

## Assessing the knowledge and attitudes of group of mothers living in Saudi Arabia with regards to their children's oral health: A cross-sectional study

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### RESEARCH

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### ABSTRACT

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#### Background

The knowledge of mothers with respect to health can affect their children's health either directly by promoting health practices or indirectly by influencing the health-related attitudes and behaviours of children.

#### Aims

The aim of this study was to assess the knowledge and attitude of a group of mothers living in Saudi Arabia with regard to their children's oral health.

#### Methods

This cross-sectional study involved 614 mothers living across Saudi Arabia. An electronic web-based questionnaire was developed and distributed among the participants using

different social media outlets.

#### Results

Almost 80 per cent of study participants were knowledgeable regarding their child's primary and permanent teeth's eruption time and agreed that their child's primary teeth were as important as the permanent teeth. The results also indicated that 79 per cent of the participants were aware that bottle feeding during sleep causes tooth decay and 73.7 per cent knew that the frequency of sugar consumption has a greater impact on oral health than the quantity of sugar consumed. Almost all participants (97 per cent) reported that they watch and help their children to brush their teeth. More than half (55.8 per cent) of them reported that they take their children for their first dental check-up when the children are one-year old, and almost three-quarters (73 per cent) reported they take their children to regular dental check-ups.

#### Conclusion

Most mothers had a positive attitude toward their children's oral health and were reasonably knowledgeable about it; however, further health education is required among some groups and in some aspects particularly those concerning oral and systemic health.

#### Key Words

Knowledge, attitude, mothers, children's oral health

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#### What this study adds:

##### 1. What is known about this subject?

Mothers' oral health knowledge plays an important role in their children's oral health; however there is no consistency in the literature about mothers' level of knowledge regarding their children's oral health.

## 2. What new information is offered in this study?

Most mothers had relatively reasonable levels of knowledge however some groups like younger mothers needed to be educated about aspects of oral health care such as association between oral and systemic health.

## 3. What are the implications for research, policy, or practice?

Findings of current study can help in planning any future programs aiming at educating mothers with regards to their children's oral health by targeting the inequalities in knowledge across groups.

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## Background

Mothers play a crucial role in a child's development and health.<sup>1</sup> They are usually the ones who carry the responsibility of maintaining a healthy environment for the benefit of their family. Their responsibilities include providing good dental habits for their children<sup>2</sup> and ensuring that their children get the required dental treatment.<sup>3-7</sup>

Moreover, studies have demonstrated that mothers' psychosocial, socioeconomic status, and oral health awareness affect the oral health of their children.<sup>3,8-13</sup> Children's oral health is also affected by their mother's dental visits and experience, caries incidence, and the attitude and perception of their child's oral health.<sup>9,14-16</sup> Furthermore, maternal anxiety has influences her family's perception of her child's oral health and tends to negatively affect the child's oral health practices.<sup>17,18</sup>

Studies have reported that maternal education about their children's oral health can improve oral health.<sup>19-21</sup> Dental health counselling during pregnancy not only improves preschool children oral health but also maintains long-term effectiveness of oral health.<sup>2,19-21</sup> Both oral health education and counselling impact mothers' adopted behaviours and practices associated with their children's oral health.<sup>22</sup> Thus, the incorporation of oral care in maternal and child health programs is advocated.<sup>21,23</sup>

Despite the importance of maternal oral health awareness, several investigations reported insufficient levels of awareness or contradictory and inconsistent information among studied populations.<sup>3,8,11,13,24-29</sup> Investigations reported a lack of knowledge among mothers with regard to dental visits, feeding, toothpaste, fluoride/antimicrobial agents, caries, maintenance of oral hygiene, etc.<sup>11,24,30</sup> Despite media advertising, reports indicate insufficient knowledge among mothers with regard to periodontal

diseases and their prevention and the importance of regular dental check-ups and note the inability of mothers to apply their knowledge of caries in daily life.<sup>25</sup> Incorrect beliefs and attitudes of parents to their children's oral health are considered to be risk factors that may cause development of caries in childhood.<sup>16</sup> The main sources of information are family and relatives.<sup>29</sup> Accordingly, previous studies suggest that oral health education and promotion should target mothers and include them in their children's oral health planning, which could be an effective method for prevention.<sup>2,6,11,13,31,32</sup>

