Research Article

Arabian Parents' Knowledge, Attitude, and Practice towards their Children's Oral Health and Early Childhood Caries Resided in Riyadh Province: An Online-Based Cross-Sectional Survey

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Abstract

Aims: To assess parents' knowledge, attitude, and practice towards their children's oral health and early childhood caries in Riyadh, Saudi Arabia. **Methods:** A structured questionnaire was used to study the awareness of early childhood caries among Saudi Arabia parents, including understanding the role of diet, brushing, fluoride, and their effect in social life. Saudi Arabian male and female participants having children above two years were included in the study in the Riyadh region. Non-Saudi males and females, participants residing out of the Riyadh region and those having children above six were excluded. Demographic data include gender, education, and experience level, were collected. The comparisons were made based on gender (male and female), age (20-29 years; 31-40 and 40 years), and education (high school, diploma, graduation, and post-graduation). Data were analyzed using the statistical package IBM SPSS statistics for windows, version24.0. Armonk, NY: IBM Corp; 2016. **Results:** A total of 866 (55.9% males and 44.1% females; >20-30 years (33%), 30-39 years (32.7%), and 40 years (34%); high school degrees (19.2%), diploma (16.3%) graduate degree (52.0%), and postgraduates (13%) participated in the study from Riyadh, Saudi Arabia. Among the participants, 54.5% brushed their teeth once, and 45.5% brushed twice, whereas 63.7% responded that their children should brush twice daily. Among parents, 85.5% use fluoride toothpaste and 14.5% use non-fluoride toothpaste. The percentage of parents using fluoridated toothpaste for children declined to 50.6% compared to their personal use (85.5%). The use of non-fluoride toothpaste for children was 49.4%. A 43.6% of fathers and 49.7% of mothers agreed that dental caries could affect children below two years of age ($p>0.05$). A majority of fathers (88.6%) and mothers (86.1%) agreed that eating sweets can cause dental decay ($p>0.05$). The fathers (75.40%) and mothers (81.70%) regarding the knowledge and awareness to opt for dental fillings to decayed teeth for children at an early age($p>0.05$). **Conclusion:** The parents had sufficient knowledge of tooth decay, dietary influence on tooth decay. The majority of the parents were unable to reveal details of their children's tooth brushing and toothpaste. The parent needs to improve knowledge on tooth brushing and the use of the fluoridated tooth.

Keywords: Oral health; Early childhood caries; Parents; Oral health education; Children

Introduction

Early Childhood Caries (ECC) is defined as the presence of 1 or more decayed, missing, or filled tooth surfaces in any primary tooth in a child 71 months or younger. [1] ECC is one of the prevalent chronic diseases among young children, which may become evident from the eruption of first teeth. [2] This disease is one of the more widespread public health issues globally. [2-4]A recent systematic review postulated that dental caries had become Saudi Arabia's public health problem, [5] and the authors reported that government officials and the dental professions would mandate immediate attention. Furthermore, in Saudi Arabia, a high ECC prevalence was reported due to dietary habits, improper oral hygiene practices, and lack of awareness among parents. [6-11] In an Arabian study, the DMFT

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(decayed, missing, and filled teeth) of six-year-old children was 3.43 for girls and 4.14 for boys, respectively. [9] Consequently, another study from Jeddah reported DMFT scores of 2.9 to 6.3 per child, and the authors also observed 70% to 76% of dental caries in children of six years old. [7] Therefore, the parental role is of utmost importance to avoid dental caries in infants and toddlers. A recent systematic review with meta-analysis[6] reported that caries in primary teeth was high compared with caries in permanent teeth in the Arab region Wyne et al. [9] further acclaimed studies to measure ECC prevalence. The prior reports from Saudi Arabia reported high caries prevalence among preschool children. A study from Tabuk[11] reported 92% of primary teeth in children of 6 years of age affected by ECC. Therefore, it is imperative to create awareness amongthe parents, regarding their children's oral health and early childhood caries, especially in Saudi Arabia [12].There is a need to assess parents' knowledge, attitude, and practices about their children's oral health in Saudi Arabia. Therefore, the study was aimed to evaluate the knowledge, attitude, and practice towards children's oral health and early childhood caries among the Arabian parents resided in Riyadh province.

