Health Education and Health Promotion (HEHP) (2015) Vol. 3 (1)

Determinants of Dental Health Behaviors among Iranian Students

Arezoo Fallahi[1]*, Babak Nematshahrbabaki[2]

Abstract

Aim: Oral health plays a crucial role to general health, and influences individual's quality of life. This study aimed to determine effective factors on dental health behaviors among Iranian students.

Methods: This cross-sectional study was carried out on high school students in the city of Sanandaj (western Iran) from November 2014 to July 2015. An instrument with 35 items was used for data collection. It included two sections: socio-demographic characteristics, and 7 domains related to dental health behaviors. Validity and reliability of the questionnaire were confirmed by using face, content and construct validity, and test-retest and Cronbach's alpha, respectively. Simple random sampling and systematic random sampling techniques were used to select high school students. Plaque Index (PI) was recorded during the clinical dental examination. Finally, data were entered into the SPSS version 16.0 software and analyzed using ANOVA, Regression logistic, correlation coefficient tests, and independent t-test.

Findings: There were statistically significant correlations between the role of school, fear of dental care, motivational beliefs, and value of teeth ($P<0.05$). Fear of dental care was the strongest predictor of oral health behaviors (ß=-0.48). PI was higher in male students ($P<0.03$) and in those who did not take care of their primary teeth ($P<0.04$).

Conclusion: The results showed that social, environmental, policy and individual factors had distinctive influences on oral health-related behaviors and decreasing dental plaque. It is very important that dental health programs should be designed according to these factors.

Keywords: Dental health, Students, Plaque index, Questionnaire

1. Assistant professor, Department of Public Health, School of Health, Kurdistan University of Medical Sciences, Sanandaj, Iran
Email: arezofalahi91@gmail.com
2. M.Sc. in Health Services Management, Health Center of Sanandaj, Kurdistan University of Medical Sciences, Sanandaj, Iran
Email: neamatbabak@gmail.com

Introduction

Oral health plays a crucial role to general health [1], and influences individual's quality of life [2]. Many adolescents are suffering from oral diseases [3]. The most common diseases are gingivitis and dental caries [4]. Dental caries results from dental plaque [5], and if untreated, it causes dental pain, which impacts person's quality of sleep, eating, self-esteem and social activities [6, 7]. It has been revealed that dental caries is prevalent in school-age children [6]. The mean number of Decay, Missing, Filling Tooth (DMFT) in Iran [7] is 2.6 and 2.7 for 15 and 16 years-olds, respectively. Also, according to a study in Iran in 2011, approximately 65% of students brush, and 37% floss their teeth [7]. Despite the fact that dental cleaning behaviors are one of the most effective tools for prevention of dental caries [8], oral health level is not high in Iranian students [6], and it is still unsatisfactory [9]. A study addressed determinants of dental health behaviors as perceived barriers and benefits among Iranian students based on quantitative methods [10]. More studies examined few factors related to dental health behaviors based on the models of change of behavior [2, 7, 11, 12]. These studies have not investigated determinants of dental health behaviors based on a questionnaire, which was developed based on students' viewpoints. To our knowledge, any questionnaire describing factors related to dental caries and dental health behaviors should be based on students' viewpoints. Also factors affecting dental caries and dental health behaviors are not so much known in many cities of Iran, especially the city of Sanandaj in western Iran. This study aimed to determine effective factors on dental health behaviors among students.

Method

A cross-sectional study design was applied from November 2014 to July 2015 to investigate factors related to dental caries and oral health behaviors of high school students in the city of Sanandaj, in west of Iran.

