

Dental caries prevalence, tooth brushing and periodontal status in 150 young people in Istanbul: A pilot study

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Objective: To evaluate periodontal conditions, prevalence and determination of dental caries and oral health behaviours in a group of young people in Istanbul. **Design:** Subjects were orally examined and questioned. **Setting:** A high school in Istanbul. **Subjects:** One hundred of fifty students. **Results:** This study showed that 28 per cent of teenagers had adequate oral hygiene. These findings suggest that 72 per cent of the subjects needed oral hygiene education and required restorative dental care. **Conclusions:** The present study showed that dental treatment need is very high in the sample group. Strong co-operation should be set up between families, schools, communities, regulators and legislators in order to develop and implement comprehensive oral health promotion programmes.

Key words: Oral hygiene, periodontal disease, dental caries

Oral diseases are rarely life-threatening conditions although a healthy mouth undoubtedly improves the quality of life. Compromised oral health results in diminished overall health and productivity¹. People in developing countries are burdened excessively by oral disease, particularly periodontal disease. This is aggravated by poverty, poor living conditions, ignorance concerning health education, lack of government funding and policies to provide sufficient oral health care workers. Acceptable goals and standards of oral health have to be agreed. Furthermore, barriers to oral health promotion need to be overcome through co-operation at all levels and appreciation of cultural sensitivity¹.

Health care costs are rising rapidly and difficulties arise in resourcing even the most effective health care treatment^{2,3}. Consequently it is generally accepted that greater benefits in improving overall health will result from focusing on health promotion and prevention programmes rather than treating diseases.

It has been stated that in defining the current problems and deficiencies in the management of oral disease, common threads of similarity emerge in all developing countries¹. These are summarised as:

- Gingivitis and periodontitis are the most common oral diseases
- Calculus deposits are high
- Life expectancy is low
- The majority of the population (80–85 per cent) is scattered in rural districts
- The economic situation in developing nations is poor
- Equipment, instruments and materials needed for oral health care are inadequate
- Use of mass media channels to help promote oral health messages is frequently an unrealistic option in rural developing regions
- Anxiety, fear of the dentist and ignorance all contribute to the acceptance that loss of teeth is part of the ageing process.

Lalonde⁴ has described the four basic elements that have a role in determination of health. These are attributed to:

- **Biological factors:** are determined by genetic factors which control susceptibility to disease
- **Environment:** is determined by factors which surround us. Socio-economic factors also effect environment
- **Lifestyle:** is also influenced by socio-economic factors and educational levels
- **Health care services:** the quality, extent and accessibility of these services; the level of health in a community.

In developing nations, all these categories except the biological influences, are adversely affected by poverty, poor living conditions, lack of government funding and lack of provision of sufficient oral health care workers. Epidemiological research can provide important insights into understanding the prevalence, extent and severity of oral diseases in the population as well as answering other important questions, such as: what is the pattern of disease progression? are oral diseases declining or increasing in the population? do some population groups have more disease than others? are there any implications for treatment needs? Epidemiologi-

cal studies are of critical importance for preventive programmes to reduce caries prevalence in young people. Studies have reported high general prevalence of caries and particularly high prevalence in young people⁵⁻⁹, a group in which dental treatment needs are unfortunately often unmet.

This pilot study was designed with the following aims: to evaluate the periodontal condition in a sample of young healthy individuals; to investigate the dental caries prevalence and determine treatment needs; to compare oral health behaviours in females and males by determining tooth brushing, and flossing habits.

Material and methods

One hundred and fifty teenagers participated in this study of whom 83 were male and 67 female with ages ranging from 15–18 years (mean=16) attending the same state high school in Istanbul. Four dentists conducted dental examinations under natural lighting conditions, with the aid of a dental mirror and No.5 caries explorer, CPITN periodontal probe and a 5cm × 5cm gauze square. All participants were interviewed using a standard survey questionnaire and examined following a standardised dental examination format.

