.8	33	33.7	51	46.4	89	40.1	
Never	9	50.0	55	56.1	49	44.5	113	50.9	
5. How often do you give plain water after each feed?									
Always	6	33.3	43	43.9	65	59.1	114	51.1	.02

PRACTICE ITEMS	Primary		Secondary		Tertiary		Total		P-value ^a
	n	%	n	%	n	%	n	%	
Frequently	11	61.1	38	38.8	31	28.2	80	35.9	
Sometimes	0	0.0	16	16.3	13	11.8	29	13.0	
6. How often do you brush your baby's teeth?									
Always	8	44.4	43	43.9	51	46.4	102	45.9	.67
Frequently	9	50.0	44	44.9	46	41.8	99	44.6	
Sometimes	0	0.0	9	9.2	12	10.9	21	9.5	
7. Do you use pacifier dipped into sweet liquid for your child?									
Frequently	2	11.1	3	3.1	1	0.9	6	2.7	.14
Sometimes	1	5.6	5	5.1	7	6.4	13	5.8	
Never	14	77.8	89	90.8	101	91.8	204	91.5	
8. Do you take the effort to improve your dental health knowledge?									
Always	4	22.2	23	23.5	34	30.9	61	27.5	.11
Frequently	8	44.4	45	45.9	29	26.4	82	36.9	
Sometimes	5	27.8	25	25.5	41	37.3	71	32.0	
Never	0	0.0	3	3.1	5	4.5	8	3.6	
When did you start semisolid foods for your child?									
6 months	6	33.3	31.0	31.6	64	58.2	101	45.9	<.001
1 year	5	27.8	42.0	42.9	29	26.4	76	34.5	
1.5 years	2	11.1	9.0	9.2	11	10.0	22	10.0	
2 years	5	27.8	13.0	13.3	3	2.7	21	9.5	
How much toothpaste do you use to brush your child's teeth?									
Pea size	12	8.3	59	41.0	73	50.7	144	64.3	.19

a Fisher's exact test n Frequency % Percentage

Insufficient emphasis has been placed on weaning ages and benefits and as a result, parents may commence this habit only when the child is old enough to cooperate. Weaning is an important contributor to early childhood caries development as a study by Shantinath *et al.* [19] discovered that caries free children started weaning 6 months earlier on average than children with caries. Additionally, 65.2% of parents agreed that night-time bottle/breastfeeding is a contributor to early childhood caries whilst 50.2% agreed that prolonged breast/bottle feeding can cause caries. This is higher than that reported by Ann *et al.*, [10] and Hugar *et al.* [11]. Bruneian parents displayed higher awareness on the benefits and drawbacks of breast/bottle feeding when compared to the studies above. This may be attributed to the toddler program in Brunei which places greater emphasis on the dangers of these practices. Also, Olatosi and Sote [20] placed great emphasis on duration for which the child was breast fed instead of the frequency or timing of breast feeding. The study showed that children who were breast fed for more than 12 months have significantly higher risk of developing ECC when compared to children who were breast fed for less than 12 months. The authors also concluded that ECC risk increased significantly for babies who were solely bottle fed and those who practice night-time bottle feeding. Parents show moderate knowledge regarding the risk of breast and bottle feeding with regards to ECC risk. Hence appropriate advice should be given to parents particularly on the dangers of night-time bottle feeding as well as the duration of which the child is breast fed.

Most parents (95.6%) seemed to be well informed regarding the importance of fluoride on toothpaste similar to Ann *et al.*, [10] at 85.3% when compared to Kujan and Alshehri [21] a study in Serbia (54.3%) and Hugar *et al.* [11] at 54.0%. Parents in countries such as Brunei and Malaysia tend to be more aware regarding the importance of fluoride due to the implementation of fluoridated water programs as well as fluoridated toothpaste when compared to India and Serbia which placed less emphasis of fluoride enrichment programs. But there seem to be a misconception on when to start using toothpaste and how much tooth paste to use. For example, only about half (54.2%) of all parents knew when to start using fluoride tooth paste to brush their child's teeth. The 2nd most common response was that fluoride toothpaste should only be used when the child can spit the tooth