The students were eligible if they were 15-19 years old, and willing to participate in the study. Exclusion criteria were unwilling to participate, and disabling in perception of the questions. Systematic random sampling method was used to select the schools. Among the 87 high schools in Sanandaj City, 15 schools were selected. Simple random sampling method was employed to select students from each school. The required sample size needed for this study was computed as follows:

$$n = \frac{z^2 p(1-p)}{d^2} \quad \text{Eq. (1)}$$

Where, "n" is the sample size, "P" is the estimated prevalence proportion observed in a pilot study (0.67), "z" is the probability (0.975), and "d" is the standard error (0.05). The final

sample size along with 10% non-response was 400 students. O'Leary Plaque Index was used to record the index during the clinical oral examination [13]. A dentist recorded the students' PI. PI was calibrated based on O'Leary Plaque Index, and recorded in the morning before students eat breakfast. A self-administered questionnaire including 27 items was initially generated in Farsi [14]. The domains and items of the questionnaire were constructed through a qualitative approach based on the students' perspective. More details of this study can be read elsewhere [9, 15].

The questionnaire included two sections. The first section was socio-demographic characteristics of the students including age, gender, parents' job and parents' educational level, monthly family income, self-assessed oral health status, attention to primary and permanent teeth, frequency of dental visits during a year, reasons of dental visits, and kind of oral diseases diagnosed. The second section composed of 6 domains; 1) motivational belief (5 items, range 5-25, and cut-off 12.5), 2), role of school (4 items, range 4-20, and cut-off 10), 3), instructive elements (4 items, range 4-20, and cut-off 10), 4), value of teeth (3 items, range 3-15, and cut-off 7.5), 5), social support (5 items, range 5-25, and cut-off 12.5), and (6) fear of dental care (6 items, range 6-30 , and cut-off 15). Each question was scored from Strongly agree (5) to Strongly disagree (1). Validity and reliability of the questionnaire were confirmed in another study conducted by Fallahi et al. (2014) [14]. Validity and reliability of the questionnaire were confirmed through face, content and construct validity, and test-retest and Cronbach's alpha, respectively. To increase its validity, feedbacks from the students, health education specialists and expert panel were received and applied to the questionnaire.

Content Validity Ratios (CVR) higher than 0.7 were accepted for each item. Also reliability of the tool was achieved by Cronbach's alpha. Cronbach's alpha greater than 0.8 was accepted for each item. After coordinating with the school officials and explaining the purpose of the study to them, the students completed the questionnaire in the morning. Data were entered into the statistical package for social science (SPSS) version 16.0 for analysis. Independent t-test, Regression logistic, Correlation coefficient, and one-way ANOVA were employed to assess the relationship between the demographic variables, mean of 6 domains (determinants dental health behaviors) and PI. In this study, dental health behaviors included brushing, flossing, using toothpick, and dental visit. P-values greater than 0.05 were considered statistically insignificant. All the participants were informed about the aims of the study, and all of them signed consent forms to participate in the study.

Results

A total of 400 students (193 girls and 207 boys; 15-19 years old; mean age: 16.46±0.76) filled the questionnaire. The completion of the questionnaire took 10-15 minutes for each student. According to the results, most of the students (73.5%) did not brush, 84.2% did not floss their teeth as a daily routing, and 14.9% (65 participants) brushed them irregularly. 72% of the students' mothers and 66% of their fathers were housekeeper and employee, respectively. More than 30% of the mothers and 19% of the fathers were illiterate. Less than 8% of the participants reported that their parents had good income. 42.5% reported that they had not health insurance coverage. More than 69% of the participants stated that they were not suffering from oral diseases, and their teeth were healthy, and 39% of the students assessed their oral health status to be excellent. About 21% of the students stated that they suffered from tooth decay, 9.5% had bleeding gums, and 3.5% reported that they tolerated dental abnormalities. 45% had not visited a dentist throughout their lives. Only about 35% reported that they had visited a dentist only once in a year. 65% declared that dental pain was a main reason for going to the dentist. 65% mentioned that they have not paid attention to their primary teeth. Those students without health insurance coverage stated more fear of dental care and less social support than other students.