The survey questionnaire aimed to gather: amnestic information (age, sex, living arrangements); previous dental history (dental service utilisation, causes of tooth loss, dental history); and current dental status (perceived needs, self rating of oral health and current oral hygiene practices). The entire survey questionnaire was completed prior to oral examination.

Oral examination

The principle investigators conducted all oral examinations. No intra-oral radiographs were taken. Specific parameters were used to examine

for dental caries, plaque and periodontal tissue status and for determination of dental treatment needs.

Dental caries

WHO criteria were used to assess all teeth for the presence of caries¹⁰. Both visual and tactile criteria were used, with the teeth scored as sound, decayed or filled.

Plaque and periodontal tissues

Plaque levels and periodontal tissue health pocket depth were evaluated by using Community Periodontal Index of Treatment Needs (CPITN)^{11,12}. Pocket depths were measured on six tooth surfaces (mesio-vestibular, mid-vestibular, disto-vestibular, disto-lingual, mid-lingual and mesio-lingual) for each tooth in each sextant. The score assigned to a sextant was the worst overall finding in that particular sextant. Findings were ranked into the following categories.

Calculus

The calculus index was utilised to determine the quantity and location of calculus deposits and to supplement the CPITN recording. The quantity of calculus was described as: *Slight* if only supragingival calculus was present, *moderate* if both supra- and subgingival calculus was present or *heavy* if both supra- and subgingival calculus were present such that they joined teeth together or was present on the occlusal surfaces of the teeth.

Determination of dental treatment needs

The appropriate dental treatment was based upon the oral health findings and by employing standard dental treatment protocols. All dental caries findings were used to describe the restorative treatment requirements for each tooth; filling, crowns or endodontic therapy.

Table 1 Number of teeth affected by caries and location of this caries and missing teeth and missing teeth location.

	Number of caries						Caries location				Missing teeth				Missing teeth location		
	1	2	3	4	5	6	0	1	2	3	1	2	3	1	2	3	
Female	10 (50%)	12 (40%)	31 (62%)	8 (33%)	4 (27%)	2 (18%)	10 (50%)	29 (41%)	6 (30%)	22 (55%)	54 (49%)	10 (33%)	2 (40%)	1 (33%)	2 (22%)	11 (34%)	54 (49%)
Male	10 (50%)	18 (60%)	19 (38%)	16 (67%)	11 (73%)	9 (82%)	10 (50%)	41 (59%)	14 (70%)	18 (45%)	58 (51%)	20 (67%)	3 (60%)	2 (67%)	7 (78%)	21 (66%)	55 (51%)
Total	20 (13%)	30 (20%)	50 (33%)	24 (16%)	15 (10%)	11 (7%)	20 (13%)	70 (47%)	20 (13%)	40 (27%)	112 (75%)	30 (20%)	5 (3%)	3 (2%)	9 (6%)	32 (21%)	109 (73%)

P=0.26

P=0.24

P=0.5

P=0.12

1: No caries 2: One caries 3: Two caries 4: Three caries 5: Four caries 6: More than five caries
 0: No caries 1: Posterior 2: Anterior 3: Both
 1: No missing teeth 2: One missing 3: Two missing 4: Four missing
 1: Anterior region 2: Posterior region 3: No missing teeth

Periodontal findings

These were used to determine treatment requirements. Treatment needs were based upon the CPITN scoring pattern.

Data analysis

Chi-square and one way Anova tests were applied to check for statistical differences between proportions and mean scores, respectively. Statistically significant differences are denoted by the *P*-value.

Results

Dental caries

The prevalence of caries was 87 per cent. Females had a slightly lower prevalence of caries than males (85 vs 80 per cent). Twenty per cent of subjects had one carious lesion, 33 per cent had two lesions, 16 per cent three, 10 per cent four and 7 per cent had more than five carious lesions in their mouths. A distribution of all the caries lesions based upon their location is found *Table 1*. As illustrated, posterior arches (53.8 per cent) were more affected by caries than anterior arches (15.4 per cent). For the 150 subjects, 20 per cent had one tooth missing, 3 per cent two teeth missing and 2 per cent four teeth missing. The tooth loss pattern revealed that teeth were most likely to be missing in the posterior arch (*Table 1*).

