Perception of Oral Health among Adults in Karachi

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Purpose: To survey an adult population in a deprived district of Karachi, with special reference to perceived oral health.

Materials and Methods: One thousand questionnaires, covering topics such as socioeconomic status, general health and oral health were distributed to the participants' homes by dental auxiliaries, and 994 were returned. The respondents were adults aged between 30 and 50 years. Women comprised 49% of the sample.

Results: Over half the participants (54%) perceived that they had oral problems: esthetic issues predominated (33%), but pain (17%), cavities (15%) and difficulty chewing (8%) were also reported. Most participants (94%) had dentitions of ≥ 20 teeth. There was a weak but significant negative correlation between age and number of teeth (r^2=0.03, p<0.001). Age and female gender were significantly associated with pain, bleeding gums and periodontitis. Pain was a more frequent complaint among poorly educated subjects than among the better educated. Diabetics comprised 17% of respondents and reported higher frequencies of dental problems, bleeding gums and calculus and fewer teeth. However, after compensation for age, gender, smoking, education and income, no significant associations were disclosed. Smoking was reported by 30% of all subjects and was significantly associated with pain, bleeding gums and periodontitis.

Conclusion: The survey disclosed that over half the subjects in this sample of underprivileged Pakistani adults suffered from poor oral health, including pain.

Key words: treatment needs, oral health, Pakistan

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Pakistan is part of the Indian subcontinent, with a population of 162 million (2005 estimate). Only 34% of the people live in urban areas. Like many other developing countries, Pakistan is becoming increasingly urbanised. Associated with changes in social structures are changes in disease patterns and treatment needs.

Very little information is available about the oral health and dental treatment needs of urban Pakistanis. The only data available are from a national pathfinder study by Maher (1991), a pilot study conducted on a sample equally distributed in four provinces of Pakistan, comprising 13 urban and rural areas. Dental caries affected 80% of the population and was reported in 55% of children aged 12-15 years and in 78% of adults. The DMFT index was 1.2 in 12-year-olds, 4.6 in 35-44-year-olds, and rose to 18.3 in 45-54-year-olds. The percentage of periodontally healthy subjects was 32% at age 12, decreasing to 10.4% at age 50. Calculus was the most frequently observed condition in all age groups.

There are several published studies of the oral health of Pakistani children. Haleem and Khan (2001) reported the prevalence of dental caries and the oral hygiene status in a survey of 3157 12-year-old children in 15 cities throughout Pakistan. Prior to this, no national survey had been undertaken since 1998 (WHO, 1988). Haleem and Khan disclosed an improvement in the oral status of urban schoolchildren since 1988.

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The proportion of caries-free children had increased from 50 % in 1988 to 63.75 % in 1999, with a marginal decline in mean DMFT score from 1.0 to 0.9. The percentage of children with calculus had decreased from 51 to 34 %. However, despite the overall improvement, there was a considerable unmet treatment need, particularly for professional scaling and restoration of carious teeth. Treatment need was noted in a higher proportion of children attending public schools, with almost no access to dental services, than in children at private schools. The survey highlighted the need for school-based dental health services.

Unmet treatment need had also been disclosed by Khan et al. (1991) in an earlier study of the prevalence of dental disease and oral hygiene habits of schoolchildren in Lahore. Alarmingly, 95 % of the total score for caries comprised decayed teeth, i.e. untreated disease. Although 93 % of the subjects in the sample practiced some form of oral hygiene, only 27 % were assessed as periodontally healthy.

To date, there are no corresponding studies of the oral status of the adult population in Pakistan.

Information about the nature and severity of dental disease in the population is an essential basis for planning and provision of dental care facilities and personnel resources.

The present study was undertaken in order to collect preliminary data about dental treatment needs in adult Pakistanis. The aim was to survey the oral health of an adult population, with special reference to self-perceived oral problems.

MATERIALS AND METHODS

Karachi is the most populous city in Pakistan with more than nine million inhabitants. The study population was selected from the P & T (Post and Telegraph) colony of Karachi and represents almost half the adult population of the colony. Selection was made from the electoral rolls. The colony has a population of 6000-10,000 people of all age groups but, as in Pakistan in general, children and young adults predominate. The socio-economic status is mediocre, many people being poor and underprivileged with an annual household income of less than 50,000 rupees (USD 800). The educational level is mostly intermediate, and males are better educated than females.

The subjects were 1000 adult residents, males and females, of the P&T colony, stratified according to age: <35 years, 36-<40 years, 40-<45 years, 45-50 years. Written informed consent was obtained from all participants.