Table 1 shows the relationship of the demographic variables with determinants dental health behaviors and PI in students. Score of value of teeth was higher in female students and in those who visited the dentist once during six months. Motivational belief score was more in male students and in those whose mothers were illiterate. Mean healthy behaviors in students with tooth decay and bleeding gums were less than in other students. The school played an important role in preventing oral diseases in big families. A significant difference was observed between frequency of dental visits and instructive elements. Also a significant difference was achieved between fear of dental care health behavior and mothers'sex and job. PI was higher in male students and in those who did not take care of their primary teeth. Mean and standard deviation of determinants dental health behaviors in students are shown in Table 2.

Table 3 shows the relationship between determinants of dental health behaviors and PI in students. There was statistically significant correlation between the role of school, fear of dental care and motivational beliefs ($p<0.05$). Role of school has stronger correlation than other determinants.

Table 4 presents regression analyses for predicting variables related to healthy behaviors. According to the results, fear of dental care was the strongest predictor of dental health behaviors

(ß=-0.48, p<0.05). Also value of teeth, role of school, fear of dental care, and motivational belief variables were predicting dental health behaviors (ß=-0.57).

Table 1: Relationship of the demographic variables with determinants of dental health behaviors and PI in students

Means of determinants / Demographic variables		Value of Teeth	Motivational belief	Role of school	Social support	Instructive elements	Fear of dental care	Plaque Index
Sex**	**Female**	8.09	12.34	9.59	8.16	14.87	15.99	1.19
	Male	6.01	13.99	8.37	8.47	14.61	19.93	1.29
	P-Value	**0.01***	**0.01***	**0.15**	**0.69**	**0.30**	**0.01***	**0.03***
Number of family members***	**1-3**	801	11.72	12.18	6.71	15.2	18.6	1.12
	4-6	8.01	12.43	10.49	7.51	14.3	18.88	1.23
	> 7	8.32	12.39	13.73	8.50	15.5	19.88	1.18
	P-Value	**0.07**	**0.23**	**0.01***	**0.2**	**0.88**	**0.72**	**0.12**
Mother's job**	**Housekeeper**	8.14	12.2	8.97	8.29	15.23	19.29	1.24
	Employee	8.19	12.8	10.22	8.9	15.73	22.49	1.18
	P-Value	**0.42**	**0.78**	**0.12**	**0.3**	**0.53**	**0.03***	**0.2**
Father's job**	**Employee**	8.46	13.68	10.23	8.55	15.77	17.11	1.19
	Non Government Jobs	7.19	13.28	10.27	8.66	15.46	21.29	1.26
	P-Value	**0.02***	**0.45**	**0.89**	**0.63**	**0.27**	**0.002***	**0.13**
Mother's education***	**Illiterate**	8.11	14.49	9.76	9.28	14.67	19.21	1.26
	8 Years	7.88	11.31	8.44	8.23	14.88	18.24	1.16
	8-12 Years	7.63	9.39	9.57	7.21	14.99	18.35	1.18
	>12 Years	7.55	12.13	8.79	8.19	15	18.12	1.16
	P-Value	**0.73**	**0.04***	**0.44**	**0.17**	**0.14**	**0.78**	**0.6**
Father's education***	**Illiterate**	9.12	15.08	3.15	2.57	4.19	5.12	1.23
	8 Years	7.27	12.63	3.65	2.99	4.56	3.66	1.14
	8-12 Years	8.43	12.33	3.56	2.89	3.32	4.42	1.26
	>12 Years	8.23	13.44	3.36	3.42	4.65	4.44	1.28
	P-Value	**0.25**	**0.21**	**0.62**	**0.17**	**0.52**	**0.03***	**0.2**
Monthly family income***	**Low**	8.33	12.11	10.99	7.78	14.55	17.23	1.21
	Average	8.12	12.26	10.19	8.12	14.21	17.56	1.23
	Good	8.13	12.29	9.62	8.13	13.56	13.2	1.26
	Excellent	8.23	12.58	12.42	7.45	13.36	18.25	1.23
	P-Value	**0.92**	**0.56**	**0.54**	**0.65**	**0.08**	**0.65**	**0.77**
Self-assessed oral health status ***	**Excellent**	7.42	12.22	10.14	8.58	14.18	19.89	1.23
	Good	8.61	13.43	10.52	9.62	13.34	17.46	1.29
	Bad	7.76	13.63	10.79	8.77	13.56	18.23	1.13
	P-Value	**0.19**	**0.23**	**0.83**	**0.64**	**0.77**	**0.18**	**0.32**
Lack of attention to primary teeth**	**Yes**	7.99	13.24	10.72	8.21	15.28	19.97	1.27
	No	7.89	13.26	10.32	8.2	15.94	18.69	1.19
	P-Value	**0.22**	**0.84**	**0.39**	**0.87**	**0.56**	**0.03***	**0.04***
Frequency of dental visits***	**Once During Month**	9.12	8.95	10.23	8.2	16.36	18.36	1.16
	Once During Three Months	9.15	14.44	11.45	8.12	17.65	19	1.23
	Once During Six Months	10.19	13.75	11.36	8.28	15.89	18.25	1.19
	Once During Year	8.39	14.85	12.32	8.36	17.98	18.69	1.22
	P-Value	**0.06**	**0.07**	**0.77**	**0.36**	**0.03***	**0.88**	**0.62**
Reasons of dental visits***	**Just To Check**	7.78	11.36	10.23	8.99	15.12	19.66	1.21
	Dental Pain	8.69	12.65	10.12	8.56	15.26	18.74	1.22
	Tooth Decay and Bleeding Gums	8.23	12.02	10.11	8.94	16	20.48	1.32
	Orthodontics	7.89	11.31	10.99	9	15.99	19.33	1.23
	P-Value	**0.65**	**0.73**	**0.41**	**0.78**	**0.23**	**0.75**	**0.64**

