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A Comparison of Psychosocial Factors Related to Dental Anxiety among Turkish and Finnish Pre-adolescents

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Purpose: To assess psychological, individual and maternal factors related to dental anxiety among pre-adolescents in the different cultural settings of Turkey and Finland.

Materials and Methods: A cross-sectional study of Finnish (n = 338) and Turkish (n = 611) pre-adolescents aged 10–12 years old by paired matching of questionnaires for the subjects and their mothers. These questionnaires, along with modified dental anxiety scales, were designed to collect data on the pre-adolescents' and their mothers' oral and dietary behaviours in relation to psychosocial factors. Multiple linear regression and factor analyses as well as descriptive and correlation statistics were applied.

Results: The Turkish pre-adolescents (TP) reported poorer dental health (50%) and more frequent gingival bleeding (26%) than did the Finnish pre-adolescents (FP) (26%, 0%), ($p < 0.05$). A similar trend occurred for reported toothache (70% and 17% for TP and FP respectively [$p = 0.00$]). Mean dental anxiety (DA) for TP and their mothers, and Finnish counterparts respectively were 9.64 ± 6.01, 8.70 ± 4.53 and 7.39 ± 4.51, 6.02 ± 5.50 ($p < 0.05$). Among TP, those with low DA reported high levels of toothbrushing and dietary self-efficacy (DSES) and self-esteem ($p < 0.05$); FP showed similar trends for DSES and self-esteem. Principal component analysis revealed that maternal DA and regular dental visits largely accounted for primary associations with DA among TP.

Conclusions: Appreciating the impact of various psychosocial factors may provide a better understanding of DA among pre-adolescents, and thus may reduce dental avoidance and behavioural management problems for the overall improvement of young patients' oral health.

Key words: culture, dental anxiety, maternal influence, pre-adolescents, psychosocial

Oral Health Prev Dent 2007; 5: 173-179. *Submitted for publication: 22.05.06; accepted for publication: 10.10.06.*

Dental anxiety (DA) is related to behavioural management problems in dental settings and to delay in dental appointments (Klingberg, 1995; Klingberg et al, 1995; Skaret et al, 1998), as well as to increased occurrence of caries (Kinirons and Stewart, 1998; Kruger et al, 1998). These may raise obstacles to the maintenance of positive oral health throughout adulthood.

Parental, especially maternal DA (MDA) can contribute to that of their children (Klingberg et al, 1995), and a family history of DA can also be predictive of child-onset DA (Locker et al, 1999). Adult-onset DA is characterised by multiple severe fears (Locker et al, 1999), whereas high levels of DA are associated with low levels of self-esteem and self-efficacy (Locker, 2003; Skaret et al, 2003). Little is known about such a relationship among children. Since altering health behaviours after adolescence is difficult (Kelder et al, 1994), preventive measures are crucial during childhood.

Folayan et al (2004) proposed that one's response to felt anxiety depends largely on cognitive appraisal and coping mechanisms developed by the individual under the modulating effect of a particular culture.

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Table 1 Characteristics of Turkish and Finnish mothers

	Turkish (%)				Finnish (%) (n=176)	p*
	Public school (n=325)	Private school (n=199)	Total (n=524)	p		
Education						
Secondary school or less	89	5	57	**0.001**	7	**0.001**
At least high school	11	95	43		93	
Age (years)						
<30	12	1	8	**0.001**	0	**0.001**
30–39	74	50	65		29	
40–49	13	45	25		64	
>49	1	4	2		8	
Number of children						
1–2	42	92	63	**0.001**	55	0.183
3 or more	58	8	37		45	
Time spent with child/school day						
<1 hour	3	3	3	**0.001**	1	**0.001**
1–2 hours	8	9	9		16	
>2 – <4 hours	15	33	22		30	
4–6 hours	30	38	32		42	
>6 hours	44	17	34		11	
Dental visit frequency						
Irregular	96	79	89	**0.001**	57	**0.001**
Regular	4	21	11		43	
Toothbrushing frequency						
Rarely	17	2	11	**0.001**	8	**0.001**
At least once a week	13	1	9		7	
Daily	70	97	80		85	

p*, statistical difference between Turkish (total) and Finnish pre-adolescents
Bold text indicates statistically significant p-values

Aetiologies of DA can differ by cultural differences in dental healthcare systems (Moore et al, 1996). Coolidge et al (2005) emphasised the need to develop culturally specific control and coping measures for DA among the youth.