This primary focus of the investigation was to gain an insight into self-perceived oral health and treatment needs of underprivileged urban Pakistanis. The participants were given a questionnaire in Urdu, their native language, comprising 36 questions covering such topics as socio-economic status, general health and diseases, oral health and oral health care habits.

There were questions about personal characteristics such as age, marital status, number of children in the family and educational level. Information about socio-economic variables was sought in questions about monthly and annual household income and occupation. Income was stratified as <50,000 rupees, 50,000-100,000 rupees, and >100,000 rupees.

Questions about oral health covered primarily such topics as oral problems (calculus, bleeding gums, periodontal disease diagnosed by dentist, and mouth dryness), dental status (number of teeth, dentures) and dental care habits.

Most questions were multiple choice, but some were open. The question about educational level was open and the participants described their standard of education as primary schooling, secondary schooling, intermediate, university education to graduate or postgraduate level. Occupation was designated as housewife, unemployed, public servant, or employed in the private sector.

With respect to specific oral problems, the participants could choose from the following:
pain, difficulty chewing, cavities, aesthetics, sensitive teeth, missing teeth, halitosis, tooth mobility, gum recession and others.

The question concerning the number of teeth offered a multiple choice response with the following options: 1-5, 6-10, 11-15, 16-20, and >20. For the question 'Do you wear dentures?', the available answers were 'Yes, partial or full' and 'No'. The question about calculus offered the answers 'Yes', 'No', and 'Don't know'. The question about bleeding gums had the alternatives 'Yes', 'Yes, while brushing only', and 'No'. In answer to the question 'Has your dentist ever told you that you have gingival pockets or periodontitis?' the choice was 'Yes' or 'No'. The question 'Do you suffer from, or have you suffered from mouth dryness?' offered the choice of 'Yes' or 'No'.

The questionnaires were distributed to the participants' homes by a dental auxiliary, who also explained the questions thoroughly. After a week the questionnaires were collected by the same dental auxiliary. To validate the written answers in the questionnaires, 20 participants were randomly selected for objective assessment of oral status by radiographic examination and history-taking by a dentist (FT). Orthopantomo-

Table 1a Mean age (SD), percentage married, and mean (SD) number of children of the participants. Almost one third (32%) of the subjects failed to answer the question about smoking

	Number	Age	Married	Children	Diabetes	Smoking
All subjects	994	42 (5)	85%	4.0 (2)	16.8%	29.5%
Age groups(yrs)						
≤35	87		68%	2.8 (2)	4.7%	16.4%
36-39	325		77%	2.8 (2)	11.5%	27.3%
40-44	260		92%	4.2 (2)	16.9%	33.0%
≥45	322		95%	4.5 (2)	25.3%	31.9%

grams and, if indicated, periapical radiographs were taken for each of the selected participants.

The study was approved by the local ethics committees at Karolinska University Hospital, Huddinge, Sweden, and at the Altamash Institute of Dental Medicine in Karachi, Pakistan. It was conducted in accordance with the Helsinki Declaration.

Statistical calculations

The Statistica 6.1 program (StatSoft, Tulsa, OK, USA) was used for the statistical analyses. The Chi-square test was applied to bivariate comparisons and correlations were calculated using the Spearman rank correlation test. The association between oral problems and different variables was tested with a logistic regression model, adjusting for age, gender, education, salary, smoking and diabetes.

RESULTS

The response rate was very high: of the 1000 questionnaires distributed, 994 were returned.

Of the participants in the study, 510 were men and 484 were women: 82% of the men and 87% of the women were married. The mean number of children was 4.0 (SD 2.0) (Table 1a). The mean ages for males and females were 42 (SD 5) and 41 (SD 5).

The educational levels and occupations of the participants are shown in Table 1b: most of the women (83%) were housewives, and 65% of the men were employed as public servants. With respect to educational level, there were no significant age-related differences. However, there were differences with respect to occupation: significantly higher numbers of public servants came from the older two age groups than from the younger two groups (p=0.01).

More than half the participants (54%) perceived that they had oral problems. The most frequent problem was aesthetics (33%), but pain (17%), cavities (15%) and difficulty chewing (8%) were also reported. Occupation seemed to have a minor influence on oral health, except among the unemployed, who reported significantly more missing teeth (p<0.001) than those in employment (Table 2).

Most participants (94%) had more than 20 teeth (Table 4). There was a weak but significant negative correlation between age and number of teeth (r^2=0.03, p<0.001). Age was also significantly associated with pain, bleeding gums and periodontitis. Women also reported significantly more pain, bleeding gums and periodontitis. Poorly educated subjects reported pain more frequently than those with higher education (Table 3).