*P-Value<0.05
** Independent t-tes
*** ANOVA test

Table 2: Mean and standard deviation of determinants dental health behaviors in students

Variables	Value of teeth	Motivational belief	Role of school	Social support	Instructive elements	Fear of dental care	Plaque Index
Mean	8.24	13.54	12.33	9.34	13.26	20.56	1.58
Standard Deviation	4.38	4.52	2.34	2.35	2.56	3.23	0.87

Table 3: Relationship between determinants of dental health behaviors

Variables	Value of teeth	Motivational belief	Role of school	Social support	Instructive elements	Fear of dental care
Value of teeth	1					
Motivational belief	0.236	1				
healthy behavior	0.287*	0.321*				
Role of school	0.321*	0.09	1			
Social support	0.09	0.269	0.016	1		
Instructive elements	0.09	0.302*	0.165	0.289*	1	
Fear of dental care	-0.416*	-0.321	-0.050	-0.301	-0.113	1

*p<0.05 (tow-tailed)

Table 4: Regression logistic analyses for predicting dental health behaviors

Variables	ß	P	R2
Value of teeth	0.18	0.03	0.57
Role of school	0.15	0.04	
Fear of dental care	-0.48	0.03	
Motivational belief	0.19	0.02	

ß = Standardized regression coefficients
Performing oral health behavior= 1
Lack of performing oral health behavior=2

Discussion and Conclusions

Oral health behaviors are still not satisfactory and are a major public health problem [2, 16]. It was found that factors such as role of school, fear of dental care, value of teeth, oral-health-related beliefs, and instrument element play a crucial role in performing dental health behaviors. The findings of this study showed a considerable association between dental health behaviors and the role of school and fear of dental care.

The results also showed that school plays an important role in prevention of dental diseases and oral health behaviors. Oral health programs in schools are vital to improving the oral health of children [3, 17]. However, Watt reported that school programs are not effective in prevention of oral diseases [18]. According to the results of this study, training through peers, dentists and teachers, replacing educational new methods, designing an appropriate place and time for cleaning teeth in schools, and employing health educators in high, guidance and primary schools may

improve dental attendance patterns and oral health status, and highlight the role of schools more than before.