Materials and Methods

A structured questionnaire was used to study the awareness of early childhood caries among Saudi Arabia parents, including understanding the role of diet, brushing, fluoride, and their effect on social life. This cross-sectional questionnaire-based study has been carried out following the STROBE guidelines specified for this type of survey after due approval was obtained from deanship of scientific research, Majmaah University, Almajmaah, Saudi Arabia, under the IRB NO MUREC- Nov-2020/9-3. The study was planned and conducted, and data recorded in 3 months, from January 2021 to March 2021. In the Riyadh region, Saudi male and female participants having children above two years were included in the study. Non-Saudi male and female participants residing out of the Riyadh region and those having children above six years were excluded. The primary endpoint was to know awareness of early childhood caries among parents. The secondary outcomes were parents' understanding of clinical features, causes, and management of ECC and its prevention in Saudi Arabia. In addition, demographic data include gender, age, and education level, were collected. The comparisons were made based on gender (male and female), age (20-29 years; 31-40 and 40 years), and education (high school, diploma, graduation, and post-graduation). Data were analyzed using the statistical package IBM SPSS Statistics for Windows (Version 24.0. Armonk, NY: IBM Corp; 2016) computing the percentage response for each question. The comparisons were made in percentages using the chi-square test with a p-value less than 0.05.

Results

The respondents were 866 (n=866), and all respondents were from the Riyadh region. Among 866 participants 55.9% (n=484) were males and 44.1% (n=382) were females. Results revealed that 34% (295) of those surveyed were above 40 years of age, while 32.7% (283) were between 31-40 years, and 33% (288) were between >20-30 years of age. Among the participants, 23.4% (203) were businessmen, while 28.4% (246) were professionals, and 48.2% (417) were skilled workers. Of the total respondents, 52.0% (450) had a graduate degree, while 16.3% (141) have a diploma, and 19.2% (166) have high school degree. All the demographic characteristic of the study population was summarized in Figure1. Regarding the number of children to parents, 43.3% (375) have more than three, while 29.7% (257) have two and 27.0% (234) have one. The overall responses to the questionnaire were summarized in Table.1. A majority of participants (87.5%) agree that sweets can cause tooth decay, while 8.4% disagree and 4.0% have no idea. Nearly 46.3%% of parents were aware that caries could affect infants below two years, but 30.1% of parents answered incorrectly, and 23.6% have no idea. 28.8% of parents were aware that nighttime bottle/breastfeeding causes tooth decay, but 44.3% of parents disagree, and 26.9% have no idea. The majority of participants (78.2%) quoted that decayed primary teeth require restoration. More than ninety percent of participants agreed that their child's teeth are cleaned regularly, and failure to do so can cause early childhood caries. Astonishingly 56.2% of participants quoted that children can brush their teeth effectively on their own. Only a minority responded that children require regular dental visits (37.6%). Among the participants, 54.5% brushed their teeth once, and 45.5% brushed twice, whereas 63.7% responded that their children should brush twice daily. Among parents, 85.5% use fluoride toothpaste and 14.5% use non-fluoride toothpaste. The percentage of parents using fluoridated toothpaste for children declined to 50.6% compared to their personal use (85.5%). Among the study population, 43.6% of fathers and 49.7% of mothers agreed that dental caries could affect children below two years of age and no statistical significance was evident among the genders ($p>0.05$). A majority of fathers (88.6%) and mothers (86.1%) agreed that eating sweets can cause dental decay ($p>0.05$). A statistically significant difference ($p<0.05$) was noticed between fathers (75.40%) and mothers (81.70%) regarding the knowledge and awareness to opt for dental fillings to decayed teeth for children at an early age. There were mixed opinions evident among the genders [Table 2], age groups [Table 3], and education [Table 4]. There was no statistically significant difference ($p>0.05$) in the opinion of night feeding by breast or bottle as an etiology of early childhood caries. Only a minority of respondent fathers (27.1%) and mothers (30.9%) viewed night feeding as the culprit. No difference was observed between fathers and mothers on daily brushing, with more than ninety percent opined to brush daily. Important notice on brushing frequency is that more percent of mothers (54.5%) had a good knowledge to brush twice daily than fathers (38.4%) ($p<0.05$).

Discussion

The present study explicated Arabian Saudi parents' knowledge and awareness of their children's oral health residing in the Riyadh region. However, the Arabian parents' knowledge and awareness varied according to the type of questions asked, and in the present study, the authors used a self-administered questionnaire. In the present study, 866 parents participated in the study, and this is a more significant number of participants to previous studies reported from Saudi Arabia where Hamasha et al. [12] study reported with 324 Alshunaiber et al. [13] reported with 202 parents. Al-Zahrani et al. [14] conducted a study with