Diabetes was reported by 166 subjects (17%) (Table 1a). The prevalence increased with age: 25% of those over 44 years of age were diabetic. However, statistical analysis disclosed no associations between diabetes and the variables gender, income, occupation or educational level. The mean age of subjects with diabetes was 43.3 years, compared to 41.2 years for the non-diabetic subjects (p<0.001). The diabetics tended to report more dental problems, more bleeding gums, more calculus and fewer teeth. However, after compensation for age, gender, smoking, educational level and income, no significant associations between diabetes and oral problems were disclosed.

While the response rate for most questions was 95-100%, only 32% responded to the question about smoking. The reason is unclear. Smoking was report-

Table 1b Mean percentages of education and occupation of the participants

	Education					Occupation			
	Primary	Secondary	Tertiar	University graduate	Post-graduate qualifications	Housewife	Unemployed	Public servant	Employed in private.sector
Male	0	20	41	34	2	0	6	65	30
Female	1	39	27	27	4	83	1	5	3
All subjects	0	30	34	30	3	42	4	35	17

Table 2 Percentage of the respondents answering that they had oral problems. n indicates number of participants answering the question 'Do you have any oral problems –Yes or No?'

Categories	n	Any oral Problem	Pain	Chewing difficulties	Cavities	Estethic	Sensitive	Missing	Halitosis	Mobility	Gum recession	Others
All participants	994	54	17	8	15	33	10	1	12	3	4	1
Gender												
Women	484	55	18	7	18	37	10	1	12	1	1	1
Men	510	53	15	9	12	37	10	1	11	2	3	1
Income *												
<50,000	148	55	18	8	18	38	10	1	13	3	4	1
50,000-100,000	275	51	16	8	10	33	11	1	11	2	3	1
>100,000	128	54	15	7	11	38	9	1	7	2	6	0
Education												
Primary	5	60	20	0	20	40	0	0	20	20	20	0
Secondary	290	55	20	10	19	35	11	2	12	3	3	1
Tertiary	342	52	17	7	11	34	10	1	10	4	5	1
Bachelor	304	57	14	6	15	42	9	1	13	2	4	1
Master	30	47	13	10	17	40	7	0	10	0	3	3
Occupation												
Housewife	374	57	18	7	20	41	9	2	13	3	3	1
Unemployed	33	31	19	3	3	19	13	32	3	0	0	0
Public serv.	356	53	15	9	12	38	8	1	11	3	4	1
Employed in private sector.	164	54	15	8	12	32	13	0	12	2	7	0

* Housewives are excluded.

Table 3 Odds ratio (95% confidence interval) for self reported oral problems. Bleeding gums includes the answers 'Yes' and 'Yes, when brushing'. Age refers to yearly increase, gender compares females to males, education compares the lowest two categories (primary and secondary school) with the two highest (bachelor and master). Salary compares the lowest income (< 50,000 rupies) with the highest (>100,000). Smoking and diabetes refers to the no alternative

Oral problems	All problems	Pain	Chewing difficulties	Bleeding gums	Cavities	Calculus	Periodontitis
Variable							
Age	1.02 (0.98-1.05)	1.08 (1.03-1.13)	1.06 (1.00-1.11)	1.05 (1.01-1.09)	1.00 (0.96-1.05)	1.00 (0.96-1.04)	1.05 (1.01-1.09)
Gender	0.97 (0.62-1.53)	1.94 (1.06-3.58)	1.18 (0.59-2.36)	2.13 (1.32-3.45)	1.08 (0.60-1.94)	1.27 (0.76-2.11)	2.13 (1.31-3.45)
Education	1.22 (0.79-1.89)	2.05 (1.15-3.65)	1.26 (0.64-2.49)	0.87 (0.55-1.37)	1.36 (0.75-2.48)	0.87 (0.53-1.43)	0.87 (0.55-1.37)
Salary	1.04 (0.62-1.73)	0.85 (0.42-1.73)	1.41 (0.58-3.44)	1.29 (0.74-2.25)	1.30 (0.62-2.75)	0.98 (0.53-1.80)	1.29 (0.74-2.25)
Smoking	0.81 (0.56-1.67)	2.26 (1.36-3.76)	1.05 (0.46-2.43)	2.92 (1.96-4.33)	0.45 (0.24-0.85)	0.73 (0.47-1.14)	2.92 (1.96-4.33)
Diabetes	0.88 (0.58-1.34)	0.67 (0.38-1.25)	0.75 (0.36-1.56)	0.76 (0.48-1.20)	0.88 (0.48-1.62)	1.48 (0.94-2.32)	0.76 (0.48-1.20)

ed by 30% of all subjects and showed a significant association with pain, bleeding gums and periodontitis. Smokers reported significantly fewer cavities (Table 3).