The results of this study showed that perception of value of teeth influenced oral health behaviors. This finding appears to be similar to the findings of studies conducted in other countries such as Sweden [7, 12, 19-21]. Perception of benefits of oral health will facilitate performing behavior and change of behavior [12].

Our study revealed that motivational beliefs such as religious beliefs influenced the students' health behaviors that it is in line with previous studies [22, 23]. These beliefs are determinative of peoples′ attitudes and behaviors. Health educators, dentists and parents must increase the effectiveness of positive beliefs such as beautiful smile by brushing and flossing everyday and thanks to their creator for making their teeth through educational programs related to oral health. If these beliefs initiate during childhood, the students will perform health behaviors easily in adolescents.

The results of this study indicated that fear of dental care was the strongest predictor of oral health behaviors. Fear of bleeding gums, fear of treatment, fear of dentist and dental instruments were the most common dental phobia in our study. Dental fear is often earned during childhood and impacts on people's quality of life and behaviors within adolescence. To reduce fear, mutual interactions are required between dentists and patients, including verbal and non-verbal communication, sympathy and attention [19, 24]. Also physical, emotional and material support through parents, friends and dentists, regular dental visits, and viewing and touching dental instruments can be very effective for decreasing such fears [9, 19].

In addition, attention to primary teeth during childhood and parents' socio-economic status influence on frequency of dental visits. Changing the behaviors needs time, energy, and is a long-term procedure. It is difficult to develop a regular pattern of tooth brushing while these patterns did not start in childhood. So there is an obvious need for improving and making educational programs to change inappropriate oral hygiene habits. Determinants of dental health behaviors mentioned in this study can be useful in designing these programs.

There are limitations in the way of implementing this study. In this cross-sectional study, the data were collected on the whole study population at a single point in time, and the results were not followed up in different times. Also the questionnaire used in this study was based on a qualitative research in a group of students, so determinants of dental health behaviors can be different in other groups of

students. Thus the results of this initial study should be treated with caution, and further studies are required to be conducted in this area and in different groups of students in other countries. In summary, it was found that social, environmental, policy and individual factors had distinctive influences on oral health-related behaviors and decreasing dental plaque. It is very important to design oral health programs according to these factors. In Iran, most of the students are suffering from oral health diseases. More researches are needed to assess determinants of dental health behaviors in different groups of students through qualitative and quantitative approaches.

Acknowledgment

We would like to thank the all students, and school officials in the city of Sanandaj who made this study possible.

Conflict of interest statement

The authors have no conflict of interest statements to declare.

References

1. Kwan S, Petersen P, Pine C, Borutta A. Health- promotion schools: an opportunity for oral health promotion. Bulletin of the World Health Organization 2005; 83(3): 677-85.
2. Hashemian M, Falahi A, Tavakoli G, Zarezadeh Y, Nemat Shahr Babaki B, Rahaei Z. Study of the Impact of Education on Inter-Dental Cleaning behavior based on Trans-Theoretical Model. Oral Health Prev Dent 2012; 10(1): 37-46.
3. Haleem A, Siddiqui M, Khan A. School-based strategies for oral health education of adolescents- a cluster randomized controlled Trial. BMC Oral Health 2012; 12: 54.
4. Rebelo MA, Lopes MC, Vieira JM, Parente RC. Dental caries and gingivitis among 15 to 19 year-old students in Manaus, AM, Brazil. Braz Oral Res 2009; 23(3): 248-54.
5. Ayele FA, Taye BW, Ayele TA, Gelaye KA. Predictors of Dental caries among children 7–14 years old in Northwest Ethiopia: A community based cross-sectional study. BMC Oral Health 2013; 13: 7.
6. Pakpour AH, Hidarnia A, Hajizadeh E, Kumar S, Fridlund B. Why Iranian adolescents do not brush their teeth: A qualitative study. Int J Dent Hyg 2012; 10(2): 86-90.
7. Taymoori P, Fallahi A, Berry T. Development and testing of the decision balance and self efficacy for oral self-care among Iranian adolescents. Eastern Journal of Medicine 2011; 16: 261-8.
8. Vehkalati MM, Widstrom E. Teaching received in caries prevetion and perceived need for best practice guidelines among

recent graduates in finland. Eur J Dent Educ 2004; 8(1): 7-11.