paste out properly. However, despite that, only 20.3% of parents agreed that swallowing toothpaste may pose a health risk to the child. Ann *et al.*, [10] mentions that attitude seem to be determined by cultural beliefs instead of the knowledge of the parent. Furthermore, about half (64.3%) of parents knew how much tooth paste to use on their child's teeth. These findings are consistent with Ann *et al.*, [10] who hypothesized these results were obtained because most fluoridated toothpaste packaging have printed instructions on them which were easily to follow, but these instructions did not place enough emphasis on the dangers of swallowing fluoride toothpaste.

Furthermore, most parents (91.9%) were aware regarding the importance of a balanced diet in the healthy development of children's teeth. However, less than half of parents (44.4%) were aware regarding the transmission of bacteria from parents to child through the sharing of utensils. This finding was similar in the study conducted in Ethiopia [22] and Ann *et al.*, [10]. Furthermore, about half (51.8%) of parent's bite food into small pieces before giving it to their children, unaware of the impact of bacterial transmission. This practice is quite common in Malaysia as reported by Ann *et al.*, [10] as well as other parts of the world such as Australia by Gussy *et al.* [23]. Parents may pre-chew food is it allows parent to monitor the temperature of the food before giving it the the child as well as to prevent choking. Despite that, dental practitioners must advise parents regarding the transmission of bacteria that can occur particularly through the exchange of saliva from mothers to children. If possible, measures such as using separate utensils for parents and children as well as cutting food into small pieces using a knife instead of chewing the food into smaller pieces should be implemented in order to reduce transmission.

Regarding caries in the primary dentition, 63.4% of parents knew that caries could affect children under 2 years old yet only 13.7% of parents knew that it is necessary to do fillings in baby teeth. This is low when compared to Ann *et al.*, [10] and Ramakrishnan *et al.* [24]. This may be the case as some children with caries in their primary dentition may not necessarily need treatment such as extraction as they may exfoliate without causing any problems hence parents may generalise that all caries in the primary dentition may not need treatment. In addition, parents seem to give less importance to primary teeth as they believed that it eventually

going to exfoliate to make new way for primary. The view that primary teeth are not important may also be spread through word of mouth particularly from other parents whose child's decayed primary teeth exfoliated without causing any complications. Parents seem to be uninformed that caries in the primary dentition increases the risk of developing caries in the permanent dentition. Similar trends were discovered in Harrison and Wong [25] and Chhabra and Chhabra [26]. These studies concluded that parents gave less importance to primary teeth as they were in the mouth only for a short period of time and will be replaced by their permanent successors hence taking care/doing fillings on them is not necessary. Therefore, appropriate advice must be given to parents in order to quell the misconception regarding primary teeth as they are vital in the health and development of the child's permanent teeth.

5. CONCLUSION

Bruneian parents show good knowledge in certain area of Early childhood caries prevention. However, good knowledge is not necessarily translated to better attitude and practices. Better emphasis must be places on the common misconceptions regarding the prevention of early childhood caries. Intervention should be given especially in areas of misconceptions such as does involving primary teeth as well as feeding/ dietary habits in the form of health promotion as well as talks and seminars.

6. LIMITATIONS AND RECOMMENDATIONS

This questionnaire is self-reported and may attribute to recall bias leading to incorrect answers. In addition to that, non-response bias is also a concern for the study. A total of 226 participants took part on the survey out of the 410 participants that opened the survey, (55.1%) response rate. The minimum target sample size of 385 participants was not reached and hence, precision and power are calculated as a limitation of the study. Changes including the use of hardcopy surveys as well as the distribution of surveys through more forms of media platforms should be implemented in order to increase response rate of the study.

CONSENT AND ETHICAL APPROVAL

Ethics approval was obtained from the joint IHSREC-MHREC committee as well as

permission form relevant education authorities (Principal/Ministry of Education). Participants required to agree to the consent form before commencing the questionnaire. No participant-identifying information (such as names, identification card number, BruHIMS number) collected.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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