Community Dental Health (2016) **33,** 232–236
Received 29 July 2015; Accepted 4 February 2016

doi:10.1922/CDH_3818Momeni05

Dental pain and its determinants in an adult population in Tehran, Iran, Urban HEART-2

Z. Momeni[1], A. Pakdaman[1], M. Asadi-Lari[2], M.R. Vaez-Mahdavi [3], A.R. Shamshiri[1,4] and H. Hessari[1,5]

[1]Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran; [2]Department of Epidemiology and Oncopathology Research Centre, Iran University of Medical Sciences, Tehran, Iran; [3]Department of Physiology, Shahed University of Medical Sciences, Tehran, Iran; [4]Dental Research Center, Dental Research Institute, Tehran University of Medical Sciences, Tehran, Iran; [5]Research Center for Caries Prevention (RCCP), Dental Research Institute, Tehran University of Medical Sciences, Tehran, Iran.

Objective: To assess the prevalence of dental pain in the past year among adults in Tehran-Iran, and its determinants. ***Basic research design:*** Cross-sectional population study. ***Participants:*** A sample of 20,322 adults (18-64 years old). ***Methods:*** A questionnaire survey was conducted across the 22 districts using the multi-stage random sampling method. Data were analysed applying the complex samples method. Multiple logistic regression analysis was used to adjust the effects of other variables on the outcome variable as dental pain in the past year. ***Results:*** Overall, 19,645 individuals with a mean age of 39.9 (SD=12.5) years responded. Dental pain in the past year was reported by about one sixth (14%) of subjects and associated with being widowed/divorced (OR 1.45, 95%CI 1.07-1.97, p=0.016), married (OR 1.24, 95%CI 1.04-1.47, p=0.016), Azari minority (OR 1.2, 95%CI 1.05-1.37, p=0.009) and having dental visit in the past year (OR 2.6, 95%CI 2.29-2.95, p<0.001). Older subjects (OR 0.76, 95%CI 0.59-0.97, p= 0.029), those with a high economic status (OR 0.84, 95%CI 0.72-0.98, p=0.03), good (OR 0.75, 95%CI 0.58-0.96, p=0.023) or moderate oral health behaviour (OR 0.79, 95%CI 0.62-0.99, p=0.042), and good self-perceived oral health (OR 0.52, 95%CI 0.45-0.61, p<0.001) were less likely to report dental pain. ***Conclusions:*** Dental pain in the past year was associated with being married/widowed, being a minority, and visiting a dentist in the past year. Older subjects and those with a high socio-economic status, good/moderate oral health behaviour, and good self-perceived oral health were less likely to report dental pain.

Key words: *toothache, oral health, pain, adult, Iran*

Introduction

Dental pain that arises from damage to the tooth structure or its supporting tissue is an important oral health indicator, and is common among individuals with poor dental health. Dental pain may affect daily activities, disturb eating, sleep and work effectiveness, which consequently increase stress and impose significant economic and emotional burden on the society (Sheiham, 2005). Controlling dental pain and its impact at the community level has been targeted by the World Health Organization in the Global Goals for Oral Health 2020 (Hobdell *et al.*, 2003) and hence is an important element to be considered by policy-makers.

The prevalence of oral pain varies across the countries. According to different definitions of dental pain, studies have reported the prevalence estimates for dental pain, ranged from 14½ to 66% among adults in developed countries (Petersen *et al.*, 2000; Vargas *et al.*, 2000). In a recent study, past year experience of oral pain was reported by 11.7% of Canadian subjects aged 6–79 years (Ravaghi *et al.*, 2013). The reported prevalence of dental or oral pain in developing countries ranges from 18% to 24% among Brazilian adults (de Pinho *et al.*, 2012; Kuhnen *et al.*, 2009) and is 60% in Tanzania (Kikwilu *et al.*, 2008).

