Perceived oral health among adults in Tehran, Iran; a telephone survey

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Abstract

Objective: In comparison to clinical oral health indices, perceived oral health measures are less applied in large-scale epidemiological oral health studies in Iran. The aim of this study was to measure perceived oral health among adults in Tehran, Iran.

Methods: In this cross-sectional study, perceived oral health was measured in 1100 adults in Tehran by two measures: 1- non-replaced extracted teeth, and 2- revised Rand dental health questions including pain, chewing problems and communication problems. Data was gathered by telephone interview using gender, age and level of education as socio-demographic information.

Results: The mean number of non-replaced extracted teeth was 1.28 with 53.8% of adults reporting no extracted teeth. Extracted teeth was significantly less in younger ($p<0.001$) and more educated people ($p<0.001$). Rand dental health scores increased by age ($p<0.001$) but had no significant changes in different educational levels. The three items of Rand dental health were highly correlated ($p<0.01$) with Chronbach's Alpha=0.73 but were not correlated with extracted teeth.

Conclusion: Approximately half of Tehran adults have the experience of lacking one or more teeth, with a small group of them suffering from pain, chewing problems and communication problems.

Key words: Adults, Extracted teeth, Iran, Oral health, Quality of life, Telephone survey.

Introduction:

Clinical measures of oral health do not take into account the individual's perceived health status or perceived needs. New measures which address Oral-Health-Related "Quality of Life (OHRQoL) are being used with increasing frequency in oral health surveys and their objectives are to document the functional and psychosocial outcomes of oral disorders (1). Evidence suggests that objective health measures do not reflect the patients' perceptions and there is a weak association between OHRQoL and clinical measures (2).

A wide range of measures considering the impacts of oral diseases or OHRQoL has been used all over the world. The first index, Social Impacts of Dental Disease (SIDD) measure, which included questions in four categories of functional, social interaction, comfort and well-being, and self image, was developed and studied by Sheiham *et al*. in the early of 1980s. The study showed that 69% of 339 subjects were satisfied with their dental status. Consequently, the Sickness Impact Profile (SIP), Rand Dental Health questions, the Geriatric Oral Health Assessment Index (GOHAI), the Dental Impact Profile, the Oral Health Impact Profile (OHIP), the Oral Health Related Quality of Life index (OHRQoL), the Dental Impact on Daily Living (DIDL), and the Oral Impacts on Daily Performances (OIDP) were established and used in different countries, each of them involving certain impacts of oral diseases by asking a short or long questionnaire from the respondent considering the study setting and target population (3).

There are many studies on adults' objective oral

health in Iran. It has been reported that among people aged 35 to 44 years, 3% are edentulous and 76% enjoy functional dentition (more than 20 teeth) (4). The mean DMFT for 18 year olds is 4.3 (5) and for 35 to 44 years is 11 (4). Perceived oral health measures of Iranian adults have been studied in limited studies with inadequate samples. Evaluation based upon Oral Impacts on Daily Performances (OIDP) index showed that 64.9% of Iranian adults had an oral impact on their daily performances. The most prevalent affected performance was eating, followed by problems with major work or role and sleeping (6). The other studied index in Iran was Oral Health Impact Profile (OHIP-14) which represents the overall burden of oral problems (ranging from 0 to 56). The mean (±SD) OHIP-14 total score was reported to be 14.6 (10.1) with the mean (SD) total number of problems of 2.4 (2.7), 7.5% with no problem at all (7). The aim of this study was to measure perceived oral health of adults in Tehran.