Literature contains sparse information about Saudi Arabian mothers. Studies report that mothers in Makkah, Jazan, and Aseer have insufficient knowledge with respect to issues related to caries, primary teeth, diet, teething, and breast feeding.<sup>8,32,33-35</sup> An investigation concerning first dental visits also concluded a lack of effective knowledge among those interviewed.<sup>35,36</sup> In fact, insufficient parental knowledge is considered to be one of the obstacles in controlling dental diseases among Saudis.<sup>36</sup> Moreover, the oral hygiene behaviours practiced in early childhood is critical, as young children are more susceptible to oral diseases. Reminding and educating caregivers about oral health, as an integral part of the child's overall health and well being, is extremely important. Thus, the aim of this investigation was to assess Saudi mothers' knowledge of children's oral health care and their attitude toward it. The result of this study may help in planning and implementing programs to raise the awareness of oral healthcare practices among mothers in Saudi Arabia and rectify any misunderstanding they may have regarding oral health.

## Method

A cross-sectional study was designed and conducted among a sample of mothers living in Saudi Arabia. A structured questionnaire in the form of multiple-choice questions was developed in Arabic. The questionnaire consisted of two parts; the first part included socio-demographic questions such as age, occupation, educational level, and number of children. The second part was designed to measure the knowledge and attitude of mothers toward their children's oral health. It employed a five-point Likert scale, the points indicating measures ranging from strongly agree to strongly disagree. The questionnaire's items were generated by carefully reviewing relevant literature on parents'/caregivers' knowledge and attitudes toward their children's oral health; the most relevant and commonly used items were selected.

A pilot study was first carried out on 30 mothers with different characteristics to assess its clarity and feasibility. Results of the pilot study revealed that the questionnaire was easy to understand and fill-up and it took about 5–10 minutes to complete. Thus, no further adjustments were recommended. A questionnaire was distributed thereafter to a convenient sample through social media outlets such as Twitter and WhatsApp.

### Statistical analysis

The data was collected, summarized, and coded. All statistical analyses were performed with the Statistical Package for Social Sciences (SPSS) program (version 22). The following descriptive statistics were performed: frequency distribution tables, one-way ANOVA, and *post hoc* analysis. P value  $\leq 0.05$  was considered statistically significant.

### Ethical considerations

The study proposal was submitted and approved by the College of Dentistry Research Center (CDRC), King Saud University, Riyadh, Saudi (IRO222)].

### Results

A total of 614 completed questionnaires were received. Two-thirds of the respondents were below the age of 40 and around one third had a college level of education or higher. More than half of the study participants (55.7 per cent) were unemployed and 34.7 per cent worked in non-health related sectors. Among the respondents, 31.3 per cent had more than 4 children and 15 per cent had 2 children. The distribution of the socio-demographic characteristics of the participants is shown in Table 1.

Table 2 shows mothers' knowledge regarding different aspects of a child's oral health such as hygiene practices, dietary habits, and preventive dental attendance. About 79 per cent responded that they had sufficient knowledge regarding their child's primary and permanent teeth's eruption time. Moreover, almost 80 per cent agreed that their child's primary teeth were as important as their permanent teeth. However, only 55.8 per cent reported that their child's first dental visit should be in the first year of life. Furthermore, majority of the mothers had sufficient knowledge about most aspects regarding healthy dietary habits; 79 per cent were aware that bottle feeding during sleep causes tooth decay and 73.7 per cent knew that the frequency of sugar consumption has a greater impact on oral health than the quantity of sugar consumed. On the other hand, 38.8 per cent of mothers did not know or disagreed that sharing eating utensils can transmit decay-causing bacteria. More than 86 per cent of the mothers

knew that habits like nail biting, thumb sucking, and breathing through mouth affect a child's primary and permanent teeth, and diabetes in childhood negatively affects children's oral health and might lead to conditions such as oral dryness, fungal and bacterial infections as well as gum disease. Unfortunately, 7 per cent of the participants disagreed that inhalers used for treatment of asthma might negatively affect oral health by inducing oral dryness, decay, fungal infections, gum inflammation, ulcers, and taste alterations, and 47.1 per cent of the participants were unaware of this.