According to the DMFT index the mean number of filled teeth was 3.84, and the mean decayed and filled value was 11.73. In other words, over half of the subjects had experienced caries at some point in their life. Severity in the DMFT score was lower in females than males but these differences were not statistically significant (*Table 2*). There were no statistically significant differences between gender and number of caries lesions, caries location, missing teeth and missing teeth location (*Table 1*).

The distribution of met and unmet treatment needs for dental caries is presented in *Table 3*. The table shows that the percentage of persons with untreated dental lesions is very high (87 per cent). Most of the treatment received in this age group consisted of fillings (60 per cent) as compared to extractions (26 per cent).

Plaque and periodontal tissues

A summary of the plaque and periodontal tissue findings are found in *Table 4*. Periodontal pocket depths of 900 sextants (4,267 standing teeth) measured by the CPITN method revealed that the mean reading for most sextants was between 1 and 2. As indicated, gingival bleeding (code 1) and supra and sub gingival calculus were the most frequently observed problems. Moderate (4–5mm)

Table 2 Dentition status and caries scores for 150 dentate individuals

	Male	Female	Total
Decayed teeth	8.08	6.93	7.89
Missing teeth	1.5	0.83	1.24
Filled teeth	3.81	3.77	3.84
Decayed & filled teeth (DFT)	11.89	10.7	11.73
Decayed, missing & filled teeth (DMFT)	13.39	11.57	12.97

Table 3 The distribution met and unmet treatment needs

Decayed teeth	Filled teeth	Missing teeth
87%	60%	26%

Table 4 Periodontal conditions according to CPITN by gender groups

	Sextant 1		Sextant 2		Sextant 3		Sextant 4		Sextant 5		Sextant 6		Total		Calculus I		
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd	1	2	3
Female	1.624	0.41	1.38	0.48	1.96	0.53	2.12	0.46	1.41	0.41	1.58	0.39	1.68	0.32	28 (45%)	30 (47%)	9 (38%)
Male	1.522	0.43	1.38	0.41	1.97	0.55	2.25	0.48	1.42	0.39	1.57	0.39	1.69	0.29	34 (55%)	34 (53%)	15 (62%)
Total	1.58	0.42	1.38	0.44	1.97	0.54	2.19	0.47	1.42	0.40	1.58	0.39	1.68	0.31	62 (41%)	64 (43%)	24 (26%)
	P=0.14		P=0.97		P=0.864		P=0.10		P=0.80		P=0.88		P=0.81		P=0.072		

Table 5 Oral hygiene status, brushing frequency and flossing habits.

	Oral hygiene		Brushing frequency			Flossing	
	Good	Average	Less than 1	More than 1	Yes	No	
Female	26 (62%)	27 (38%)	32 (44%)	16 (39%)	19 (51%)	26 (65%)	41 (37%)
Male	16 (38%)	44 (62%)	40 (56%)	25 (61%)	18 (49%)	14 (35%)	69 (63%)
Total	42 (28%)	71 (47%)	72 (48%)	41 (27%)	37 (25%)	40 (27%)	110 (73%)
	P=0.03		P=0.6			P=0.025	

periodontal pockets and deep (≥ 6 mm) periodontal pockets were not observed.

There were no statistically significant differences for periodontal status between male and female. Approximately half the sample (43 per cent) had only light and localised calculus deposits as recorded by the calculus index. There were no statistically significant differences between females and males for calculus deposits (Table 4).

An evaluation of oral hygiene practices revealed many different findings. Forty-two (28 per cent) of subjects had good oral hygiene and 37 (25 per cent) had poor oral hygiene, while 74 per cent never flossed their teeth and 48 per cent brushed their teeth less than once a day. There were significant differences between male and female for oral hygiene and flossing habits ($P=0.03$, $P=0.025$ respectively). There were no statistically significant differences for brushing habits between female and male (Table 5).