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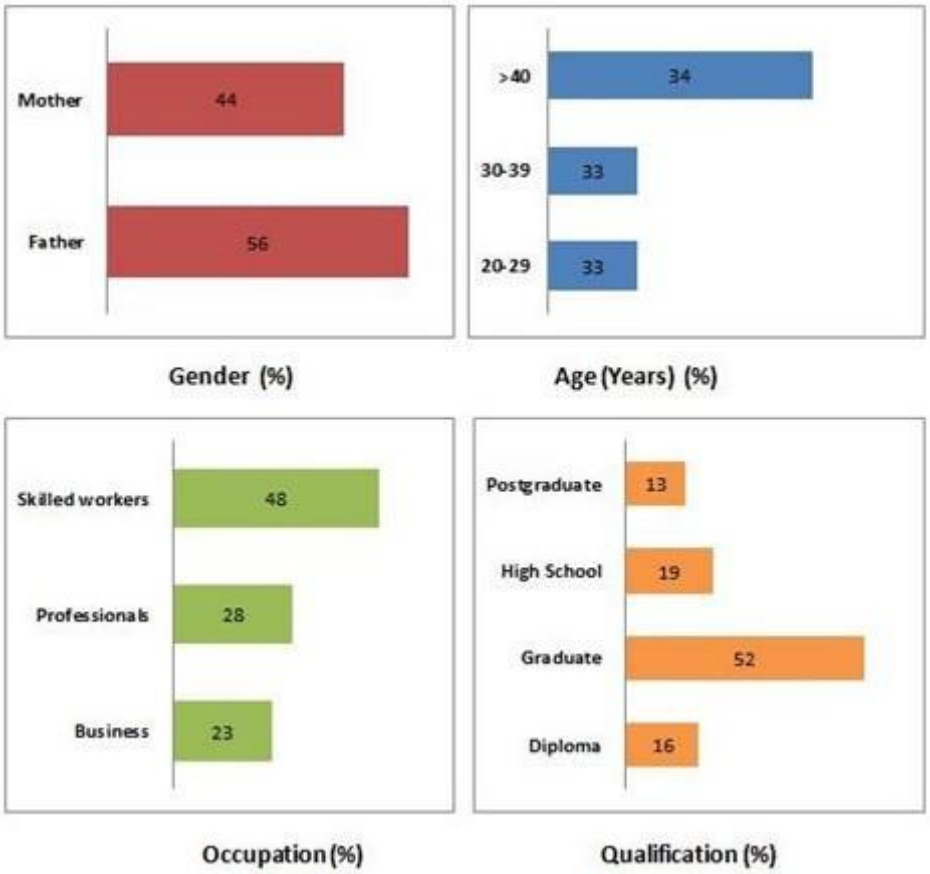

Figure 1. Demographic characteristics of study population

Table 1: Participants achieved overall scores.

Questions	Options	N %
How many children do you have?	1	27.0%
	2	29.7%
	>3	43.3%
Do you think tooth decay can affect infants below two years of age?	Agree	46.3%
	Disagree	30.1%
	I don't know	23.6%
Do you think eating sweets could cause tooth decay?	Agree	87.5%
	Disagree	8.4%
	I don't know	4.0%
Do you know baby tooth fillings are required for tooth decay?	No	21.8%
	Yes	78.2%
Do you think the nighttime bottle/breastfeeding causes tooth decay?	Agree	28.8%
	Disagree	44.3%
	I don't know	26.9%
Do you know that the child's teeth should be cleaned daily?	No	7.6%
	Yes	92.4%
How many times do you brush your teeth daily?	Once	54.5%
	Twice	45.5%
How many times do you think that your child should brush his/her teeth?	Once	36.3%
	Twice	63.7%
Which of these tools do you use for cleaning the tooth?	Finger	2.1%
	Miswak	8.8%
	Toothbrush	89.1%
Do you know the role of fluoride in toothpaste?	No	36.5%
	Yes	63.5%

Do you think the child required a dentist visit regularly?	No	62.4%
	Yes	37.6%
Do you think tooth brushing can protect teeth from tooth decay?	I don't know	5.2%
	No	6.5%
	Yes	88.3%
Do you think children can brush their teeth by themselves?	No	38.6%
	I don't know	5.2%
	Yes	56.2%
Do you know that not brushing teeth can cause dental decay?	No	3.9%
	I don't know	3.5%
	Yes	92.6%
Which toothpaste do you use?	Fluoride	85.5%
	Non fluoride	14.5%
Which toothpaste do you use for your children?	Different toothpaste	49.4%
	Same as me	50.6%

Table 2: Comparison of overall scores based on gender.