The "Bottle feeding during sleep causes tooth decay" question was significantly associated with most variables: age ( $p=0.000$ ), number of children ( $p=0.001$ ), and occupation ( $p=0.012$ ). Mothers with more than one child were more likely to know that oral dryness in children could increase the risk of tooth decay, fungal and bacterial infection. Tukey *post hoc* analysis showed that mothers employed in the health-related sector were slightly more knowledgeable about the importance of primary teeth ( $p=0.017$ ) and the effect of asthma inhalers on oral health ( $p=0.023$ ).

Education level was significantly associated with the question "Oral dryness in children can cause an increase in decay, fungal and bacterial infections". A p value of 0.001 was noted in the question "Childhood diabetes affects children's oral health negatively and might cause diseases like oral dryness, fungal and bacterial infections as well as gum disease" with the number of children the mothers have. As expected of mothers in the health-related sector, a significance of  $p=0.023$  was noted with regard to the knowledge that "Inhalers used for treatment of asthma affects the oral health by producing oral dryness, decay, fungal infections, gum inflammation, ulcers, and taste alterations". Age and education had significance related to the knowledge that "Habits like nail biting, thumb sucking and mouth breathing has an effect on a child's primary and permanent teeth". The different significance values are presented in Table 3.

With regard to habits such as nail biting, Tukey *post hoc* analysis indicated a significant difference exists ( $p=0.029$ ) between respondents within the age range 40–50 years and those below 30 years. Mothers between 40–50 years were more to agree on the effects of these habits. Bottle feeding during sleep was significant at  $p=0.000$ , Tukey *post hoc* showed a difference exists between those above 40 years and those at an age between 26 and 30 years ( $p=0.001$ ). Younger mothers (18–25 years) were less aware of the

harmful effects of feeding during sleep. Similarly, Tukey *post hoc* analysis indicated that younger mothers were less likely to appreciate the effects of sugar consumption frequency than those above 51 at  $p=0.001$ .

When considering the number of children, Tukey *post hoc* analysis indicated that respondents with more than four children were more aware of the harmful effects of feeding during sleep than those with two kids at  $p=0.000$ . *Post hoc* analysis displayed a difference between those with one and two children when considering oral dryness and its association with caries, infections ( $p=0.01$ ) and diabetes ( $p=0.001$ ).

When considering education, postgraduates were more likely to agree on oral habits and the effects of different types of foods on dental health at  $p=0.004$  and  $p=0.017$ , respectively, than those with an education below high school. Increased decay and infections due to oral dryness was agreed more by those with a high school education than those who did not complete high school education.

Participants employed in health-related sector were more likely to know about the start of baby teeth eruption than students and those working at non-health related sectors ( $p=0.043$ ). Health-related workers were also more likely to be aware of the importance of primary teeth than those who were unemployed ( $p=0.01$ ). Employed respondents were more likely to agree on the role of food on oral health than the unemployed ones ( $p=0.031$ ). Workers at health-related sector better understood the adverse effects of asthma inhalers than unemployed ones ( $p=0.023$ ).

## Discussion

This cross-sectional study aimed at assessing the knowledge and attitude of a group of mothers living in Saudi Arabia with regard to their children's oral health. The findings revealed relatively moderate to high levels of knowledge on certain aspects of their children's oral health but insufficient knowledge on aspects related to their attitudes such as taking their child to the dentist during his/her first year of age.