It appears in some countries that the association between higher caries experience and ethnic diversities may be a minor confounder and that the underlying relationship relates to poverty, educational attainment and acculturation (Verrips et al, 1992, Vargas et al, 1998; Sundby and Petersen, 2003). However, this has not been shown in terms of DA and studies about the influences of cultural differences and healthcare systems on DA among children of different nationalities are few.

The aim of the present study was to increase our understanding of DA among pre-adolescents by assessing psychological and maternal factors in the different dental health care and cultural settings of Turkey and Finland.

MATERIALS AND METHODS

A cross-sectional study of Finnish and Turkish school pre-adolescents (FP and TP) aged 10 to 12 years old in Munkkiniemi (a suburb of Helsinki) (n = 338) and Kadiköy (a managerial district of Istanbul) (n = 611) was performed by the paired matching of questionnaires for pre-adolescents (Pre-adolescent Health Be-

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haviour Questionnaire [PHBQ]) with those of their mothers (Maternal Health Behaviour Questionnaire [MHBQ]), in winter and spring 2004.

PHBQ included new and modified scales (Cinar et al, 2005; Holund, 1991; Macgregor and Balding, 1991; Reynolds, 1993; Wong et al, 1998) and surveyed pre-adolescents' beliefs and attitudes about oral health and dietary patterns by assessing their self-esteem, toothbrushing habits, dietary self-efficacy and DA. MHBQ, modified from Pine et al (2000), surveyed socio-economic factors, maternal dental health beliefs, attitudes, behaviour, and mothers' conceptions and supervision of their own pre-adolescent children's dental health behaviour.

Back translations to and from Turkish and Finnish were conducted by two native speakers to ensure comparability with the original forms in English. PHBQ and MHBQ were revised after being tested by a pilot study (Cinar et al, 2005).

In Turkey, two schools were selected by cluster sampling from high and low socio-economic suburbs to represent the general profile of the district. Then a representative sample of 611 children (n = 29189) was randomly selected and, proportionally assigned by age groups 10, 11 and 12 years; the classroom served as the sample unit (World Health Organization, 1998). Sample size was calculated assuming the most unfavourable situation (p = q = 50% [where q = 1 - p]) with standard error (SE) 2 (CI 95%). A similar process was applied to the Finnish sample. The high SE can be attributed to the characteristics of cluster sampling (World Health Organization, 1998).

Of the 360 public and 251 private school pre-adolescents, 96% and 98% completed the questionnaires. The respective response rates for mothers were 93% (n = 334) and 79% (n = 199). Finnish data with no distinctive difference in socio-economic profiles, showed a 65% (n = 223) and 53% (n = 180) response rate for pre-adolescents and their mother respectively.

Turkish Ministry of Education, local administration authorities and the school authorities in Turkey as well as the relevant ethics committee in Finland granted ethical clearance and written permission to conduct the study. All of the participating mothers and pre-adolescents provided written informed consent. PHBQ were completed in classes and MHBQ were completed at home; the mothers' data are shown in Table 1.

Modified DA scales for pre-adolescents (six items) and their mothers (MDA) (five items), were ranged on a five-point Likert Scale (1 = not anxious, to 5 = extremely anxious). The sum scores of those scales for Turks and Finns were coded as low and high by taking the means as the cut-offs (10 TP, 9 Turkish mothers; 7 FP, 6 Finnish mothers) respectively. The self-esteem scale, (Macgregor and Balding, 1991) with nine items, each ranging on a three-point scale (agree = 1, to disagree = 3), was coded with median cut-off points, 4 for Turks and 5 for Finns. Toothbrushing and modified dietary self-efficacy scales (DSES; Reynolds, 1993; Cinar et al, 2005) consisted of 8 and 11 items respectively, where each item can give a score from 1 (totally disagree) to 5 (totally agree). Design of these scales with median cut-offs of 9 and 16 for Finnish pre-adolescents (α = 0.83, α = 0.86), has been described previously (Cinar et al, 2005).

Cronbach coefficient measures for Turkish modified pre-adolescents DA (α = 0.81), MDA (α = 0.86) and self-esteem (α = 0.68) were acceptable. These were α = 0.75, α = 0.89 and α = 0.70 for the respective Finnish scales.

In addition to these tools, the following factors representing oral health and behaviour were also analysed for possible correlations with modified DAS:

- Oral health status: self-reported dental health (1 = very bad, to 5 = well), gingival health (observation of bleeding ranging from 1 = always, to 5 = never) and past experience of toothache (yes or no).
- Behaviour: frequency of regular toothbrushing (once or twice a day) and dental visits (regular = once a year, irregular = more or less than once a year). Regular dental visits were not applicable to Finnish pre-adolescents regarding the recall system applied by the school dentist.
- Socio-economic status and maternal factors (Table 1), and MDA.

