Influence of mothers' oral health knowledge and attitudes on their children's dental health

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Abstract

Aim: This was to evaluate the influence of mothers' oral health-related knowledge and attitudes on the tooth-brushing behaviour and dental health of their children and to compare the effect of these maternal aspects on child's oral health. **Study design and methods:** In 2005, an oral health study conducted among a random sample of 457 mother and child pairs in Tehran, Iran, used self-administered questionnaires to provide data on mothers' oral health-related knowledge and attitudes and children's tooth-brushing behaviour. Clinical data allowed assessment of dental status of the primary and permanent dentition. **Statistics:** Chi-square test and binary logistic regression models were employed. **Results:** Generally, mothers had extensive knowledge of and positive attitudes towards oral health. Mothers' higher level of oral health knowledge and better attitude scores were associated with children's sound dentition ($p<0.05$), while only mothers' better attitude was associated with children's twice-daily tooth brushing ($p=0.001$). The multivariate analyses showed that children of mothers with higher attitude scores were more likely to brush their teeth twice daily (OR = 2.1; 95% CI 1.2 – 3.7) and have sound dentition (OR = 12.4; 95% CI 1.8 – 85.9). The models revealed that mother's knowledge *per se* had no effect on children's sound dental health, but showed an additive effect with mother's attitudes. **Conclusions:** Because twice-daily tooth-brushing behaviour and sound dentition in 9-year-olds were associated with their mothers' positive oral health-related attitudes, in developing oral health promotion programs for children and adolescents, the considerable potential of mothers should be a major focus of oral health professionals.

Introduction

Many behavioural theories such as the Health Belief Model and Theory of Reasoned Action have confirmed the major role of knowledge and attitudes in explaining behavioural changes [Ajzen and Fishbein, 1980; Noar, 2005]. These aspects are especially emphasized when the role of parents' knowledge of and attitudes towards health behaviour and status of their offspring is assessed. Parents play a central role in giving children the information and encouragement needed for healthy lives [Christensen, 2004].

Parental oral health-related knowledge, belief, and attitudes influence the tooth-brushing behaviour of their children [Adair et al., 2004; Skeie et al., 2006; Poutanen et al., 2007]. Furthermore, parents' attitudes have a significant positive influence on the children's dental caries and gingival health [Okada et al., 2001; Szatko et al., 2004]. Within the family, the role of mother has been emphasised in relation to a child's oral health habits and status [Åstrøm, 1998; Okada et al., 2002; Saied-Moallemi et al., 2007]. Despite changing roles and areas of responsibility within the family [Rossow, 1992], in the child's oral health-related lifestyle, the mother still seems to play the key role [Okada et al, 2001; Poutanen et al., 2007].

To find factors promoting children's oral health behaviour, more research on family characteristics and parent-child relations has been suggested [Christensen, 2004]. While a wealth of research has been performed to determine the importance of parents' oral health-related knowledge and attitudes for oral health among preschoolers [Szatko et al., 2004; Adair et al., 2004; Skeie et al., 2006], few studies have been carried out on school-aged children [Okada et al, 2001; Poutanen et al., 2007]. This information is important, especially in societies where mothers play a significant role in rearing their children.

The present study evaluates the influence of mothers' oral health-related knowledge and attitudes on tooth-brushing behaviour and dental health of their children, and to compare the effect of these maternal aspects on child's oral health.

Materials and Methods

Study subjects and data collection. The present study was carried out in a representative sample of 9-year-old primary school children in Tehran, Iran, a sample selected from all public primary schools of the city by multi-stage sampling [Saied-Moallemi et al., 2006]. From a list of schools, eight boys' schools and eight girls' schools were randomly selected. From each school one third-year class was randomly chosen, with all children with their mothers included. A total of 457 subjects (equal gender distribution) and their mothers (n = 415; response rate 91%) participated. The data included children's tooth-brushing behaviour and their clinical dental examinations together with a self-administered questionnaire delivered to the mothers [Saied-Moallemi et al., 2007].

Key words: attitude, child behaviour, dental health, knowledge, mother-child relations

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Questionnaire. The questionnaire utilized oral health-related knowledge and attitude statements from previous research [Okada et al., 2001; Szatko et al., 2004]. Originally written in English, it was translated into Persian. After a pilot study [Saied-Moallemi et al., 2007], the statements were slightly modified.