In dental literature, the knowledge of mothers/guardians has been reported to be a significant factor in the prevention of oral diseases.<sup>2,6,9,11,30</sup> Maternal knowledge and behaviours toward dental health have also been associated with a child's oral health.<sup>6</sup> Arming mothers with the correct information would create an opportunity of improving the overall health and well being of the future generation by inculcating good oral health practices in childhood.

Assessing and analysing the knowledge of a child's caregivers may contribute to solving some health issues in any given community. The statistical identification of stakeholders' concerns and knowledge discrepancies might help in designing and implementing a comprehensive and effective health intervention system.

In contrast to some previous local and international studies,<sup>3,7,10,12,23,25-27</sup> our investigation indicated a reasonable level of knowledge and desirable attitude among mothers with regard to their children's oral health. The results revealed that an overwhelming majority agreed on various aspects of oral health. These findings were in accordance with a recently published study aimed at investigating mothers' oral-health-related knowledge in Riyadh city of Saudi Arabia, which used a similar sampling methodology.<sup>37</sup> Interestingly, such high levels of knowledge might indicate that Internet users are more knowledgeable compared with mothers who reported low levels of knowledge in contradicting studies where data were collected using a more conventional "paper-based" method.

Many mothers in our study agreed on the impact of some harmful childhood habits such as nail biting and/or thumb sucking, demonstrating high levels of knowledge of habits that may affect a child's primary as well as permanent teeth. This was of significance among younger mothers below 40 years of age and those with a higher education. The findings may highlight the possible exposure of such mothers to educational materials through exposure to health-related information on the Internet for example. Additionally, knowledge on the eruption time of both primary and permanent teeth was lacking in almost a quarter of the sample population consisting mainly of younger-aged mothers who were still students. This could be explained by the inexperience and lack of time due to other responsibilities.

Bottle-feeding was significantly agreed upon as one of the causes of tooth caries. This finding contradicts what has been previously reported among Saudi mothers.<sup>25,31</sup> This information was linked to mothers working in the health sector or being above the age of 40 years. Mothers above 40 usually have more children in their families and might thus acquire this information through exposure to such problems or even by gathering information during previous dental visits. This may indicate the importance of the educational role of dentists as well as the need to disseminate health-promoting advices through different methods and in different settings.

The results also indicate that the majority of the sampled mothers perceived the importance of primary teeth, which is in agreement with other studies.<sup>25,29,31</sup> These findings are particularly significant among those above the age of 40 years. Bracksley et al. noticed that although mothers agreed on the importance of primary teeth, they could not explain why that is important.<sup>38</sup> Hence, educational information given to caregivers ought to include all aspects of any issue when disseminated, and should be explained in an easy and understandable way.

The effect of diet on a child's oral health seems to be well acknowledged among the participants. They were more likely to believe that frequency of sugar consumption and type of food intake has an impact on oral health, as previously reported in other studies.<sup>12,29,31</sup> Yet, this connection was significantly appreciated among older, educated mothers, as well as those employed in health-related sectors. This may also shed some light on groups having inadequate knowledge in the community. Oral dryness and diabetes were predominantly agreed upon as factors to deteriorate oral health in children among mothers with repeated experience of motherhood. Salivary hypo-function was also significant among health care workers and highly educated individuals.

Despite the reported increase in asthma prevalence among children in Saudi Arabia,<sup>39</sup> the effects of inhaler on oral health was not greatly known. This goes to show the passiveness of physicians and pharmacists when prescribing and dispensing medication, without offering an adequate explanation of the side effects that the prescribed medications might cause. Findings also showed that unlike other groups, the majority of the health sector employees knew the consequences of inhalers while students were least likely to be aware of those side effects. This also further highlighted the existing gap in knowledge across different groups, which needs to be considered when planning any health educational intervention program.