Factor analysis and item analysis applied to the psychological tools and behavioural variables above that were differentiated between high and low levels of pre-adolescent DA among the TP and FP to assess the discriminative clusters between those two groups. Components were assigned a title based on the variable with highest loading in that particular component.

In addition to those analyses, descriptive statistics, the Pearson correlation coefficient, chi-square, and Student *t*-tests were applied.

RESULTS

TP reported poorer dental health (50%) and more frequent gingival bleeding (26%) than did FP (26%, 0%), ($p<0.05$). A similar situation occurred with reported toothache (70% and 17%), ($p = 0.001$). Regular tooth-

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Table 2 Distribution of dental anxiety (DA) levels among Turkish (n = 534) and Finnish (n = 172) pre-adolescents through self-esteem, toothbrushing, and dietary self-efficacy

	Turkish (%)			Finnish (%)		
DA-related self-reported individual and psychological factors	Low DA (n = 266)	High DA (n = 268)	p	Low DA (n = 95)	High DA (n = 77)	p*
Self-reported gingival bleeding						
Usually	23	30	**0.001**	-	-	0.455
Sometimes	27	39		28	34	
Rarely	51	31		72	66	
Self-reported dental health						
Below average	9	9	**0.022**	-	-	0.733
Average	36	48		27	24	
Above average	55	43		73	76	
Self-esteem						
Low	53	67	**0.001**	43	71	**0.001**
High	47	33		57	29	
Toothbrushing self-efficacy						
Low	50	59	**0.024**	53	50	0.628
High	50	41		47	50	
Dietary self-efficacy						
Low	47	60	**0.006**	41	66	0.001
High	53	40		59	34	
Maternal dental anxiety						
Low	58	41	**0.001**	61	56	0.398
High	42	59		39	44	

p*, statistical difference between Turkish (total) and Finnish pre-adolescents
Bold text indicates statistically significant p-values

brushing frequency among TP (70%) was lower than that of FP (96%) ($p = 0.001$). Irregular dental visits were higher among TP (68%).

Mean DA scores for TP and FP were 9.64 ± 6.01 and 7.39 ± 4.51 respectively ($p < 0.05$). Both TP and FP showed similar percentages of high DA (55%). TP with high DA self-reported poorer oral health and behaviour than did those who were less dentally anxious (Table 2). No similar trend occurred for FP.

Half of the TP and FP showed high levels of toothbrushing self-efficacy (TBSES) and DSES. High levels of self-esteem were 41% for TP and 43% for FP. Among TP, those with low DA reported high levels of TBSES, DSES, and self-esteem ($p < 0.05$) (Table 2). There was a similar trend among FP, but for DSES and self-esteem only.

Mean MDA among all TP mothers (8.70 ± 4.53) was higher than that of FP mothers (6.02 ± 5.50) ($p < 0.05$). Turkish mothers (51%) were also more likely to experience high levels of MDA than were their counterparts in Finland (40%) ($p < 0.05$). Highly anxious TP were more likely to have mothers with high MDA than those with low anxiety (Table 2). No such trend appeared among Finnish mothers.

As shown in Table 1, only maternal education and dental visit frequency among the psychosocial factors were associated with DA among Turkish mothers ($R^2 = 0.215$, $p < 0.05$). For Finnish mothers, such a trend occurred only with frequency of dental visits ($R^2 = 0.031$, $p < 0.05$).

Table 3 displays the behavioural clusters related to DA among TP and FP. According to factor analysis, they accounted for 43.4% and 56.9% of the total variance, thus meeting the Kaiser Criteria (eigenvalue greater than 1 rule). Principal component analysis revealed that MDA and regular dental visits were the major contributors to DA among TP.

DISCUSSION

DA has been a predictor of poor clinical dental health among children and adolescents (Bedi et al, 1992; Bolin, 1997) regarding the negative association between those two (Kinirons and Stewart, 1998; Kruger et al, 1998). This seems to be the case in the present study: highly anxious TP had self-assessed poorer oral health.