Methods:

Design and sampling
This paper is presenting a part of a cross-sectional telephone interview survey aiming at studying socio-economic inequalities in oral health and dental care utilization performed in Tehran in 2010. The Iran Centre for Dental Research granted ethical approval for the present study.
Using fixed telephone services, the target population comprised of people>18 year olds living in Tehran, Iran. Fixed telephone services covers more than 90% of population in Tehran. The services consist of 637 sub-regions, each of them having four-digit code as the prefix for its telephone numbers followed by a four-digit running number. The present sampling used a stratified random technique. As Bayat's study (8) showed dental visit rate of around 50% in Tehran adults, and with consideration of CI=

0.95 and d=0.03, 1068 samples were estimated to be required for the original study. After adjustment for expected response rate from a previous study (8) and using Kish tables (9) in sampling process, 5096 telephone numbers were drawn by computerized random selection of the four-digit running numbers, eight sets for each of the 637 four-digit prefix codes. Using Kish tables is a way to randomly select the respondent from a family. There is a set of standard tables which are applied in sequence for each family in order to reach a reasonable age/sex composition among the respondents (9).
Interview:
To prevent inter-rater bias, all phone calls were made by single interviewer who was trained on conversational interviewing approach protocol (10). The approach allows interviewers to interact freely with the respondent, to modify and adapt questions to the respondent's situation, and to assist respondents neutrally in formulating a response. The interviews were randomly recorded and checked by the main investigator in the case of consistency among all respondents. The phone calls were made up to three times from 14 May to 14 December 2010. When answered, the interviewer recorded all individuals living in the house by sex and age. The sample was then selected randomly by Kish table and if he/she was out, the next call was made when he/she was available. Each interview continued an average of 15 minutes using a structured questionnaire. People under 18 years old and edentulous people were excluded.
Questionnaire:
A questionnaire was developed based on related recent studies (11-13) and expert opinions. Background data included gender, age and level of education. Oral health was measured by two different measures: first, the respondent was asked about the number of non-replaced extracted teeth. Only those teeth self-assessed as extracted because of decay, pain, or other dental disease which were not substituted by prosthesis

were included in this study. Teeth lost for other reasons, such as injury or orthodontics and also extracted teeth which had been replaced with fixed or removable dental prosthesis were not included. Secondly, perceived dental health was measured by the three-question four-level likert-type questions obtained from Rand Health Insurance Study (HIS) (12) with some modifications. The three HIS dental health questions measured major consequences of dental disease: pain, worry, and reduced social interactions. The pilot study showed that the question about "worry" did not make any sense to Iranian population. As chewing is the important function of dentition and problems in eating or chewing may concern or worry people about their oral health, so the expert panel decided to substitute "worry" with "problems in chewing". Responses to the pain and chewing questions ranged from "a great deal" to "not at all". Responses to the question about conversation avoidance ranged from "most of the time" to "none of the time". The total Rand dental health with a possible range of 3 to 12 was a sum of three response values of pain, chewing and communication (score 12 indicating no self-reported impact from dental problems). The psychometric properties of new dental health measure were tested in the case of face and content validity, internal consistency and test-retest reliability. Face and content validity were tested using Waltz & Bausell method (14) by ideas of 10 experts in public health dentistry. To check the reliability, a 35-sample test-retest study was performed with a two weeks interval. The questions and interview procedures were pilot tested on 100 randomly selected Tehran adults, and modifications were subsequently made to the procedures prior to the initiation of data collection

Statistics:

One-way ANOVA and t-test were performed for analysis of extracted teeth and Rand score differences in age, gender and educational level

groups using SPSS Version 16.0. Mann-Whitney and Kruskal-Wallis tests were applied to explore sex, age, and education related differences in pain, chewing and communication scores. Regression was used to study the relative effect of age, sex and education factors on oral health variables. Pearson correlation was used to assess the correlations between oral health measures.

Results:

From the 5271 randomly generated telephone numbers, 3771 telephone numbers were not reached (184 busy, 1406 no answer, 60 fax, 1549 line blocked, 572 commercial). Of the 1500 subjects who answered the phone calls, 400 refused to participate, leaving 1100 adults (response rate: 73% among those who answered) in the final sample. Of the respondents, 50.8% were women and the age mean (SD) was 38.99 (13.82). One-sample t test showed that the sample mean age was not different from the study population (Mean difference=-0.108 (95% CI=-0.93-0.78)). Table 1 shows the distribution of respondents by age group in comparison to study population separately for men and women. 19% of samples had educated less than 8 years, while 51% had high school education and 30% had academic education.