There are different variations in the time frames used, from prevalence over the past 6 months to the past year's experience of oral/dental pain. Overall, in relation to the time period, the prevalence estimates for pain ranged from 17% to 59% (de Pinho *et al.*, 2012; Kikwilu *et al.*, 2008; Kuhnen *et al.*, 2009; Okunseri *et al.*, 2005; Tanwir *et al.*, 2006). The six-month prevalence of oral/dental pain has been reported as 18% to 29% among adults in developing countries (Bastos *et al.*, 2008; de Pinho *et al.*, 2012; Kuhnen *et al.*, 2009; Peker, 2012), and the 12-month prevalence of dental pain as 21% to 34% (Bastos *et al.*, 2005; Okunseri *et al.*, 2005)

An association has been reported between dental pain and demographic variables. Previous studies have reported a higher prevalence of dental pain among females (Bastos *et al.*, 2008; Kuhnen *et al.*, 2009), although some did not (Pau *et al.*, 2003). Younger subjects, those with a lower income and less education were more likely to report dental pain (Pattussi *et al.*, 2010; Pau *et al.*, 2003).

There are few published studies on the prevalence of dental pain in developing countries especially in Iran, though a study in Kerman province found 55% of the respondents had dental pain in the past 6 months (Kakoei *et al.*, 2013).

Correspondence to: Dr Afsaneh Pakdaman, Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran. Email: pakdaman@sina.tums.ac.ir

There is scarce information on the prevalence of dental pain and its determinants in Iran. The purpose of the present study was to evaluate the self-reported dental pain in the past year and its determinants among adults aged 18 to 64 years old residing in Tehran, Iran.

Methods

The data for the present study were obtained from the second round of Urban Health Equity Assessment and Response Tool (Urban HEART) survey in Tehran in November 2011. A multistage random sampling method was applied. Twenty two districts and 368 sub-districts of Tehran were considered as strata. The blocks were then randomly selected as clusters in each sub-district. A group of trained surveyors (auxiliary health workers) collected and entered data following training in five two-day workshops covering the definition of the variables, questionnaire instructions, sampling, how to manage non-response cases, how to communicate with families and encourage them to participate in the survey. This process was supervised regularly by local officers to increase the internal validity. The survey protocols, including the sampling frame, the sampling strategy and the response rate have been reported in an earlier paper (Asadi-Lari *et al.*, 2013). Ethical approval was sought from the Ethics Committees of Iran University of Medical Sciences, and the Research and Planning Centre of Tehran Municipality in 2011.

A comprehensive self-administered questionnaire including questions on age, gender, ethnicity, education, marital status, economic status, oral health behaviour, dental care utilisation, self-perceived oral health, and dental pain in the past year was used. The questionnaire was completed by a household representative. A single question, *Did you experience dental pain in the past year?* (November 2010 to November 2011) was used to report dental pain as the outcome variable of oral health (Ravaghi *et al.*, 2013).

Years of education was used as a valid and reliable proxy of social level in Iran and were extracted from case records and categorised as: illiterate/primary (<8 years of education), high school/diploma and university level. The average living area in square metres per person (m^2/p) was used to measure the economic status. The average living area was then categorised into three levels: low (≤18.5 m^2/p), moderate (18.0-30.0 m^2/p) and high (>30.0 m^2/p) (Donyavi *et al.*, 2011). Three oral health behaviour (OHB) items were scored: toothbrushing frequency (0, less than once daily; 1, once daily; 2, twice daily or more); using fluoridated toothpaste (0, no; 1, yes) or smoking (0, yes; 1, no). These scores were summed and the overall OHB score was classified as; poor (0-1), moderate (2-3), or good (4) (Shekarchizadeh *et al.*, 2013). The questionnaire was reviewed and validated by experts from the different disciplines and its reliability examined in a pilot study (Asadi-Lari *et al.*, 2013).