Mothers' knowledge of oral health. Eight statements (Fig 1) on different aspects of oral health (microbial plaque, causes and prevention of oral diseases), on a five-point Likert scale from 'fully agree' to 'fully disagree', assessed the mothers' knowledge of oral health. Their responses were scored from 1 to 5; with the higher scores indicating higher degree of knowledge (the negative statements were re-scored). The sum of these scores served as the final oral health knowledge score for each respondent. For further analyses, the sum scores were sub-grouped into quartiles, and the low (Q1: 8 - 29) and the high (Q4: 34 - 40) quartiles were compared.

Mothers' attitudes towards oral health. Six statements (Fig 2) about the importance of oral health and the seriousness of oral diseases, with the same scale as for the knowledge statements and same scoring assessed the mothers' attitudes. The sum scores for the low (Q1: 8 - 22) and the high (Q4: 27 - 30) quartiles were compared.

Mothers' level of education. Mothers were asked for information on their level of education, assessed by a 7-point scale from illiterate to doctoral. These mothers' level of education was then categorised into three levels as low (illiterate, primary or intermediate school), medium (high school or diploma) or high (university degree) [Saied-Moallemi et al., 2008].

Children's tooth-brushing behaviour and dental status. The children were first asked a question "How often do you usually brush your teeth?" with the following alternatives: "irregularly or never", "once a week", "a few times a week", "once daily", and "twice daily or more" [Saied-Moallemi et al., 2008]. The question was asked twice and a comparison was made between the answers (kappa value = 0.8).

A clinical dental examination was then performed by one of the authors (Z.S-M.) based on WHO criteria for recording children's dental health [WHO, 1997]. DT and dt values facilitated assessment of the children's dental status. Children with no decay experience in primary and/or permanent dentition (DT and/or dt = 0) were defined as having sound dentition [WHO, 1997]. Intra-examiner reliability for diagnostic criteria resulted in a kappa value of 0.9 (Saied-Moallemi et al., 2006). The study protocol was approved by the Ethics Committee of Shaheed Beheshti University, Tehran, Iran.

Statistical analyses. Statistical evaluation was performed by means of Chi-square test for comparison of the extreme quartiles. Binary logistic regression analysis was fitted to the data to measure odds ratios (OR) with 95% confidence intervals (CI).

Results

The oral health knowledge scores among the mothers were generally high. Fig 1 shows almost all of the mothers (92-97%) recognized that regular dental examinations, restricting the consumption of sugary snacks, and regular tooth-brushing can prevent dental decay. A majority of mothers (79-84%) were aware of the preventive role of fluoride toothpaste and the harmful effect on teeth of sweet foods. More than 60% of the mothers acknowledged that microbial plaque can cause dental and gingival diseases.

The mothers showed mainly positive attitudes towards oral health. As shown in Fig 2, almost all (97%) considered dental decay and its potential consequences as serious, and 75% of them regarded dental disease to be as important as other diseases. Almost all mothers (90%) thought that they would be able to prevent dental decay. About 75% of the mothers assessed the primary teeth as important and agreed to the possibility of maintaining one's dentition for entire life.

Twice-daily tooth-brushing (Table 1) was reported more frequently among children whose mothers had higher oral health attitude scores (high quartile: Q4), but their mothers' knowledge of oral health showed no association with children's tooth-brushing. Mothers with higher oral health knowledge and attitude scores (high quartile: Q4) had more children who were defined as sound (Table 1).

In the logistic regression model (Table 2), girls (OR = 2.1; 95% CI 1.2 – 3.5) and the children of mothers having higher oral health attitude scores (OR = 2.1; 95% CI 1.2 – 3.7) were most likely to brush their teeth twice-daily. Mothers with higher oral health attitude scores (high quartile: Q4), but not higher knowledge scores significantly more often had children with sound permanent dentition (OR = 12.4; 95% CI 1.8 – 85.9; cf Table 2).