Of the 20 subjects randomly selected for professional validation, 18 were examined and evaluated. Verbal questioning affirmed that all the selected participants had understood the questions. Radiographic examination confirmed that all participants had correctly estimated their number of teeth. The responses in the questionnaire with respect to calculus and periodontitis were less reliable: objective examination disclosed that only 10 out of the 18 subjects had correctly answered the question about calculus, and five out of 16 subjects had correctly assessed their periodontal condition.

DISCUSSION

The present study was undertaken in order to obtain preliminary data on the oral status of adult Pakistanis. To our knowledge, no such studies have previously been conducted in Pakistan.

It is assumed that the P & T colony is representative for most low-income areas in the city of Karachi, and that the conditions disclosed by this survey of the residents are typical of many underprivileged Pakistani adults. Throughout Pakistan, there are many similar underprivileged colonies where the dental clinics have long waiting lists of people seeking dental examination and/or needing treatment for dental disease.

More than half the adults surveyed had dental problems. The most frequent problems were aesthetic, but 14% were also in pain.

Only 5% of the population had fewer than 20 teeth. Similar findings are reported from Beijing, China (Luan et al, 1989), southern Thailand (Baelum et al, 2002), USA (Marcus et al, 1996) and from Stockholm, Sweden (Buhlin et al, 2003).

Bleeding gums, including bleeding when brushing, were reported by 30% of the subjects. This is in accordance with a similar study conducted in Sweden (Buhlin et al, 2002). There do not appear to be any corresponding published studies from developing countries.

Income had no real influence on the frequency of oral problems. This suggests that the cost of dental care is not a major barrier to dental treatment but is outweighed by such factors as availability of care, poor understanding of oral disease and cultural attitudes to oral health.

Our study disclosed no association between reported cavities and age, gender or education. This is in contrast with an earlier study that showed a strong

Table 4 Perceived oral health status. Percentage of participants answering yes to the specific question. n= number of participants in indicated subgroup

Categories	n	Dentures*	Calculus	Bleeding Gums	Bleeding on brushing	Periodontitis	Mouth Dryness
All participants	994	2	24	4	26	16	12
Gender							
Female	484	2	29	5	29	18	14
Male	510	2	24	4	30	17	11
Income *							
<50,000	590	2	29	5	28	18	13
50,000-100,000	275	2	23	4	32	18	15
>100,000	127	1	22	1	29	17	9
Education							
Primary	5	0	40	20	40	20	60
Secondary	290	2	25	6	29	18	17
Intermediate	342	1	24	4	28	18	11
Bachelor	304	2	31	4	29	16	11
Master	30	0	23	3	27	20	17
Occupation							
Housewife	402	2	33	5	30	19	11
Unemployed	32	0	9	0	38	16	13
Gov. serv.	353	2	25	5	28	17	13
Private serv.	168	1	20	2	30	16	11
Age groups							
≤35	87	1	25	2	29	15	7
36-39	234	1	22	3	29	17	12
40-44	260	2	29	4	28	16	10
≥45	322	3	28	6	34	21	18

*Both partial and full dentures.

univariate relationship between low educational level and severe caries (Hadden et al, 2003).

Diabetes showed no association with any of the variables. This finding was somewhat unexpected because several earlier studies have demonstrated greater susceptibility to periodontitis in diabetics and some studies have shown a higher prevalence of caries and tooth loss (for review see Taylor et al, 2004). The reason for this is unclear, but it might be attributable to the design of the study, with other factors masking the influence of the disease, even though 17% of the subjects were diabetics.

Smoking showed a strong relationship with periodontal disease, which is in agreement with many studies (for review see Nunn, 2003). On the other hand, there was a significant negative association between smoking and caries, which is in contrast to a number of previous studies (Zitterbart et al, 1990; Axelsson et al, 1998; Soetiarto, 1998). It is possible that caries is unsuitable for self-assessment and that clinical and radiological examinations are prerequisites for any conclusions to be drawn.

In a randomly selected sample of participants, responses to the questions were validated by dental professionals, disclosing that while the participants had correctly estimated their number of teeth, self-assessments of calculus and periodontitis were less reliable. Comparable findings have been reported in a previous study conducted in Stockholm, Sweden, using similar questions (Buhlin et al, 2002). As the primary purpose of the survey was not to estimate the oral health status in this population, but to gain an insight into the

subjective oral health, the validation affirmed that the respondents had understood the questions in the questionnaire.

In conclusion, this survey of a representative sample of adults from a deprived district of Karachi disclosed a high frequency of oral health problems, including pain and untreated dental disease.

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