Questions	Option	Female	Male	P value
Yoor age group (Years)?	>20-30	24.40%	44.50%	0.001*
	31-40	35.50%	29.10%	
	>40	40.10%	26.40%	
Occupation	Business	28.10%	17.50%	0.001*
	Professionals	31.00%	25.10%	
	Skilled worker	40.90%	57.30%	
What is your education?	High school	19.40%	18.80%	0.85
	Diploma	15.70%	17.00%	
	Graduate	52.90%	50.80%	
	Past graduate	12.00%	13.40%	
How many children do you have?	1	25.60%	28.80%	0.39
	2	29.10%	30.40%	
	>3	45.20%	40.80%	
Do you think tooth decay can affect infants below two years of age?	Agree	43.60%	49.70%	0.16
	Disagree	31.00%	29.10%	
	I don't know	25.40%	21.20%	
Do you think eating sweets could cause tooth decay?	Agree	88.60%	86.10%	0.36
	Disagree	7.20%	9.90%	
	I don't know	4.10%	3.90%	
Do you know baby tooth fillings are required for tooth decay?	No	24.60%	18.30%	0.02*
	Yes	75.40%	81.70%	
Do you think the nighttime bottle/breastfeeding causes tooth decay?	Agree	27.10%	30.90%	0.24
	Disagree	44.00%	44.80%	
	I don't know	28.90%	24.30%	
Do you know that the child's teeth should be cleaned daily?	No	7.20%	8.10%	0.62
	Yes	92.80%	91.90%	
How many times do you brush your teeth daily?	Once	61.60%	45.50%	0.00*
	Twice	38.40%	54.50%	
How many times do you think that your child should brush his/her teeth?	Once	39.70%	31.90%	0.01*
	Twice	60.30%	68.10%	
Which of these tools do you use for cleaning the tooth?	Finger	2.50%	1.60%	0.00*
	Miswak	12.20%	4.50%	
	Toothbrush	85.30%	94.00%	
Do you know the role of fluoride in toothpaste?	No	38.40%	34.00%	0.18
	Yes	61.60%	66.00%	
Do you think the child required a dentist visit regularly?	No	63.40%	61.00%	0.46
	Yes	36.60%	39.00%	
Do you think tooth brushing can protect teeth from tooth decay?	I don't know	5.20%	5.20%	0.93
	No	6.20%	6.80%	
	Yes	88.60%	88.00%	

Do you think children can brush their teeth by themselves?	No	37.20%	40.30%	0.55
	I don't know	5.00%	5.50%	
	Yes	57.90%	54.20%	
Do you know that not brushing teeth can cause dental decay?	No	3.70%	4.20%	0.89
	I don't know	3.30%	3.70%	
	Yes	93.00%	92.10%	
Which toothpaste do you use?	Fluoride	85.70%	85.10%	0.78
	Non fluoride	14.30%	14.90%	
Which toothpaste do you use for your children?	Different toothpaste	48.10%	51.00%	0.39
	Same as me	51.90%	49.00%	

*: Statistically significant

Table 3: Comparison of overall scores based on the age of the parent.

Questions	Response	>20-30 years	31-40 years	>40 years	P-value
Gender	Father	66%	41%	61%	0.001*
	Mother	34%	59%	39%	
Occupation	Business	16%	33%	21%	0.001*
	Professionals	32%	27%	27%	
	Skilled worker	53%	40%	52%	
What is your education?	High school	22%	18%	17%	0.001*
	Diploma	25%	8%	16%	
	Graduate	45%	59%	52%	
	Past graduate	8%	15%	15%	
How many children do you have?	1	6%	55%	20%	0.001*
	2	14%	34%	42%	
	>3	80%	12%	37%	
Do you think tooth decay can affect infants below two years of age?	Agree	46%	45%	48%	0.82
	Disagree	32%	30%	29%	
	I don't know	22%	25%	23%	
Do you think eating sweets could cause tooth decay?	Agree	86%	88%	88%	0.04*
	Disagree	7%	8%	10%	
	I don't know	6%	4%	2%	
Do you know baby tooth fillings are required for tooth decay?	No	22%	23%	20%	0.66
	Yes	78%	77%	80%	
Do you think the nighttime bottle/breastfeeding causes tooth decay?	Agree	27%	25%	34%	0.03*
	Disagree	49%	43%	40%	
	I don't know	23%	31%	27%	
Do you know that the child's teeth should be cleaned daily?	No	8%	7%	7%	0.78
	Yes	92%	93%	93%	
How many times do you brush your teeth daily?	Once	55%	47%	61%	0.001*
	Twice	45%	53%	39%	
How many times do you think that your child should brush his/her teeth?	Once	29%	33%	47%	0.001*
	Twice	71%	67%	53%	
Which of these tools do you use for cleaning the tooth?	Finger	2%	3%	2%	0.001*
	Miswak	13%	5%	8%	
	Tooth brush	85%	92%	90%	
Do you know the role of fluoride in toothpaste?	No	30%	40%	40%	0.02*
	Yes	70%	60%	60%	
Do you think the child required a dentist visit regularly?	No	65%	61%	61%	0.40
	Yes	35%	39%	39%	
Do you think tooth brushing can protect teeth from tooth decay?	I don't know	4%	6%	6%	0.43
	No	5%	8%	6%	
	Yes	91%	86%	88%	
Do you think children can brush their teeth by themselves?	No	39%	36%	41%	0.17
	I don't know	5%	7%	3%	
	Yes	56%	57%	57%	