Discussion

This study has demonstrated that mothers' positive attitudes towards oral health had a significant influence on their children's twice-daily tooth-brushing behaviour and achievement of sound dentition. These findings are in line with earlier research showing an association between mothers' oral health attitudes and the caries experience of their young children [Skeie et al., 2006] and the gingival health of their school-aged children [Okada et al., 2001]. The influence of mothers' positive oral health attitudes on twice-daily tooth-brushing behaviour among our 9-year-olds is in accordance with earlier findings among preschoolers [Pine et al., 2000; Adair et al., 2004].

Health educational programs have been traditionally based upon the theory that acquiring new knowledge will alter attitudes and lead to a change in behaviour. However, a linear relationship between knowledge, attitude, and behaviour seems simplistic because external factors such as environmental, social, and family circumstances have an influence on human behaviour, as suggested in behavioural theories

Figure 1. Percentages of Iranian mothers (n=415) responding correctly to statements concerning oral health-related knowledge.

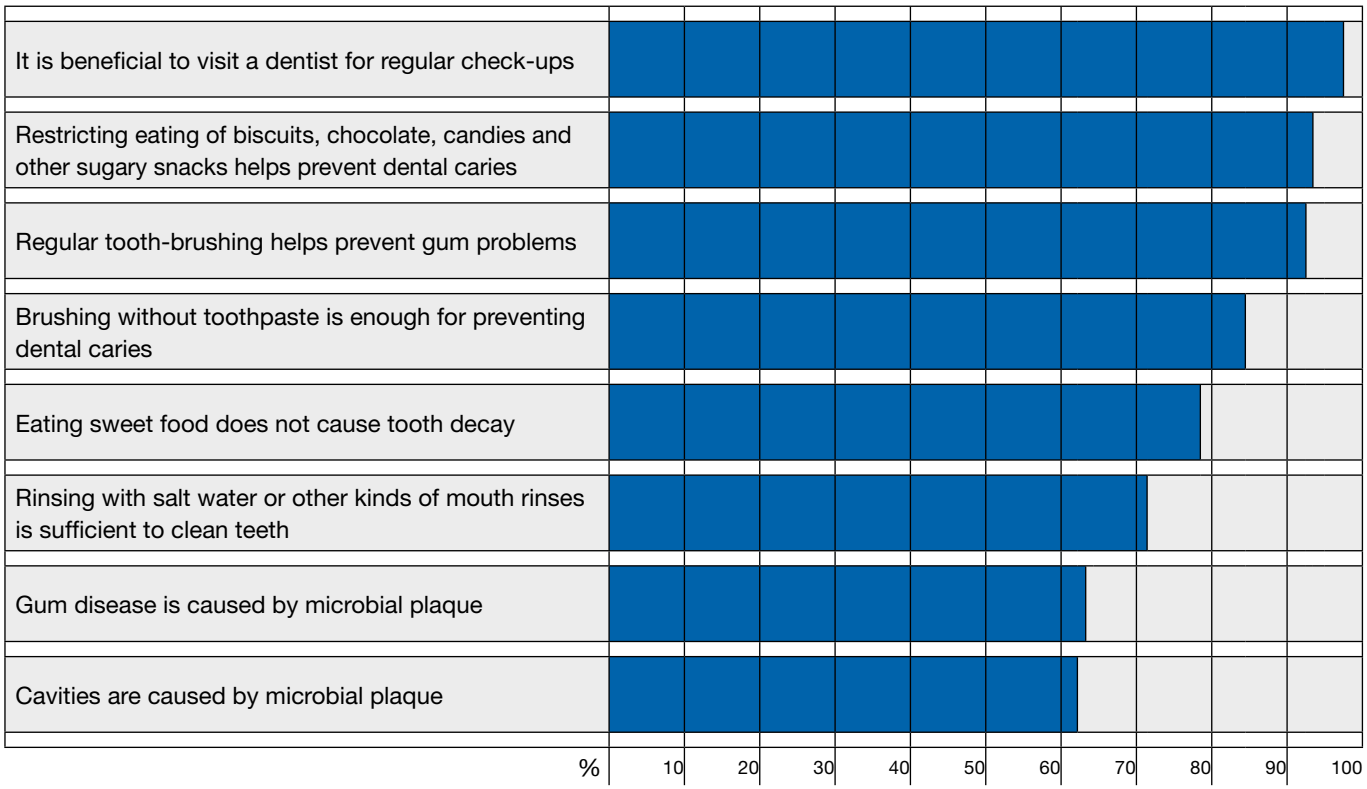

Figure 2. Percentages of Iranian mothers (n=415) responding positively to statements revealing oral health-related attitudes.