Findings on the child's first dental visit showed lower levels of knowledge compared to other oral health-related questions. This is similar to what has been reported by Togoo and his colleagues and Al-Shalan, but less than what was observed by Al-Zahrani and co-workers.<sup>25,31,35</sup> This could be explained by the fact that the study by Al-Zahrani et al. was confined to a smaller city and contained only 101 mothers from one hospital.<sup>33</sup>

The reported high levels of dental caries among children in Saudi Arabia<sup>40</sup> could be partly attributed to low levels of

knowledge and oral health-promoting practices among children and their caregivers. The result of this study may help in planning and implementing programs to raise the awareness and rectify the incorrect understanding among some Saudi mothers regarding oral health. Though mothers displayed a reasonable level of knowledge, one should interpret the current data carefully since this study might have such results from sampling mothers through Internet targeting more knowledgeable and more affluent mothers compared to non-Internet users. Our data demonstrated that age, education, occupation, and number of children play a role on the level of maternal knowledge and attitude toward their children's oral health. Accordingly, these factors should be anticipated when planning, designing, and conducting health educational programs. Different approaches should be implemented to comprehend the diversity in population.

## Conclusion

Based on the data of this study, it can be concluded that sampled mothers living in Saudi Arabia have a reasonable level of knowledge, as well as a relatively positive attitude when it comes to their children's oral health. This might be a result of the usefulness of several dental educational programs held to raise the level of awareness among mothers in Saudi Arabia. However, more educational programs are needed to decrease the knowledge gap between groups, especially for mothers who are over 41 years, those who are students, those with low educational levels, and those who have >4 children.

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#### **PEER REVIEW**

Not commissioned. Externally peer reviewed.

#### **CONFLICTS OF INTEREST**

The authors declare that they have no competing interests.

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None

#### **ETHICS COMMITTEE APPROVAL**

College of Dentistry Research Center (CDRC), King Saud University, Riyadh, Saudi (IR0222).

**Table 1: Socio-demographic characteristics of the participated mothers**

	Variable	Number	Percent
Age	18–25	49	8.0
	26–30	91	14.8
	31–35	116	18.9
	36–40	127	20.7
	41–50	158	25.7
	≥51	73	11.9
Educational level	Illiterate	22	3.6
	<High school	342	55.7
	High school	37	6.0
	College & above	213	34.7
Occupation	Student	22	3.6
	Unemployed	342	55.7
	Health-related sector	37	6.0
	Non-health related sectors	213	34.7
Number of children	1	99	16.1
	2	92	15.0
	3	121	19.7
	4	110	17.9
	>4	192	31.3

**Table 2: Maternal knowledge and attitudes regarding their children’s oral health**

Variable	Strongly Agree (per cent)	Agree (per cent)	I don't know (per cent)	Disagree (per cent)	Strongly Disagree (per cent)
I take my child to his first dental appointment during his first year of life.	112 (18.2)	231 (37.6)	105 (17.1)	153 (24.9)	13 (2.1)
I watch and help my child during brushing as long as he needs supervision.	338 (55.0)	259 (42.2)	7 (1.1)	10 (1.6)	0 (0.0)
Baby teeth start to erupt at 6 months.	142 (23.1)	349 (56.8)	55 (9.0)	62 (10.1)	6 (1.0)
Permanent teeth start to erupt at 6 years.	141 (23.0)	349 (56.8)	62 (10.1)	56 (9.1)	6 (1.0)
I have to take my child for dental checkups every 6 months.	155 (25.2)	292 (47.6)	77 (12.5)	85 (13.8)	5 (0.8)
Habits like nail biting, thumb sucking, and mouth breathing has an effect on child’s primary and permanent teeth.	296 (48.2)	236 (38.4)	60 (9.8)	18 (2.9)	4 (0.7)
Bottle feeding during sleep causes tooth decay.	284 (46.3)	201 (32.7)	76 (12.4)	49 (8.0)	4 (0.7)
I believe that primary teeth are as important as permanent teeth.	233 (37.9)	256 (41.7)	66 (10.7)	55 (9.0)	4 (0.7)
The type of food that my child consumes has an effect on his oral health.	359 (58.5)	220 (35.8)	19 (3.1)	15 (2.4)	1 (0.2)
Sharing eating utensils can transmit decay-causing bacteria.	212 (34.5)	164 (26.7)	99 (16.1)	119 (19.4)	20 (3.3)
Not drinking enough water and increase in caffeinated drinks can cause oral dryness in children.	215 (35.0)	248 (40.4)	142 (23.1)	8 (1.3)	1 (0.2)
Oral dryness in children can cause an increase in decay, fungal and bacterial infections.	223 (36.3)	231 (37.6)	152 (24.8)	5 (0.8)	3 (0.5)
Diabetes in childhood affects children’s oral health negatively and might cause diseases like oral dryness, fungal and bacterial infections as well as gum disease.	318 (51.8)	227 (37.0)	41 (6.7)	27 (4.4)	1 (0.2)
The frequency of sugar consumption has a higher impact on oral health than quantity.	230 (37.5)	222 (36.2)	159 (25.9)	3 (0.5)	0 (0.0)