Do you know that not brushing teeth can cause dental decay?	No	3%	5%	4%	0.18
	I don't know	4%	5%	2%	
	Yes	93%	90%	94%	
Which toothpaste do you use?	Fluoride	88%	81%	88%	0.02*
	Non fluoride	12%	19%	12%	
Which toothpaste do you use for your children?	Different toothpaste	45%	55%	48%	0.08
	Same as me	55%	45%	52%	

*: Statistically significant

Table 4: Comparison of overall scores based on the education of the parent.

Questions	Response	High School	Diploma	Graduation	Post-graduation	P value
Gender	Father	57%	54%	57%	53%	0.85
	Mother	43%	46%	43%	47%	
Your age group (Years)?	>20-30	32%	17%	38%	39%	0.00*
	30-40	29%	31%	33%	39%	
	>40	39%	52%	30%	22%	
Occupation	Business	24%	17%	22%	38%	0.00*
	Professionals	6%	18%	38%	39%	
	Skilled worker	70%	65%	41%	24%	
How many children do you have?	1	33%	21%	28%	25%	0.00*
	2	17%	28%	32%	41%	
	>3	51%	52%	40%	34%	
Do you think tooth decay can affectinfants below two years of age?	Agree	48%	37%	48%	50%	0.24
	Disagree	31%	33%	30%	27%	
	I don't know	20%	30%	23%	23%	
Do you think eating sweets could cause tooth decay?	Agree	85%	89%	89%	83%	0.27
	Disagree	8%	8%	8%	13%	
	I don't know	7%	4%	3%	5%	0.19
Do you know baby tooth fillings are required for tooth decay?	No	25%	20%	20%	20%	
	Yes	75%	80%	80%	72%	
Do you think the night time bottle/ breastfeeding causes tooth decay?	Agree	27%	26%	29%	35%	0.55
	Disagree	46%	46%	45%	36%	
	I don't know	27%	28%	26%	29%	
Do you know that the child's teeth should be cleaned daily?	No	5%	6%	8%	11%	0.18
	Yes	95%	94%	92%	89%	
How many times do you brush your teeth daily?	Once	55%	57%	55%	47%	0.35
	Twice	45%	43%	45%	53%	
How many times do you think that your child should brush his/her teeth?	Once	37%	38%	35%	38%	0.94
	Twice	63%	62%	65%	62%	
Which of these tools do you use for leaning the tooth?	Finger	3%	4%	2%	1%	0.01*
	Miswak	16%	6%	8%	7%	
	Tooth brush	81%	91%	91%	92%	
Do you know the role of fluoridein tooth paste?	No	36%	43%	35%	35%	0.34
	Yes	64%	57%	65%	65%	
Do you think child required dentist visit regularly?	No	59%	67%	64%	53%	*
	Yes	41%	33%	36%	47%	0.07*
Do you think tooth brushing can protect teeth from tooth decay?	I don't know	5%	5%	4%	10%	0.13
	No	5%	4%	7%	8%	
	Yes	90%	91%	89%	82%	
Do you think children can brush their teeth by themselves?	No	39%	40%	39%	34%	0.95
	I don't know	5%	5%	6%	5%	
	Yes	56%	55%	56%	61%	
Do you know that not brushing teeth can causedentaldecay?	No	4%	5%	4%	3%	0.96
	I don't know	4%	4%	3%	4%	
	Yes	92%	91%	93%	94%	
Which tooth paste do you use?	Fluoride	76%	87%	89%	83%	0.00*
	Non fluoride	24%	13%	11%	17%	

Which toothpaste do you use for your children?	Different toothpaste Same as me	47%	46% 54%	50% 50%	55% 45%	0.48