Treatment needs

In general, the need for oral hygiene instruction (OHI) and oral prophylaxis were high, but the need for complex periodontal treatment was low. OHI was required for 72 per cent of subjects and scaling and instructions in oral hygiene for 16 per cent. The need for caries treatment was high and fillings were required for 87 per cent of those examined.

Discussion

In the present study, the mean decayed and filled (DFT) score was 11.73. The increase in DFT scores in young people are likely to be due to an increase in caries rates. This findings suggests that the prevalence and need for restorative treatment of caries is higher in these young groups. Various epidemiological studies have concluded that dental caries is a severe problem in young people in Turkey¹³⁻¹⁵.

Saydam *et al.*¹³ found the caries prevalence in 17-year-old children to be 77 per cent in 1990. Comparison with the 1990 caries data suggest that the prevalence and severity of dental caries lesions and the prevalence of untreated dentinal lesions has remained very high; in our study 87 per cent. Despite the low sample size in our study the findings suggest that the prevalence of dental caries in young people was high but its severity was low. The prevalence of unmet treatment was very high with fillings as the predominant treatment need. The survey has shown that the vast majority of young people are not receiving and/or not seeking oral care. These results show that a primary preventive approach is very important in our country.

The reasons why dental care is not sought more frequently are generally complex and involve many factors. Among these include differences between perceived and real need, fear of dentistry and high cost¹⁶.

Periodontal status

A less complex and internationally established method of estimating levels of periodontal conditions in populations which is widely used, is the WHO CPITN. In less than a decade CPITN has become an established index and has generated considerably data to identify levels of periodontal conditions of populations for which specific interventions might be considered¹⁷⁻¹⁹. CPITN has been applied in national representative studies in industrialised countries, for example Germany, Italy, Ireland, The Netherlands, and The United Kingdom and in a multinational study in the elderly in Europe¹⁷. We also used this method to determine periodontal conditions.

In the present study periodontal disease was not present in all the subjects. Bleeding on gently probing was the most frequently observed condition together with slight gingival inflammation. This

was mostly accompanied by relatively high levels of plaque and calculus. It is evident that the levels of calculus are on average much higher in most developing countries than in industrialised countries¹⁷. The earlier belief that gingivitis increased with age until teenage years and then slowly decreased in a reciprocal relationship to the increase in the prevalence of periodontitis is not supported by data from national surveys in the USA^{18,19}. It is generally believed that gingivitis has declined over recent years because of greater attention to oral hygiene^{20,21}. Periodontal disease is still of considerable magnitude and importance as bleeding on probing indicates inflammation and is widely encountered in the younger age groups.

There are number of demographic, socio-economic and behavioural characteristics which are associated with periodontal status in the population, among them gender and frequency of brushing and flossing. Males usually have more disease than females, but gender has not been demonstrated to be causal in adult periodontitis. When assessing oral hygiene, only 25 per cent of people brushed their teeth more than once a day and only 27 per cent flossed their teeth. There were no significant differences between brushing habits of females and males. However, females had better oral hygiene than males and females also flossed their teeth more than twice as often as males. These findings suggest that adequate brushing is more important than frequent brushing. The view that periodontal diseases are a much more prevalent and severe a problem in the developing countries seems to be true only in terms of poorer oral hygiene and considerably greater calculus retention already at a young age.

Conclusions

The present study shows that dental treatment need of this sample group

in Istanbul is very high. Istanbul is the biggest city in Turkey and the economic status of this city is better than other cities. We conclude that the following needs require to be met:

- Government policy to incorporate periodontal / oral health into general health systems and with agreement to fund it appropriately
- Provision of adequate basic equipment and materials
- Recruitment, training and distribution of oral health personal to the areas where the need is greatest (in rural districts)
- The seeking of assistance and funding from the dental industry in supporting national campaigns, research and equipment and the dissemination of information
- Encouragement of joint participation and commitment from Governments. Ministries of Health, oral health personnel and non-dental personnel, all are working towards the common goal of improving oral/periodontal health in developing nations
- Co-operation between families, schools, communities, regulators and legislators in order to develop and implement comprehensive oral health promotion programmes.

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