Inhalers used for treatment of asthma affects oral health by producing oral dryness, decay, fungal infections, gum inflammation, ulcers, and taste alterations.	120 (19.5)	160 (26.1)	289 (47.1)	40 (6.5)	5 (0.8)
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**Table 3: Association of sample characteristics with knowledge and attitudes**

Variable			Sum of Squares	Df	Mean Square	F	Sig.
Age	Habits like nail biting, thumb sucking, and breathing through the mouth has an effect on child's primary and permanent teeth.	Between Groups	11.794	5	2.359	3.634	0.003
		Within Groups	394.642	608	0.649		
	Bottle feeding during sleep causes tooth decay.	Between Groups	28.751	5	5.75	6.384	0
		Within Groups	547.607	608	0.901		
	I believe that primary teeth are as important as permanent teeth.	Between Groups	17.191	5	3.438	3.911	0.002
		Within Groups	534.511	608	0.879		
	The frequency of sugar consumption has higher effect than quantity dose.	Between Groups	13.436	5	2.687	4.292	0.001
		Within Groups	380.683	608	0.626		
No. of children	Bottle feeding during sleep causes tooth decay.	Between Groups	17.272	4	4.318	4.704	0.001
		Within Groups	559.086	609	0.918		
	Oral dryness in children can cause an increase in decay, fungal and bacterial infections.	Between Groups	8.012	4	2.003	2.978	0.019
		Within Groups	409.584	609	0.673		
	Childhood diabetes affects children's oral health negatively, and might cause diseases like oral dryness, fungal and bacterial infections as well as gum disease.	Between Groups	11.792	4	2.948	4.659	0.001
		Within Groups	385.381	609	0.633		
Education	Habits like nail biting, thumb sucking, and mouth breathing has an effect on child's primary and permanent teeth.	Between Groups	8.272	3	2.757	4.218	0.006
		Within Groups	398.07	609	0.654		
	The type of food that my child consumes has an effect on his oral health.	Between Groups	4.051	3	1.35	2.824	0.038
		Within Groups	291.189	609	0.478		
	Oral dryness in children can cause an increase in decay, fungal and bacterial infections.	Between Groups	7.439	3	2.48	3.682	0.012
		Within Groups	410.15	609	0.673		
Occupation	Baby teeth start erupting at 6 months.	Between Groups	6.545	3	2.182	2.73	0.043
		Within Groups	487.528	610	0.799		
	Bottle feeding during sleep causes tooth decay.	Between Groups	10.299	3	3.433	3.699	0.012
		Within Groups	566.06	610	0.928		
	I believe that primary teeth are as important as permanent teeth.	Between Groups	8.153	3	2.718	3.813	0.01
		Within Groups	543.549	610	0.891		
	The frequency of sugar consumption has higher effect than quantity dose.	Between Groups	7.255	3	2.418	3.337	0.019
		Within Groups	386.864	610	0.634		
	Inhalers used for treatment of asthma affects the oral health by producing oral dryness, decay, fungal infections, gum inflammation, ulcers, and taste alterations.	Between Groups	8.082	3	2.694	3.337	0.019
		Within Groups	492.407	610	0.807		