Data were analysed using SPSS version 20 (Armonk, NY: IBM Corp.). In the present study, descriptive and inferential statistics were reported using the complex sample design to ensure non-biased, representativeness of the sample in relation to the population (Constante *et al.*, 2012; Kuhnen *et al.*, 2009; Pattussi *et al.*, 2010). A sampling weight was also applied to adjust the unequal probability of sampling based on the area population, age and gender estimation from recent census data, which was derived from the report of the Statistical Centre of Iran, 2011. This method makes it possible to calculate population-level prevalence data, performing the regression analysis based on the study design and sampling method. Simple and multiple logistic regressions were therefore applied to identify the variables independently associated with the prevalence of past-year dental pain. The significance level was set at $P<0.05$.

Table 1. Distribution of socio-demographic, economic and oral health characteristics among adults (n=19465) in Tehran, Urban HEART-2 survey, 2011

	n [1]	% [2]
Socio-demographic characteristics		
Gender		
Female	10,811	50.6
Male	8,652	49.4
Age		
18-24	2,464	18.1
25-34	5,530	31.7
35-44	4,455	21.5
45-54	3,988	17.9
55-64	3,029	10.9
Ethnicity		
Fars	10,590	57.9
Azari	4,889	22.7
Others	3,658	19.4
Marital status		
Single	3,869	27.1
Widowed/Divorced	1,080	4.9
Married	14,149	68.1
Education		
Illiterate/Primary School[3]	4,524	20.4
High School/Diploma	9,106	45.3
University	5,833	34.3
Economic status[4]		
Low	6,328	31.5
Moderate	7,253	38.6
High	5,652	29.8
Oral health characteristics		
Oral Health Behaviour score		
Poor OHB	1,150	5.8
Moderate OHB	12,092	62.3
Good OHB	5,896	31.9
Dental visit in the past year		
No visit	7,479	40.4
Once & more	11,053	59.6
Self-perceived oral health		
Poor	2,927	14.3
Good	16,536	85.7
Dental pain in the past year		
No	16,773	86.0
Yes	2,689	14.0

[1]Non-weighted data; [2]Weighted prevalence; [3]Illiterate/primary: <8 years of education; [4]Clear cut by average living area in square meters per person: low (<18.5 m^2/person), moderate (18.5-30m^2/person), and high (>30m^2/person)

Results

Demographic characteristics of the study population are presented in Table 1. A third of the participants were in the age group of 25-34 years age group and approaching half had a moderate level of education. Overall, the self-perceived oral health of the participants was good (85.7%), and only 14.3% reported poor oral health. The overall weighted prevalence of dental pain in the past year was 14% (n=2689). A third of the participants were categorised in the lowest level of economic status (31.5%), and 60% had a dental visit in the past 12 months.

Except gender and education other demographic and economic determinants were significantly related to dental pain in the past year in the unadjusted bi-variate analysis. Dental pain in the past year was significantly less among those in the moderate and high economic status compared with those in the lowest status (Table 2). Multivariate regression analysis, after adjusting for the effect of demographic and economic determinants and oral health variables, indicated that marital status, ethnicity, economic status, dental visit in the past year, oral health behaviour, and self-perceived oral health were independently associated with self-reported dental pain in the past year.

Logistic regression analysis indicated that the participants in the older age group were less likely to report dental pain in the past year compared with participants aged 18-24 years (OR 0.76, 95%CI 0.59-0.97, p=0.029). The participants who had a dental visit were 2.6 times (95%CI 2.29-2.95, p<0.001) more likely to report dental pain in the past year when compared to those with no visit. Reporting dental pain in the past year was less likely (95%CI 0.45-0.61, p<0.001) among those who reported good vs poor self-perceived oral health (Table 2).

Table 2. Dental pain in the past year and its determinants among adults (n=19,465) in Tehran, Urban HEART-2 survey, 2011