Overall, 53.8% of adults reported no non-replaced extracted teeth, 39.7% reported 1-4, 4.4% reported 5-8, 1.6% reported 9-12 and a further 0.5% reported >12 missing teeth. 70% of samples did not have any dental pain while 80% and 97% had no problems in chewing and communication. The mean Rand score was 10.96 with 70% of people getting the full score, 13% more than score 10 and 2% under score 6. The three Rand score items were significantly correlated ($p<0.01$) with Chronbach's Alpha=0.73. There was a weak correlation between extracted teeth and communication score (r=-0.31, $p<0.001$) in <25 years old, and also between extracted teeth and chewing score

(r=-0.12, *p*<0.05) in 25 to 34 years old.

As presented in Table 2, there were no significant differences in oral health status between males and females.

Table 1- distribution (%) of adult respondents (R) and population (P) by age and gender, Tehran*.

Age (years)	Men R %	Men P %	Women R %	Women P %	All R %	All P %
18-24	14	21	16	21	15	21
25-34	30	24	30	24	30	24
35-44	22	21	22	22	22	22
45-59	24	22	21	21	22	21
60+	10	12	11	12	11	12
n	539	2,822	556	2,676	1095	5,499

* According to Iran Census 2006.

Table 2- Demographic and socio-economic distribution of oral health indicators (n=1094).

	Extracted teeth Mean	SE	Pain score Mean	SE	Chewing ability score Mean	SE	Communication score Mean	SE	RAND score Mean	SE
Sex	*c		***c		***c		***c		*c	
Male	1.32	0.1	3.42	.04	3.62	.04	3.96	.01	10.99	0.83
Female	1.24	0.09	3.37	.04	3.62	.04	3.95	.01	10.93	0.83
Age group	**f		****f		****e		****c		**f	
18-24	0.39	0.06	3.42	0.08	3.62	0.07	3.92	0.03	10.96	0.15
25-34	0.69	0.6	3.25	0.06	3.52	0.05	3.93	0.02	10.69	0.12
35-44	1.37	0.12	3.34	0.07	3.56	0.06	3.98	0.01	10.88	0.12
45-60	2.1	0.19	3.47	0.06	3.69	0.05	3.96	0.02	11.12	0.11
60+	2.28	0.33	3.72	0.07	3.84	0.05	3.99	0.01	11.55	0.11
Education	**f		****c		****c		****c		**c	
<8 years	2.93	0.26	3.52	0.07	3.7	0.05	3.96	0.02	11.19	0.12
9 to 12	1.04	0.08	3.33	0.04	3.56	0.04	3.94	0.01	10.84	0.09
>13	0.65	0.06	3.41	0.06	3.66	0.04	3.96	0.01	11.03	0.1

Note: * t-test   c p>0.05   ** ANOVA   d p<0.05
       ***Mann-Whitney   e p<0.01   ****Kruskal-Wallis   f p<0.001

Tooth loss was more prevalent among older, but subjective morbidity attenuated in older age. Dental disease impacts including pain and chewing problems were less prevalent in older adults, but no significant association was detected between communication problems and age. More educated people had significantly less missing teeth (*p*<0.001), but no better Rand scores. Similarly, regression revealed that age and education are important factors in extracted teeth while Rand score was affected only by age (Table 3).

Table 3- Summary of regression analysis of variables predicting extracted teeth and Rand scores (n=1094).

	B	95% Confidence Interval for B	
		Lower Bound	Upper Bound
Model for extracted teeth			
Age group	.033	.024	.043
Sex	-.093	-.340	.153
Education	-.177	-.214	-.140
Model for RAND score			
Age group	.167	.068	.265
Sex	-.046	-.276	.183
Education	.045	-.130	.220

Discussion:

This study investigated perceived oral health in a population sample of adults in Tehran, Iran. The main finding was that perceived oral health was satisfactory in the study population. The age/sex composition of the study sample was similar to Tehran city population due to applying Kish tables in sampling method.