9. Fallahi A, Ghofranipour F, Ahmadi F, Malekafzali B, Hajizadeh E. Challenges of Iranian adolescents for preventing of dental caries. Iran Red Crescent Med J 2014; 16(9): e15009.
10. Vakili M, Rahaei Z, Nadrian H, Yarmohammadi P. Determinants of dental health behaviors among Iranian students. J Dent Hyg 2011; 85(1): 39-48.
11. Saied-Moallemi Z, Murtomaa H, Tehranchi A, Virtanen JI. Oral health behaviour of Iranian mothers and their 9-year-old children. Oral Health Prev Dent 2007; 5(4): 263-9.
12. Morowatisharifabad MA, Fallahi A, Nadrian H, Haerian A, Babaki BN. Inter-dental cleaning behavior and its relationship with psychological constructs based on the Transtheoretical model. Oral Health Prev Dent 2011; 9(3): 211-20.
13. O'Leary TJ, Drake RB, Naylor JE. The plaque control record. J Periodontol 1972; 43(1): 38.
14. Fallahi A, Ghofranipour F, Ahmadi F, Hajizadeh E, Malekafzali B. Psychometric properties of questionnaire of predicting factors for dental caries in adolescents: Fitness theory through factor analysis. Journal of Sabzevar University of Medical Sciences 2014; 21(1): 69-80.
15. Fallahi A, Ghofranipour F, Ahmadi F, Malekafzali B, Hajizadeh E. Adolescent's perspectives on the factors that influence caries development: A qualitative study. SJSPH 2013; 10(4): 65-80.
16. Kasila K, Poskiparta M, Kettunen T, Pietilä I. Oral health counselling in changing schoolchildren's oral hygiene habits: A qualitative study. Community Dent Oral Epidemiol 2006; 34(6): 419-28.
17. Saied-Moallemi Z, Virtanen JI, Vehkalahti MM, Tehranchi A, Murtomaa H. School-based intervention to promote preadolescents' gingival health: a community trial. Community Dent Oral Epidemiol 2009; 37(6): 518-26.
18. Watt RG. Strategies and approaches in oral disease prevention and health promotion. Bull World Health Organ 2005; 83(9): 711-8.
19. Bernson J, Hallberg L-M, Elfstro M, Hakeberg M. Making dental care possible – a mutual affair. A grounded theory relating to adult patients with dental fear and regular dental treatment. Eur J Oral Sci 2011; 119(5): 373-80.
20. Ostberg AL, Jarkman K, Lindblad U, Halling A. Adolescents' per-ceptions of oral health and influencing factors. A qualitative study. Acta Odontol Scand 2002; 60(3): 167-73.
21. Hoeft KS, Barker JC, Masterson EE Urban Mexican-American mothers' beliefs about

caries etiology in children. Community Dent Oral Epidemiol 2010; 38(3): 244-55.

22. Javali SB, Pandit PV. A comparison of ordinal regression models in an analysis of factors associated with periodontal disease. J Indian Soc Periodontol 2010; 14(3): 155-9.
23. Luzzi L, Spencer AJ. Factors influencing the use of public dental services: An application of the Theory of Planned Behavior. BMC Health Serv Res 2008; 8:93.
24. Jamieson LM, Koopu PI. Exploring factors that influence child use of dental services and toothbrushing in New Zealand. Community Dent Oral Epidemiol 2006; 34(6): 410-8.