	Pain - Yes *n[1] (%)[2]*	*Unadjusted* *OR (95% CI)*	*P**	*Adjusted [3]* *OR (95% CI)*	*P***
Socio-demographic characteristics					
Gender					
Female	1,512 (13.8)	1		1	
Male	1,177 (14.2)	1.03 (0.93-1.14)	0.571	1.09 (0.97-1.22)	0.156
Age					
18-24	318 (12.1)	1		1	
25-34	832 (14.7)	**1.26 (1.06-1.50)**	**0.01**	1.08 (0.88-1.31)	0.475
35-44	649 (15.6)	**1.34 (1.12-1.61)**	**0.002**	1.06 (0.85-1.32)	0.625
45-54	563 (14.6)	**1.24 (1.03-1.50)**	**0.021**	0.95 (0.76-1.20)	0.678
55-64	327 (11.2)	0.91 (0.75-1.12)	0.373	**0.76 (0.59-0.97)**	**0.029**
Ethnicity					
Fars	1,349 (13.4)	1		1	
Azari	811 (16.1)	**1.24 (1.10-1.40)**	**< 0.001**	**1.20 (1.05-1.37)**	**0.009**
Others	485 (13.6)	1.02 (0.89-1.17)	0.824	0.99 (0.85-1.15)	0.863
Marital status					
Single	482 (11.9)	1		1	
Widowed/Divorced	140 (14.8)	**1.30 (1.01-1.66)**	**0.044**	**1.45 (1.07-1.97)**	**0.016**
Married	2,044 (15.0)	**1.31 (1.15-1.50)**	**< 0.001**	**1.24 (1.04-1.47)**	**0.016**
Education					
Illiterate/Primary School [4]	621 (13.7)	1		1	
High School/Diploma	1,319 (14.8)	1.09 (0.96-1.25)	0.174	1.14 (0.98-1.31)	0.085
University	749 (13.2)	0.96 (0.83-1.11)	0.554	1.06 (0.90-1.26)	0.488
Economic status [5]					
Low	991 (15.6)	1		1	
Moderate	1,016 (13.8)	**0.86 (0.76-0.98)**	**0.022**	0.88 (0.77-1.01)	0.06
High	655 (12.8)	**0.79 (0.69-0.91)**	**0.001**	**0.84 (0.72-0.98)**	**0.03**
Oral health characteristics					
OHB Score (Oral Health Behaviour)					
Poor OHB	197 (18.2)	1		1	
Moderate OHB	1678 (14.2)	**0.74 (0.61-0.91)**	**0.003**	**0.79 (0.62-0.99)**	**0.042**
Good OHB	767 (13.0)	**0.67 (0.54-0.83)**	**< 0.001**	**0.75 (0.58-0.96)**	**0.023**
Dental visit in the past year					
No visit	632 (8.2)	1		1	
Once & more	1,960 (18.3)	**2.51 (2.22-2.84)**	**< 0.001**	**2.60 (2.29-2.95)**	**<0.001**
Self-perceived oral health					
Poor	623 (22.1)	1		1	
Good	2,066 (12.7)	**0.51 (0.45-0.58)**	**< 0.001**	**0.52 (0.45-0.61)**	**<0.001**

Bold indicates relationship is statistically significant at the 0.05 level.*Result of Simple Regression; **Result of Multivariate Regression; CI= Confidence Interval; OR= Odds Ratio (in the context of complex sample analysis). [1]Non-weighted data; [2]Weighted prevalence; [3]Adjusted by socio-demographic characteristics, economic status and oral health characteristics; [4]Illiterate/primary school: <8 years of education; [5]Clear cut by average living area in square metres per person: low (<18.5m²/person), moderate (18.5-30m²/person), and high (>30m²/person)

Discussion

The present study used the data of the Urban HAERT-2 survey conducted in Tehran, the capital of Iran, and aimed to evaluate the self-reported dental pain in the past year and its determinants among adults. This study showed that the reported dental pain in the past year among Tehran residing adults aged 18 to 64 years was 14%. Dental pain in the past year was associated with a low economic status, poor oral health behaviour and poor self-reported oral health. Those with a history of dental pain were more likely to have visited a dentist in the past year.