***: Statistically significant**

101 mothers from Saudi Arabia; the findings are not comparable with the present study. The present study compared knowledge and attitudes of Saudi Arabian parents based on gender, age, and education. Hamasha et al. [12] found that less than 30% of parents could identify the number of primary teeth, the ideal duration of tooth brushing. Similar findings were evident in the present study. Sixty-three percent of Arabian parents were not aware of the best time for their child to visit dentists for the first time[15]. A recent longitudinal prospective study [15] reported that tooth brushing could partially diminish the association between sugar consumption and dental decay outcomes in children less than five years. Similarly, in the present, the parents were aware (87.5%) that tooth decay could cause by sweets consumption. The majority of the parents believed in this concept, and there was statistical significance evident only for age comparison ($p<0.05$), while comparison among parent gender and occupation was found statistically significant ($p>0.05$).

Bottle feeding habit at night has been considered significant risk factors of early childhood caries. [16-19] Most of the children in our study were fed with a bottle according to their parents, but only a few had ECC. Only 28% of the parents felt that the bottle feedings at night cause tooth decay, and surprisingly 44.3% were disagreeing this concept. The use of night bottle lack of awareness was evident in the present study. Similar findings were apparent in a study from Ghana reported that the knowledge of ECC preventedby feeding by the majority (89.3%) of the respondents was statistically significant. [18] There is a need to improve the understanding of the specific benefits of feeding in preventing dental diseases.

The question on frequency of tooth brushing most of the parents (54%) reported that their children brush only once daily. Among participants, mothers brush61% once daily while 45% father brushes daily and findings were statistically significant. It explains both the parents required oral health education to improve their practices. Surprisingly 63.7% of the parents want their children to brush twice daily. Among these mothers (60%) and fathers (68%) responded with twice brushing. Alshehri et al. [19] reported that only 30% of the parents replied twice brushing a day, and these findings were not in agreement with the present study. A recent Swedish study [21] reported that children's brushes two times are more determined to dental caries. This study was conducted on 336 children less than five years. Nonetheless, it is imperative to create knowledge among the parents about tooth brushing.

The benefits of fluoride toothpaste to decrease the dental caries incidence rate. [21-25] It has been reported that fluoridated teeth regularly will reduce the 25% incidence rate of dental caries compared to non-fluoridated toothpaste use. [24,25] The majority (85%) of the parents are using fluoridated toothpaste in the present study. There is no surprise that most of the parents in the study are aware of fluoridated toothpaste use. Gender, age, and occupation do not influence fluoridated toothpaste ($p<0.05$).

Another[25] from Saudi Arabia found thatonly 45.8% of the parents were aware of fluoridated toothpaste. These findings were not in agreement with the present study. The national survey of children from Scotland [24] recommended three concepts for primary prevention of caries in children are of (1) Oral health advice, (2) Twice tooth brushing with fluoridated (1000 ppm) toothpaste, and (3) Application pits or fissures. In the present cross-sectional survey, 89% of the parent-reported parents prefer their children to brush themselves. [26]

There is no relationship established among the gender, age groups, and education on allowing their children to brush themselves. Proper oral hygiene and the usage of fluoride toothpaste are the essential factors in caries prevention. [27-29] Parents are responsible for their children's tooth brushing and proper oral health. [30] It is essential to identify carious lesions early to avoid potential sequelae of dental caries. [31,32] A recent study [33] from Sheffield performed qualitative research on parents' experiences of tooth brushing with children and suggested developing a behavior change intervention to encourage parental supervised brushing. A systematic review [34] concluded that the oral health habits of parents might impact the oral health of their children. The authors also reported that special attention concerning their lifestyle and oral health habits should significantly impact children's oral health. A study from the West Indies [35] reported that oral health promotion should be accessible to oral health care for family members with children, including disseminating oral health information and primary health education. Children at an early age are at a higher risk of developing dental caries in primary dentition[36-38] and its progression to permanent dentition due to their morphology.[37,39,40]Hence, parents need to know their children's oral health [4,6,11,23-26], which eventually affects the quality of life of school-going children.

The Google form was sent to the parents in the study *via* social media to determine parental knowledge and concerns about oral health. Only 866 responses were received from the parents, which may not be represent the entire Saudi Arabia. However, the sample size was comparatively more with prior published studies. The response rate was not sought since the questionnaire was sent through social media. The questionnaire was self-administered, and the tool was not validated. These areconsidered potential limitations.

Conclusion

The parents had sufficient knowledge of tooth decay, dietary influence on tooth decay. However, the majority of the parents were unable to reveal details of their children's tooth brushing and toothpaste. The parent needs to improve knowledge on tooth brushing and the use of fluoridated toothpaste. It is essential to create awareness among mothers and fathers on oral health promotion to maintain optimal oral health in their children regardless of age and education.

