

# Disparities in oral health of children in Tehran, Iran

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## Abstract

**Aim:** This was to investigate the association between parents' educational level and oral health of Iranian primary school children. **Methods:** Data came from the voluntary clinical examination in 2005 of a random sample of 459 third-year primary school children in the 16 schools in Tehran, together with a self-administered questionnaire regarding information on the educational level of the parents. The study used the dmft/DMFT values for dental status, and the CPI, and PI to assess periodontal condition. **Statistics:** One-Way ANOVA, Kruskal-Wallis and Mann-Whitney U tests were used. **Results:** The mean dmft value was 4.2 (SD±2.9) in boys and 3.4 (SD±2.6) in girls for the whole study group. The children of the low education parents had more dental caries than those of high education parents in both primary ( $p < 0.01$ ) and in permanent teeth ( $p < 0.05$ ). A strong association was found between high parental education and restorations in primary teeth ( $p < 0.001$ ), but only a trend for restorations in permanent teeth. Mean number of sextants with a CPI score 0 was significantly associated with parents' educational level ( $p < 0.01$ ). **Conclusion:** The disparities in the oral health of children need to be considered when developing oral health promotion programmes.

## Introduction

Inequalities in oral health have been reported to be linked to differences in socio-economic background in different countries [Vanobbergen et al., 2001; Hobdell et al., 2003; Christensen et al., 2003]. Where distinct criteria for assessing socio-economic background are lacking, such indicators as income, occupational status or educational level of parents have been used [Irigoyen et al., 1999; Sundby and Petersen, 2003]. Lower level of parents' education may indirectly affect the risk of dental caries in both primary and permanent dentition in children [Petersen, 2005b].

The objective of the present study was to assess oral health status, including caries experience, periodontal health as well as oral hygiene level of 9-year-old children in Tehran, Iran, and to identify socio-demographic factors associated with their oral health status.

## Materials and methods

**Population.** The present study was carried out in a representative sample of 9-year-old primary school children in

Tehran, Iran. Samples of pupils were selected by multi-stage stratified random sampling from all the public primary schools of the city. Firstly, from a list of primary schools, taking the gender of their pupils into account, sixteen schools were randomly selected for the study. Thereafter, from each school one third-year class was chosen (at random if the school had several parallel classes). Totally, 459 subjects (225 boys and 234 girls) participated in the study. A voluntary clinical examination of the child together with a self-administered questionnaire delivered to the mother formed the basis for obtaining the relevant data.

In December 2004 a separate pilot study was conducted in one girls' school in Tehran in order to test the reliability and feasibility of the methods. The protocol was revised slightly and the main project was carried out with the total sample of 459 children in February-March 2005.

**Dental examination.** The children were examined in the health office of the school during school time. All clinical examinations were conducted by the first author (ZS) using a disposable mirror, a sterile CPI probe, and a blue and white headlamp under natural light in the office. A research assistant recorded the clinical data on prepared data sheets. At the beginning of the survey duplicate examinations of the children in one school were performed in order to assess intra-examiner agreement in the use of the diagnostic criteria (Kappa value  $> 0.9$ ).

Clinical examinations were carried out based on WHO criteria for recording dental status, periodontal and oral hygiene conditions [WHO, 1997]. Dental status was scored as the number of decayed, missing, and filled teeth in both primary and permanent dentitions tooth by tooth (dmft and DMFT). Modified CPI (scored as: healthy, bleeding, and calculus) and a modified plaque index (PI) (scored as: no plaque, plaque on gingival margin only, and plaque elsewhere) for oral hygiene, in six index teeth were calculated.

**Questionnaire.** Data regarding parents' education were collected from the mothers through a self-administered questionnaire. For the analysis, parents' education was categorized into three levels; low (primary or intermediate schools), medium (high school or diploma), and high (university degree). The educational level of the parents was defined as the highest level of either parent's education. The response

**Key words:** Children, Dental health surveys, Oral health, Parents' education, Socio-economic factors

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rate of the questionnaire was 90%, with the result that the data included information for 409 children.

*Statistical analyses.* One-Way ANOVA and Kruskal-Wallis tests were used to compare differences between groups based on parents' education. Mutual differences between groups were tested with the Mann-Whitney U test.

**Results**

The mean dmft value was 4.2 (SD±2.9) for boys and 3.4 (SD±2.6) for girls for the total study group. The difference in mean dmft values between genders was statistically significant ( $p < 0.01$ ) but no significant differences regarding parents' educational level were observed. The total mean DMFT

value was 0.4 (SD±0.9) and no differences between genders and parents' educational level were found. For all components of dmft, significant differences were found between children of low education and high education parents (Table 1). Regarding the components of DMFT between children of low education and high education parents, a significant difference ( $p < 0.03$ ) was observed only for DT.

Percentages of caries-free children for primary and permanent dentition were 15% and 78%, respectively. No differences in relation to parents' educational level in the percentage of caries-free children were found, whereas a significant difference between genders for primary dentition was observed ( $p < 0.05$ ).

**Table 1** Mean dmft and DMFT values with their components in the primary and permanent dentition of 9-year-old Iranian boys and girls in relation to their parents' education.