The reported prevalence of dental pain in the past year in our study is in line with the findings of previous studies (Constante *et al.*, 2012; Ravaghi *et al.*, 2013). However, other studies from developing countries have reported values ranged from 18% and 24% in Brazil (de Pinho *et al.*, 2012; Kuhnen *et al.*, 2009) to 29% in Turkey (Peker, 2012). In the USA, a prevalence of 15% has been reported for dental pain in the past 6 months (Vargas *et al.*, 2000). In Tanzania, the reported prevalence was 59% (Kikwilu *et al.*, 2008) which is similar to a report on Pakistani adults (Tanwir *et al.*, 2006). Some studies reported a 12- month prevalence of oral pain of 40% in developed countries such as UK and USA (Nuttall *et al.*, 2001; Yuen *et al.*, 2011). A previous local study conducted in Kerman, a deprived province of Iran (Kakoei *et al.*, 2013), reported a prevalence of 55% in adults.

Comparison of the findings among studies is complicated by the threshold considered painful, methodological differences such as variation in the recall period, and the fact that pain might be oral pain, dental pain or referral pain from supporting structures. The reported prevalence in our study is lower than some other studies, as we did not investigate current dental pain which, might result in underestimation of the dental pain in our study.

No gender difference was found in our study population reporting dental pain in the past year similar to a review study (Pau *et al.*, 2003). A higher prevalence of dental pain has been reported by women in some studies (Bastos *et al.*, 2008; Kuhnen *et al.*, 2009) and by men in others (Kikwilu *et al.*, 2008; Pattussi *et al.*, 2010).

We did not find any association between reporting of dental pain in the past year and age group except for those aged 55 years and older who reported less pain, which might be due to the higher percentage of edentulousness at older ages (Hessari *et al.*, 2008). Although educational attainment, as a proxy of the social status, may influence the use of health services and improvement of health-related behaviours (Bastos *et al.*, 2008), we did not find any association between reporting dental pain in the past year and the educational level.

Since, people may have different sources of income in Iran, house space is used to assess the economic status (Mahdavian *et al.*, 2015). We used the "average living area in square metres per person (m^2/p)" as a valid and reliable proxy measure of economic status (Donyavi *et al.*, 2011). In our study the participants with a high economic status were less likely to report dental pain, indicating that the condition is common in individuals from a low socio-economic status (Ferreira *et al.*, 2012). This might reflect the fact that this group has poor oral health conditions and complex barriers in access to dental services. They are more likely to endure dental pain, either due to a low level of socio-economic status (Ravaghi *et al.*, 2013) or consequently a lower tendency to regularly visit a dentist (Pau *et al.*, 2007; Vargas *et al.*, 2000).

In our study, those who reported good self-perceived oral health had less dental pain than their counterparts. This finding is consistent with the findings in a neighbouring country (Peker, 2012) and other studies (Pattussi *et al.*, 2010; Santiago *et al.*, 2013). In our study oral health behaviours were recorded using a combined index (Shekarchizadeh *et al.*, 2013). The result of our study showed that those with poor oral health behaviours (OHB) were more likely to report pain in the past 12-months. The finding is similar to a study by Ferreira *et al*. (2012) which reported an association between dental pain and a low daily tooth brushing frequency in adolescents. However, in Canadian adults OHB was not a covariate of pain in an adjusted model (Ravaghi *et al.*, 2013).

The results of our study support the fact that adults with a low economic status visit a dentist mostly due to dental pain, which is in line with the finding of a previous local study (Kakoei *et al.*, 2013). Nonetheless dental visits may have no association with dental pain as shown in Canada and USA (Ravaghi *et al.*, 2013, Vargas *et al.*, 2000; Yuen *et al.*, 2011) or even have a controlling role if a regular dental check-up (Kuhnen *et al.*, 2009). In Iran, it is common that people usually seek to visit a dentist when they experience acute oral problems or dental pain (Gholami *et al.*, 2012), similar to other developing countries (Petersen, 2009). Moreover, dental pain is often considered a good predictor for having barriers to access costly dental services (Petersen, 2009; Ravaghi *et al.*, 2013).