Significance

The present study shows that despite good knowledge among parents, their attitude and practices towards brushing and using fluoridated toothpaste oral health should be improved. Parents should be informed to brush their children's teeth at least once by parents.

Conflict of Interest

The authors have no conflicts of interest to declare

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References

1. Zhang S, Liu J, Lo EC, Chu C. Dental caries status of Bulang preschool children in Southwest China. BMC Oral Health. 2014;14:16–22.
2. Congiu G, Campus G, Sale S, Spano G, Cagetti MG, Lugliè PF. Early childhood caries and associated determinants: a cross-sectional study on Italian preschool children. J Public Health Dent. 2014;74:147–152.
3. Thekiso M, Yengopal V, Rudolph MJ, Bhayat A. Caries status among children in the West Rand District of Gauteng Province, South Africa. SADJ. 2012;67:318–320.
4. Pitts NB, Boyles J, Nugent ZJ, Thomas N, Pine CM. The dental caries experience of 5-year-old children in Great Britain (2005/6). Surveys co-ordinated by the British Association for the study of community dentistry. Community Dent Health. 2007;24:59–63.
5. Khan SQ. Dental caries in Arab League countries: a systematic review and meta-analysis. Int Dent J. 2014;64:173-80. 5
6. Farsi N, Merdad L, Mirdad S. Caries risk assessment in preschool children in Saudi Arabia. Oral Health Prev Dent. 2013;11:271–280.
7. AlAgili DE, Alaki SM. Can socioeconomic status indicators predict caries risk in school children in Saudi Arabia?A cross-sectional study. Oral Health Prev Dent. 2014;12:277–288.
8. Ahmed Abdullah Alghamdi, Ahmed Almahdy. Association between dental caries and body mass index in schoolchildren aged between 14 and 16 years in Riyadh, Saudi Arabia. J Clin Med Res. 2017; 9: 981-986.
9. Wyne AH. Caries prevalence, severity, and pattern in preschool children. J Contemp Dent Pract. 2008;9:24–31.
10. Aljanakh M. Prevalence and severity of dental caries among public school students aged 16-l8 in Hail, Kingdom of Saudi Arabia. Int J Health Sci (Qassim) 2017;11: 50–53.
11. Stewart BL, AlJuhani TS, AlAkeel AS, AlBrikeet HA, AlBuhairan WH, AlBundagji NH, et al. Caries experience in grades 1 and 6 children attending elementary schools in King Abdulaziz Military City, Tabuk, Saudi Arabia. Saudi Dent J. 2000; 12, 140–148.
12. Hamasha AAH, Rasheed SJ, Aldosari MM, Rajion Z. Parents knowledge and awareness of their children's oral health in Riyadh, Saudi Arabia. The Open Dent J. 2019;13:236–241.
13. Alshunaiber R, Alzaid H, Meaigel S, Aldeeri A, Adlan A. Early childhood caries and infant's oral health; pediatricians' and family physicians' practice, knowledge and attitude in Riyadh city, Saudi Arabia. Saudi Dent J. 2019;31:S96-S105.
14. Al-ZahraniAM, Al-Mushayt AS, Otaibi MF, Wyne AH. Knowledge and attitude of Saudi mothers towards their preschool children's oral health. Pak J Med Sci. 2014;30:720–4.
15. Skafida V, Chambers S. Positive association between sugar consumption and dental decay prevalence independent of oral hygiene in preschool children: a longitudinal prospective study. J Public Health (Oxf). 2018;40:e275-e283
16. Dilley GJ, Dilley DH, Machen JB. Prolonged nursing habit: a profile of patients and their families. ASDC J Dent Child. 1980;47:102-8.
17. Johnsen DC, Nowjack-Raymer R. Baby bottle tooth decay (BBTD): issues, assessment, and an opportunity for the nutritionist. J Am Diet Assoc. 1989;89:112-6.
18. Anyanechi CE, Ekabua KJ, Ekpenyong AB, Ekabua JE. Parturients' Awareness and perception of benefits of breast feeding in the prevention of infant and childhood oral and dental diseases. Ghana Med J. 2017;51:83-87
19. Alshehri M, Kujan O. Parental views on fluoride tooth brushing and its impact on oral health: A cross-sectional study. J Int Soc Prev Community Dent. 2015;5:451-6.
20. Boustedt K, Dahlgren J, Twetman S, Roswall J. Tooth brushing habits and prevalence of early childhood caries: a prospective cohort study. J Eur Arch Paediatr Dent. 2020;21:155-159
21. Petersen PE. The World Oral Health Report 2003: Continuous improvement of oral health in the 21st Century-The approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol. 2003;31:3–23.
22. Petersen PE. Challenges to improvement of oral health in the 21st century--the approach of the WHO Global Oral Health Programme. Int Dent J. 2004;54:329–43.
23. Clarkson JE, Ellwood RP, Chandler RE. A comprehensive summary of fluoride dentifrice caries clinical trials. Am J Dent. 1993;6:59–106
24. Masson LF, Blackburn A, Sheehy C, Craig LC, Macdiarmid JI, Holmes BA, et al. Sugar intake and dental decay: results from a national survey of children in Scotland. Br J Nutr. 2010;104:1555-64.
25. Amin TT, Al-Abad BM. Oral hygiene practices, dental knowledge, dietary habits and their relation to caries among male primary school children in Al Hassa, Saudi Arabia. Int J Dent Hyg 2008; 6:361-70.
26. Mitrakul K, Laovoravit V, Vanichanuwat V, Charatchaiwanna A, Charatchaiwanna A, Bunpradit W, et al. Factors associated with parent capability on child's oral health care. Southeast Asian J Trop Med Public Health. 2012;43:249–55.
27. Nagarajappa R, Kakatkar G, Sharda AJ, Asawa K, Ramesh G, Sandesh N. Infant oral health: Knowledge, attitude and practices of parents in Udaipur, India. Dent Res J (Isfahan) 2013;10:659–65.
28. Togoo RA, Zakirulla M, Yaseen SM, Nasim VS, Al Qahtani AR, Al-Turki AA. Cross-sectional study of awareness and knowledge of causative factors for early childhood caries among Saudi parents: A step towards prevention. IntJ Health Sci Res. 2012;2:1–7.
29. Vanagas G, Milasauskiene Z, Grabauskas V, Mickeviciene A. Associations between parental skills and their attitudes toward importance to develop good oral hygiene skills in their children. Medicina (Kaunas) 2009; 45: 718-23.