We studied two different measures for exploring perceived oral health status in Tehran adults, extracted teeth and the three-item Rand dental health questions. The validity of self-assessed remaining teeth has been evaluated using telephone interview and was found to closely approximate clinical assessments (15). In the present study, more than half of Tehran adults stated that they do not have any non-replaced extracted teeth. Hessari reported that 70% of 18 years old adults in Iran have their full dentition (5) compared with 39% of Iranian 35 to 44 years adults having 25-28 teeth (16). Susin *et al.* stated that 94% of Brazilian >30 years old adults had experienced tooth loss (17), and a mean number of 24 natural present teeth was reported for United States adults (18). The results of present study were rather different with respect to other mentioned studies. It could be related to the study population and also the used tooth loss indicator. We counted non-replaced extracted teeth; therefore, extracted teeth which had been substituted by fixed or removable prosthesis have not been into account.

There is a lack of large-scale epidemiologic study on quality of life measures of oral health in Iran. It was the first time that Rand dental health measure was studied in Iranian population. Results from Rand dental questions showed highly skewed dental disease impacts in Tehran population, with majority of people reporting no pain, no chewing problems, and no conversation avoidance. It means that although half of the respondents had experienced some disability because of having extracted their teeth, it could not have great impacts on their lives. The results were consistent with Rand Health Insurance Study in United States (3). Persian versions of Oral Health Impact Profile (OHIP-14) (7, 19), Oral Impacts on Daily Performances (OIDP) (6) and Dental Impact of Daily Living (DIDL) (20) indices have been tested in small samples of Iranian population. In accordance to our results, Iranian adults reported satisfactory oral health with minority of population experiencing pain, chewing problems and communication problems.

We did not observe any differences in any oral health-related indicators between two genders which it is supported by other evidences (4, 5, 16, 21). While non-replaced extracted teeth were more prevalent in older adults, they reported less pain, less chewing problems and better Rand scores. This reduced reported complaint from oral diseases was observed in Australia (13) and could be related to less expectation in older people.

Higher rates of extracted teeth among less educated people was found in our study population as well as Burt's study in United States (22) and Hessari's study in Iran (16).

As it has been mentioned elsewhere (13, 23), weak correlations are expected between missing teeth and quality of life oral health measures. Extracted teeth reflect historical disease experience, but may not reflect current perceptions of health. However it could be better interpreted by using more detailed quality of life measures.

According to pervious oral health studies in Iran, the mean number of teeth in 18 years old was 27.4, with decayed, missing or filled teeth (DMFT):4.3, decayed teeth (DT):3.0 and filled teeth (FT):0.7 (5) while the mentioned measures were 21.5 teeth, with DMFT: 11, DT: 2.6, and FT:1.8 for 35-44 years old reported by Hessari *et al.* (16). Also, 21% of 18 years and 53% of 35-44 years people had periodontal pockets. It means that although Iranian adults were known to have dental caries and periodontal problems, but they were relatively satisfied with their oral health status. It may be because perceived oral health indicators depend on people's different expressions, expectations and cognition towards their oral health.

The present study had some limitations including the cross-sectional design, the use of self-assessment to measure tooth loss and exclusion of edentulous people. Telephone interview seems to be an appropriate method for studying perceived oral health as used in other studies (13, 24). However, in the case of oral disease impacts, we had limitations in asking many detailed questions because of timing considerations in telephone interviews.

Although clinical measures of oral health (e.g. DMFT and community periodontal index for treatment needs (CPITN)) have been studied in large-scale surveys (16), there is a lack of good epidemiological studies in the field of perceived oral health in Iranian population. Some qualitative and quantitative researches should be done in Iranian context to explore the adverse outcomes of oral diseases in Iranian population.

Conclusion:

Approximately half of Tehran adults have the experience of lacking one or more teeth, with a small group of them suffering from pain, chewing problems and communication problems. The majority of Tehran adults are satisfied with their oral health status although they may have some disabilities resulted from tooth loss.