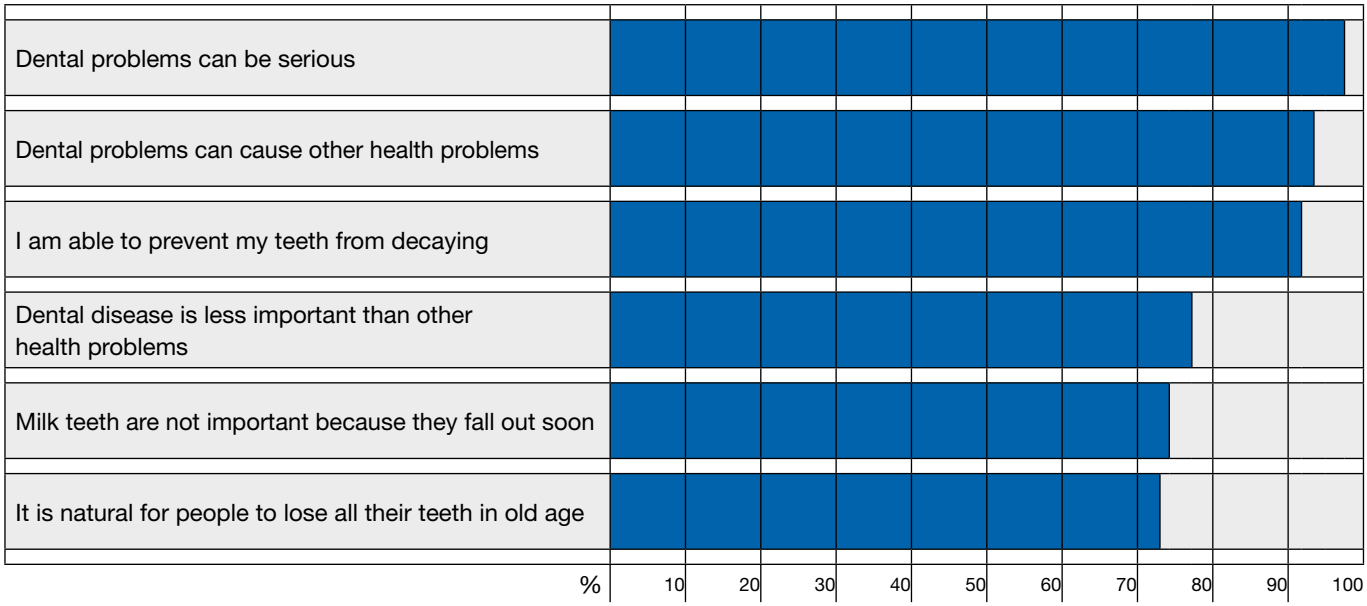

Table 1. Tooth-brushing frequency and dental health of 9-year-olds (n=457) according to mothers' oral health-related knowledge and attitudes and their level of education in Tehran, Iran.

		Mothers' knowledge			Mothers' attitudes		χ^2	Mothers' education			χ^2
	All (n=457) %	**Q_1**[a] (n=119) %	**Q_4**[b] (n=107) %	**P**[c]	**Q_1**[a] (n=123) %	**Q_4**[b] (n=113) %	**P**[c]	**Low** (n=123) %	**Medium** (n=197) %	**High** (n=85) %	**P**[c]
Tooth-brushing frequency											
Twice-daily or more	46	46	46	0.18	38	54	0.001	41	49	48	0.03
Once-daily	30	25	34		27	31		27	28	38	
Less frequently	24	29	20		35	15		32	23	14	
Dental health											
dt=0	36	27	42	0.02	31	43	0.055	33	33	47	0.045
DT=0	88	85	94	0.02	82	94	0.004	83	89	93	0.07
DT+dt=0	33	23	41	0.004	26	42	0.01	28	30	43	0.04

[a]Q_1: mothers with lower oral health knowledge and attitude scores; [b]Q_4: mothers with higher oral health knowledge and attitude scores;

Table 2. Performing twice-daily tooth-brushing or having sound dentition among 9-year-olds as explained by mothers' oral health-related knowledge and attitude, mothers' education, and child's gender by means of two logistic regression models.