30. Bhumireddy JR, Challa R, Mallineni SK, Nuvvula S. Comparison of International Caries Detection and Assessment System and digital radiographs for detecting occlusal dental caries: An *in vivo* Study. Eur J Gen Dent 2018;7:61-5

31. Bhumireddy JR, Nirmala S V, Mallineni SK, Nuvvula S. Diagnostic performance of the visual caries classification of International Caries Detection and Assessment System II versus conventional radiography for the detection of occlusal carious lesions in primarymolars. SRM J Res Dent Sci 2019;10:117-21.

32. Oredugba F, Agbaje M, Ayedun O, Onajole A. Assessment of mothers' oral health knowledge: Towards oral health promotion for infants and children. Health. 2014;6:908–15.

33. Marshman Z, Ahern SM, McEachan RRC, Rogers HJ, Gray-Burrows KA, Day PF. Parents' experiences of tooth brushing with children: A qualitative study. JDR Clin Trans Res. 2016;1:122-130.

34. Castilho AR, Mialhe FL, Barbosa Tde S, Puppin-Rontani RM. Influence of family environment on children's oral health: A systematic review. J Pediatr (Rio J) 2013;89:116–23.

35. Naidu R, Nunn J, Forde M. Oral healthcare of preschool children in Trinidad: A qualitative study of parents and caregivers. BMC Oral Health. 2012;12:27.

36. Nuvvula S, Bhumireddy JR, Kamatham R, Mallineni SK. Diagnostic accuracy of direct digital radiography and conventional radiography for proximal caries detection in primary teeth: A systematic review. J Indian Soc Pedod Prev Dent 2016;34:300-5.

37. Mallineni SK, Yiu CKY. A Retrospective Audit of Dental Treatm--ent Provided to Special Needs Patients under General Anesthesia During a Ten-Year Period. J Clin Pediatr Dent. 2018;42(2):155-160.

38. Mallineni SK, Yiu CK. A retrospective review of outcomes of dental treatment performed for special needs patients under general anaesthesia: 2-year follow-up. ScientificWorldJournal. 2014;2014: 748353.

39. Goose DH, Brayshaw B. Tooth morphology and dental caries. Public Health. 1972 Mar;86(3):137-41.

40. Zhu F, Chen Y, Yu Y, Ye Y, Zhu H, Wang H. Caries prevalence of the first permanent molars in 6-8 years old children. PLoS One. 2021Jan 13;16(1):e0245345.