	Parents' education					
	Low		Medium		High	
	Boys n = 43	Girls n = 51	Boys n = 85	Girls n = 88	Boys n = 74	Girls n = 68
dmft	4.1 (2.8)	3.5 (2.5)	4.3 (3.2)	3.1 (2.3)	4.2 (2.7)	3.7 (2.9)
dt	2.2 (1.8)	1.9 (1.9)	1.8 (1.8)	1.5 (1.6)	1.4 (1.7)	1.2 (1.7)
mt	1.4 (1.4)	1.3 (1.3)	1.2 (1.5)	0.7 (1.0)	0.8 (1.2)	1.1 (1.3)
ft	0.5 (1.1)	0.3 (1.0)	1.2 (2.2)	1.0 (1.4)	2.0 (2.0)	1.5 (1.9)
DMFT	0.4 (0.9)	0.6 (1.1)	0.2 (0.5)	0.5 (1.0)	0.5 (1.0)	0.3 (0.8)
DT	0.3 (0.7)	0.3 (0.6)	0.1 (0.4)	0.1 (0.4)	0.2 (0.5)	0.1 (0.3)
MT	0 (0.2)	0.1 (0.3)	0	0 (0.1)	0 (0.1)	0
FT	0.1 (0.5)	0.2 (0.8)	0.1 (0.4)	0.3 (0.9)	0.3 (0.9)	0.3 (0.8)

**Table 2** Mean number of sextants with CPI and PI and their standard deviations (SD) of 9-year-old Iranian boys and girls in relation to their parents' education.

	Parents' education					
	Low		Medium		High	
	Boys Mean (SD)	Girls Mean (SD)	Boys Mean (SD)	Girls Mean (SD)	Boys Mean (SD)	Girls Mean (SD)
<b>CPI</b>						
Healthy	1.5 (1.1)	1.5 (1.3)	2.0 (1.4)	1.8 (1.1)	2.1 (1.4)	1.8 (1.2)
Bleeding	4.4 (1.2)	4.3 (1.2)	3.7 (1.4)	4.0 (1.1)	3.7 (1.4)	4.0 (1.2)
Calculus	0.2 (0.5)	0.2 (0.5)	0.3 (0.5)	0.2 (0.4)	0.2 (0.4)	0.2 (0.5)
<b>PI</b>						
No plaque	0.1 (0.4)	0.4 (0.7)	0 (0.2)	0.3 (0.6)	0.3 (0.7)	0.2 (0.6)
Plaque gingival margin	0.4 (0.7)	1.0 (1.0)	0.7 (0.9)	0.9 (1.0)	0.8 (0.9)	0.4 (0.8)
Plaque elsewhere	5.5 (0.8)	4.7 (1.2)	5.3 (0.9)	4.8 (1.2)	4.9 (1.1)	5.3 (1.0)

All children had plaque on at least one index tooth. No difference between children in different education groups was found regarding dental plaque; however, the girls had 50% more teeth without plaque compared to the boys (Table 2). Seventeen percent of the 9-year-olds had no healthy sextant (CPI score 0). The mean number of sextants with a CPI score 0 among the children of low and high education parents was 1.5 and 2.0, respectively ( $p < 0.01$ ) (Table 2).

## Discussion

A reduction in the prevalence of dental caries in permanent teeth was found in this study, but the figures for primary teeth remain about the same as those previously reported in a national survey taken in 1998 [Pakshir, 2004]. The reduction in caries experience in permanent teeth may be due to the recent implementation of a comprehensive national oral health program, including fluoride mouth rinses and oral health education in all primary schools. On the other hand, the findings for primary teeth demonstrate insufficient promotion of preventive oral care in the early years of life. In addition, they may partly reflect the lower value adults place on primary teeth and the inadequate attention paid to them.

In the present study girls' permanent teeth were found to have been treated more frequently than those of boys. This finding, which is the opposite of that reported by Alvarez-Arenal et al. [1998] might partly be due to the fact that the girls' teeth are exposed to the oral environment (and thereby to caries and treatment) earlier than boys' teeth [Virtanen et al., 1994]. In addition, girls are in general more concerned about their personal health.

Educational background has been shown to be one of the most important predictors of oral health [Hobdell et al., 2003; Petersen, 2005b]. The results show a strong inverse association between parents' education and caries experience, as has also been shown in developed [Bolin et al., 1997, 2005 and Petersen, 2005b] as well as in developing countries [Al-Tamimi, 1998; Mascarenhas, 1999], although other studies have found no such association [Ullah et al., 2002; David et al., 2005].

The positive relationship between socio-economic status and access to treatment services has been shown [Irigoyen et al., 1999; Vanobbergen et al., 2001; Hobdell et al., 2003]. Higher SES has also been shown to be related to healthier periodontium in children [Christensen et al., 2003]. Among these children a great discrepancy in the dental treatment and unmet treatment needs was observed in relation to the parents' education probably due to the economic barriers to dental care confronting the low education group.

The present study confirmed the necessity of developing programmes to promote oral health in children. It is clear that the ongoing community-based oral health promotion programme for increasing oral health knowledge and improving the oral health behaviour of children in Iran must

be strengthened. As parents play a very important role in the oral health of their children, raising their awareness and engaging them would certainly benefit the oral health of their offspring. These health promotion policies should emphasize the reduction of health inequalities by changing the determinants of health. As suggested by Petersen [2005a] more oral health research should be devoted to identifying and reducing risk factors and the burden of oral disease in the developed and developing world.

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