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Table 3 Factor analysis for assessing behavioural clusters of dental anxiety (DA) among Turkish pre-adolescents and their Finnish counterparts by Varimax rotated solution*

	Turkish pre-adolescents (n = 377) Component**		Finnish pre-adolescents (n = 125) Component**	
	MDA	OHB	PDA	OHB
PDA	0.621	*	0.838	*
MDA	0.733	*	*	-0.461
Self-esteem	-0.598	*	-0.580	*
Pre-adolescent toothbrushing self-efficacy	*	0.759	*	0.695
Dietary self-efficacy	*	0.681	-0.567	*
Toothbrushing frequency	*	0.580	*	0.699
Pre-adolescent regular dental visit frequency	-0.700	*	NA	NA

*Loadings below 0.40 extracted for ease of communication
** MDA, maternal dental anxiety; NA, not applicable; PDA, pre-adolescent dental anxiety; OHB, oral hygiene behaviour

Less toothache experience and better oral health behaviour are typical of adults and children with low to moderate DA (Bedi et al, 1992; Wogelius et al, 2003). In children with high DA, Bedi et al (1992) found less frequent daily toothbrushing and more consumption of sugar. Similarly, in the present study, TP with low DA reported more frequent daily toothbrushing and suffering fewer toothaches than did those with high DA. No significant associations appeared among the FP, which may be due to organised and prevention-oriented oral health care in conjunction with health promotion programmes running in Finnish elementary schools. Such programmes may create an environment that fosters well-established and regular toothbrushing habits as well as good oral health status among FP.

Adults with low socio-economic status and education are more likely to have higher DA (Moore et al, 1993). Similarly, earlier findings indicate that children from families with moderate to high levels of education were more likely to experience less DA than were those with low levels of education (Bedi et al, 1992; Rantavuori et al, 2004). In the present study, TP and their mothers with lower levels of education than those of Finnish mothers were more dentally anxious than were their Finnish counterparts. This may underline the effect of social status in Turkey, for public oral health care settings are few and out-of-pocket payments are the primary source of paying for dental care and treatment. In Finland, public health care is provided free of charge for children up to 18 years old. Turkish women with low educational level and those who married young mostly live in urban areas. The use of healthcare services among Turkish women with low socio-economic status was less than that among those with high socio-economic status (Institute of Population Studies, 2004). The use of dental services in Turkey was positively related to education level and income (Mumcu et al, 2004).

In the present study, MDA was one of the explanatory factors for different levels of DA among TP but not for FP, due perhaps to the different roles of families in these cultures. In collectivist cultures, high parental control, protectiveness and involvement are the major characteristics (Wang and Ollendick, 2001), and receiving positive appraisals from the social environment is maximised (Tafarodi and Swann, 1996). Turkish culture, with similar characteristics, sees one's self-concept in terms of achievement for the group and co-operativeness. Achievement is mainly characterised by family norms, such as calling on obedience during dental treatment. Finnish culture emphasises individualistic values in which personal achievement is valued. In addition, regular free dental check-ups are the significant source of dental knowledge for FP whereas among the TP such knowledge comes from their mothers' experience and knowledge of dental care. In combination, such factors may also explain why pre-adolescent DA forms a unique cluster among FP whereas DA among the Turkish draws largely from the MDA cluster.

As Locker (2003) reported among adults, low self-esteem was commonly associated with high DA. Family factors play an important role in the development of self-esteem (Heinonen et al, 2003). Shek (2005) has found that socially disadvantaged children had lower

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self-esteem than did those with high socio-economic status. Such findings may explain why in the present study, self-esteem and MDA shared the same cluster in TP. This may be due to the negative influence of unequal socio-economic status on self-esteem affecting the maternal modelling pathway of high DA in TP. DA among FP with equal socio-economic profiles comprised a cluster with self-esteem and dietary self-efficacy. This may reveal that in equal and reasonably high socio-economic circumstances, individual psychological variables play more of a major role in the DA of pre-adolescents.

Culture, the standards for behaviour that one acquires as a member of social group (Harwood, 1981), passes from generation to generation among members of a group and helps one to cope with social life and daily events (Folayan et al, 2004). Culture also affects the individual attitudes and perceptions regarding teeth and dental care (Petersen, 1990). As the factor analysis showed in the present study, different aetiologies seem to play a significant role in development of DA and appear to be culture-related. This further underlines that appreciation of the impact of cultural and ethnic diversity is important in understanding how parental attitudes to oral health vary, as shown by Adair et al (2004). On the other hand, Pine et al (2004) have found variations in parental beliefs and behaviours for different ethnic and socio-economic groups that separately have an impact on their children's oral health.

With the limitations of the present study in determining specific ethnocultural beliefs of Turkish and Finnish families, there is a need for further studies to better understand the role of ethnocultural factors on parental influence towards oral health and DA of their pre-adolescent children. Appreciating the role of differing circumstances within cultural contexts may provide a better understanding of DA among pre-adolescents to reduce dental avoidance and behavioural management problems for the improvement of young patients' oral health.

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