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Conflict of Interest: "None Declared"

References:

1. Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Validity and reliability of a questionnaire for measuring Child Oral-health-related quality of life. J Dent Res 2002; 81: 459-463.
2. Allen PH. Assessment of oral health related quality of life. Health Qual Life Outcomes 2003 ;1 :40.
3. Slade GD. Measuring oral health and quality of life: Chapel Hill: University of North Carolina,

Dental Ecology 1997; Chap 6: 65-71.

4. Hessari H, Vehkalahti MM, Eghbal MJ, Murtomaa H. Tooth loss and prosthodontic rehabilitation among 35- to 44-year-old Iranians. J Oral Rehabil 2008; 35: 245-251.

5. Hessari H, Vehkalahti MM, Eghbal MJ, Samadzadeh H, Murtomaa HT. Oral health and treatment needs among 18-year-old Iranians. Med Princ Pract 2008; 17: 302-307

6. Dorri M, Sheiham A, Tsakos G. Validation of a Persian version of the OIDP index. BMC Oral Health 2007 26; 7: 2.

7. Navabi N, Nakhaee N, Mirzadeh A. Validation of a Persian Version of the Oral Health Impact Profile (OHIP-14). Iran J Publ Health 2010; 39: 135-139.

8. Bayat F, Vehkalahti MM, Heikki T, Zafarmand HA. Dental attendance by insurance status among adults in Tehran, Iran. Int Dent J 2006; 56: 338-344.

9. Aday LA, Cornelius LJ. Designing and conducting health surveys: a comprehensive guide. 3rd Ed. Jossey-Bass Inc Pub 2006; Chap 6: 144.

10. Biemer PP, Lyberg L, Wiley J. Introduction to survey quality. Wiley Online Library 2003; Chap 5: 149-188.

11. Locker D, Slade G. Association between clinical and subjective indicators of oral health status in an older adult population. Gerodontology 1994; 11: 108-114.

12. Spolsky VW, Health USDo, Services H. Measurement of dental health status. Rand Corporation 1983; Chap 3: 50-79.

13. Sanders AE, Spencer AJ. Social Inequality: Social inequality in perceived oral health among adults in Australia. Aust NZ J Public Health 2004; 28: 159-166.

14. Waltz C, Bausell RB. Nursing Research: Design, statistics, and computer analysis. FA Davis Co. 1981; Chap 6: 63-101.

15. Pitiphat W, Garcia RI, Douglass CW, Joshipura KJ. Validation of Self-reported oral health measures. J Public Health Dent 2002; 62: 122-128.

16. Hessari H, Vehkalahti MM, Eghbal MJ, Murtomaa HT. Oral health among 35-to 44-year-old Iranians. Med Princ Prac 2007;16:280-285.

17. Susin C, Oppermann RV, Haugejorden O, Albandar JM. Tooth loss and associated risk indicators in an adult urban population from south Brazil. Acta Odontol Scand 2005; 63: 85-93.

18. Beltrán-Aguilar ED, Barker LK, Canto MT, Dye BA, Gooch BF, Griffin SO, *et al*. Centers for Disease Control and Prevention (CDC).Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis- -United States, 1988-1994 and 1999-2002. MMWR Surveill Summ 2005; 54: 1-43

19. Motallebnejad M, Hadian H, Mehdizadeh S, Hajiahmadi M. Validity and reliability of the Persian version of the oral health impact profile (OHIP)-14. Caspian J Intern Med 2011; 2: 314-320.

20. Khadem P, Jabari far E, Maroofi V, Ghasemi D, Mohammad taher V. The Relationship between Oral and dental health and quality of life based on DIDL index. J Res Dent Scie 2011; 7: 35-41.

21. Leao A, Sheiham A. Relation between clinical bental status and subjective impacts on daily living. J Dent Res 1995; 74: 1408-1413.

22. Burt BA, Ismail AI, Morrison EC, Beltran ED. Risk factors for tooth loss over a 28-year period. J Dent Res 1990; 69: 1126-1130.

23. Yiengprugsawan V, Somkotra T, Kelly M, Seubsman S, Sleigh AC. Factors associated with self-reported number of teeth in a large national cohort of Thai adults. BMC Oral Health 2011; 11: 31.