	Estimate	**S.E.**	**P**	**OR**	**95% CI**
Model for twice-daily tooth-brushing					
Gender (0=boy, 1=girl)	0.718	0.277	0.01	2.1	1.2-3.5
Mother's attitude towards oral health (0=Q_1, 1=Q_4)[a]	0.736	0.295	0.01	2.1	1.2-3.7
Mothers' education	0.034	0.126	0.79	1.0	0.8-1.3
Constant	-0.993	0.424			
Goodness of fit[b] (P=0.25)					
Model for sound dentition (DT)					
Gender (0=boy, 1=girl)	0.334	0.635	0.60	1.4	0.4-4.9
Mother's knowledge of oral health (0=Q_1, 1=Q_4)[a]	-0.852	0.761	0.26	0.4	0.1-1.9
Mother's attitude towards oral health (0=Q1, 1=Q_4)[a]	2.514	0.990	0.01	12.4	1.8-85.9
Mothers' education	0.062	0.334	0.85	1.1	0.6-2.1
Constant	1.518	0.919			
Goodness of fit[b] (P=0.15)					

[a]Q_1: mothers with less oral health knowledge and lower attitude scores, Q_4: mothers with greater oral health knowledge and higher attitude scores .
[b]Hosmer- Lemeshow test

such as the PRECEDE-PROCEED model [Green and Kreuter, 1991]. Based on the Theory of Reason Action [Ajzen and Fishbein, 1980], 'important others' such as family members and friends are important in changing and maintaining oral health behaviour in adults [Freeman and Linden, 1995]. Bearing in mind the important role of parents, and especially mothers, in developing positive values and behaviours in their children [Christensen, 2004; Padilla-Walker, 2007], the influence of mothers in this study as 'important others' on children's health behaviour is logical.

In the context of a family, children should not be considered merely as passive recipients of care in everyday routines of health action, because they play an active role in making healthful choices [Christensen, 2004]. In their role as health-promoters, they can contribute to healthy activities in the family. Thus, the family should promote children's health as well as their children's ability in developing a healthy lifestyle. The significant influence of mothers' attitudes on children's oral health found here may be attributed to the impact of their attitudes on their parental caring behaviours for their children [Skeie et al., 2006]. Additionally, this points to the deep interaction between mother and child, and supports the mother's role as an important resource for the child's perception and acceptance of attitudes, values, and behaviours [Padilla-Walker, 2007] especially during the critical period for establishing attitudes and beliefs and shaping each individual's health behaviour [Nutbeam et al., 1989].

Bivariate analysis in the present study showed that mothers' oral health knowledge and attitudes both to be positively related to their children's sound dentition. Although multivariate analysis failed to reveal a clear relationship between the mothers' oral health knowledge and whether their children had a sound dentition, knowledge did show an additive effect with attitude (OR changed from 2.7 to 12.4) when it was fitted in the model. These observations are in line with several previous findings [Skeie et al., 2006] as well as behavioural theories explaining the impact of attitudes in changing and maintaining behaviour [Noar, 2005]. A recent study in fact showed parental knowledge to be associated with children's oral health behaviour [Poutanen et al., 2006]; the additive as well as supportive role of knowledge in establishing attitudes must be kept in mind.

Mothers' own oral self-care behaviour has a clear positive influence on their children's tooth-brushing behaviour and on their dental health [Okada et al., 2002; Saied-Moallemi et al., 2007]. The presence of desirable oral health practice among those with positive attitudes suggests that good oral health habits interact with attitudes towards oral health [Freeman and Linden, 1995]. Each parentally linked factor, such as parents' oral health knowledge, attitudes, and behaviour, may be considered to shape the oral health behaviours of their children. A possible optimistic estimation of oral health behaviour, however, does not rule out the influence of mother's attitudes towards their children.

Conclusion

Twice-daily tooth-brushing behaviour and sound dentition in 9-year-olds were both associated with the positive oral health-related attitudes of their mothers. When developing oral health promotion programs for children and adolescents, the considerable potential in mothers should be taken into account and advocated by oral health professionals.

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