This study is a well-designed population-based survey and its findings can be used in local health promotion programmes. The positive point is that a representative sample through multi-stage stratified random sampling method was used, and hence, the results can be generalised to the entire population residing in Tehran (Asadi-Lari *et al.*, 2013). Moreover, trained surveyors were used for data collection. This process was accomplished and supervised by local officers who had regular field visits, which increased the internal validity of the study. However, due to possible recall bias in self-reported/ self-administered questionnaires, the results should be interpreted with caution.

To conclude, the prevalence of dental pain in the past year among Iranian adults is low to moderate. Married/ widowed/divorced individuals, Azari minorities, and those visited a dentist once and more in the past year were more likely to report dental pain in the past year. Older subjects, those with a high economic status, moderate/good oral health behaviours, and good self-perceived oral health were less likely to report dental pain in the past year.

Acknowledgments

The authors thank the Municipality of Tehran for funding, supporting and implementing the Urban Health Equity Assessment and Response Tool survey. We are especially grateful to the staff and colleagues who were involved in designing and implementing the project as well as the participants.

References

Asadi-Lari, M., Vaez-Mahdavi, M., Faghihzadeh, S., Cherghian, B., Esteghamati, A., Farshad, A., Golmakani, M., Haeri-Mehrizi, A., Hesari, H., Kalantari, N., Kamali, M., Kordi, R., Malek-Afzali, H., Montazeri, A., Moradi-Lakeh, M., Motevallian, A., Noorbala, A., Raghfar, H. and Razzaghi, E. (2013): Response-oriented measuring inequalities in Tehran: second round of Ur- ban Health Equity Assessment and Response Tool (Urban HEART-2), concepts and framework. *Medical Journal of the Islamic Republic of Iran* **27,** 236-248.

Bastos, J.L., Gigante, D.P. and Peres, K.G. (2008): Toothache prevalence and associated factors: a population- based study in southern Brazil. *Oral Diseases* **14**, 320-326.

Bastos, J.L., Nomura, L.H. and Peres, M.A. (2005): Dental pain, socioeconomic status, and dental caries in young male adults from southern Brazil. *Cadernos de Saúde Pública* **21**, 1416-1423.

Constante, H.M., Bastos, J.L., Peres, K.G. and Peres, M.A. (2012): Socio-demographic and behavioural in equalities in the impact of dental pain among adults: a population-based study. *Community Dentistry and Oral Epidemiology* **40**, 498–506.

de Pinho, A.M., Campos, A.C., Ferreira, E.F. and Vargas, A.M. (2012): Toothaches in the daily lives of Brazilian adults. *International Journal of Environmental Research and Public Health* **9,** 2587-2600.

Donyavi, T., Naieni, K.H., Nedjat, S., Vahdaninia, M., Najafi, M. and Montazeri, A. (2011): Socioeconomic status and mortality after acute myocardial infarction: a study from Iran. *International Journal for Equity in Health* **10**, 9.

Ferreira, L.L., Brandão, G.A.M., Garcia, G., Tavares Costa, L.D.S., Ambrosano, G.M.B. and Possobon, R.D.F. (2012): Dental pain associated with socioeconomic status, psychosocial factors and oral health. *Revista Dor. São Paulo* **13**, 343-349.

Gholami, M., Pakdaman, A. and Virtanen, J.I. (2012): Common perceptions of periodontal health and illness among adults: A qualitative Study. *International Scholarly Research Network*. **2012**, 671879.

Hessari, H., Vehkalahti, M.M., Eghbal, M.J. and Murtomaa, H. (2008): Tooth loss and prosthodontic rehabilitation among 35- to 44- year-old Iranians. *Journal of Oral Rehabilitation* **35**, 245-251.

Hobdell, M., Petersen, P.E., Clarkson, J. and Johnson, N. (2003): Global goals for oral health 2020. *International Dental Journal* **53**, 285-8.

Kakoei, S., Parirokh, M., Nakhaee, N., Jamshidshirazi, F., Rad, M. and Kakooei, S. (2013): Prevalence of toothache and associated factors: a population-based study in southeast iran. *Iranian Endodontic Journal* **8**, 123-128.

Kikwilu, E.N., Masalu, J.R., Kahabuka, F.K. and Senkoro, A.R. (2008): Prevalence of oral pain and barriers to use of emergency oral care facilities among adult Tanzanians. *BMC Oral Health* **8**, 28.

Kuhnen, M., Peres, M.A., Masiero, A.V. and Peres, K.G. (2009): Toothache and associated factors in Brazilian adults: a cross-sectional population-based study. *BMC Oral Health* **9**, 7.

Mahdavian, M. and Safizadeh, H. (2015): Measurement of Socioeconomic Status in Iran: A Systematic Review. *Asian Journal of Agricultural Extension, Economics & Sociology* **6**, 1-15.

Nuttall, N.M., Steele, J.G., Pine, C.M., White, D. and Pitts, N.B. (2001): The impact of oral health on people in the UK in 1998. *British Dental Journal* **190**, 121-126.

Okunseri, C., Hodges, J.S. and Born, D. (2005): Self-reported toothache experience in an adult population in Benin City, Edo State, Nigeria. *BMC Oral Health* **3**, 119-125.

Pattussi, M.P., Peres, K.G., Boing, A.F., Peres, M.A. and da Costa, J.S.D. (2010): Self-rated oral health and associated factors in Brazilian elders. *Community Dentistry and Oral Epidemiology* **38**, 348–359

Pau, A., Croucher, R.E. and Marcenes, W. (2007): Demographic and socio-economic correlates of dental pain among adults in the United Kingdom, 1998. *British Dental Journal* **202**, 548-549.

Pau, A.K., Croucher, R. and Marcenes, W. (2003): Prevalence estimates and associated factors for dental pain: a review. *Oral Health & Preventive Dentistry* **1**, 209-220.

Peker, K. (2012): The determinants of self–rated oral health in Istanbul adults. In, Virdi,M. (Ed.), *Oral Health Care - Pediatric, Research, Epidemiology and Clinical Practices*. Rijeka, Croatia: InTech, pp171-188.

Petersen, P.E. (2009): Global policy for improvement of oral health in the 21st century – implications to oral health research of World Health Assembly 2007, World Health Organization. *Community Dentistry and Oral Epidemiology* **37**, 1-8.

Petersen, P.E., Aleksejuniene, J., Christensen, L.B. and Eriksen, H.M. (2000): Oral health behavior and attitudes of adults in Lithuania. *Acta Odontologica Scandinavica* **58**, 243-248.

Ravaghi, V., Quinonez, C. and Allison, P.J. (2013): Oral pain and its covariates: findings of a Canadian population-based study. *Journal of the Canadian Dental Association* **79**, d3.

Santiago, M., Valença, M.G. and Vettore, M.V. (2013): Social capital and dental pain in Brazilian northeast: a multilevel cross-sectional study Bianca. *BMC Oral Health* **13**, 2.

Sheiham, A. (2005):. *Oral health, general health and quality of life, World Health Organization*. http://www.who.int/bulletin/volumes/83/9/editorial30905html/en

Shekarchizadeh, H., Khami, M.R., Mohebbi, S.Z. and Virtanen, J.I. (2013): Oral health behavior of drug addicts in withdrawal treatment. *BMC Oral Health* **13**, 11.

Statistical Centre of Iran (2011): *Statistical Pocketbook of the Islamic Republic of Iran* 2011. http://www.amar.org.ir.

Tanwir, F., Altamash, M. and Gustafsson, A. (2006): Perception of oral health among adults in Karachi. *Oral Health & Preventive Dentistry* **4,** 83-89.

Vargas, C.M., Macek, M.D. and Marcusc, S.E. (2000): Sociodemographic correlates of tooth pain among adults: United States, 1989. *Pain* **85**, 87-92.

Yuen, H.K., Wiegand, R.E., Hill, E.G., Magruder, K.M., Slate, E.H., Salinas, C.F. and London, S.D. (2011): Factors associated with toothache among african american adolescents living in rural south Carolina. *Social Work in Public Health* **26**, 695–707.