Determinants of Tooth Brushing among Primary School Students

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Abstract

Background: Oral health is one of the main determinants impacting the quality of life. The aim of this study was to investigate determinants of tooth brushing among primary school students based on the Health Belief Model (HBM).

Methods: This cross-sectional study which was conducted in Shadegan city, in the south of Iran, where a total of 300 primary school students were randomly selected to participate voluntarily in the study. Participants filled out a self-administered questionnaire including the HBM constructs. Data were analyzed by SPSS version 16 using bivariate correlations, and logistic regression statistical tests at 95% significant level.

Results: The mean age of respondents was 9.91 years [SD: 1.26], and ranged from 7 to 12 years. Use of dental floss after each brushing was re-ported among 10.4% of the participants. Daily tooth brushing was reported by 30.6% of participants. Cues to action with odds ratio estimate of 1.371 [95% CI: 1.009, 1.865], and self-efficacy with odds ratio estimate of 1.291 [95% CI: 1.117, 1.492], were the best predictors of tooth brushing.

Conclusion: Cues to action and self-efficacy may be the most effective determinants of tooth brushing among primary school students.

Key words: Oral Health, Self-efficacy, Cues to Action, Health Belief Model.

Introduction

Oral health is one of the main determinants impacting the quality of life. In addition, oral diseases are highly prevalent in a way that tooth decay is the most common disease in humans and over 99 percent of individuals are somehow afflicted with this disease. Therefore, oral disease prevention is nowadays one of the health priorities of the society (1). Having a healthy mouth enables the individual to eat, talk, communicate and socialize. Over 50 million hours are wasted each year for problems caused by oral diseases that impact the individual's performance and activities (2). The human mouth is usually afflicted with disease more than other parts of the body and thus, it needs more care. In addition, as the general health of the body is directly related to oral health, oral health has a special importance in maintaining and improving individuals' health (3). The plaque in the mouth is reduced with the improvement of dental and oral health care behaviors and it can finally lead to oral health. In this regard, dentists believe that oral health in society can be improved with the change of conditions, behaviors and environment and with organization of care (4). Despite great advancements in fighting diseases globally, dental diseases, especially tooth decay, are among the most common diseases in the world, including Iran (5). Considering the clear impact of oral health on individuals' physical and mental health and the controllability of these diseases, many actions have been adopted in the developed countries for the prevention of these diseases including extensive use of fluoride in different forms, oral health improvement, change of healthy habits and sugary-material consumption and community-based health education programs (6). Education, prevention and treatment of oral and dental diseases are among the duties of the health system. And in this regard, before any health education planning and before any preventive act, it is necessary to survey the individuals we are dealing with, regarding their knowledge and finally, the factors that impact on their knowledge, attitudes and behaviors (7). Individuals' actions and healthy behaviors in society are impacted by their knowledge and attitudes and, in order to achieve preventive behaviors, making efforts for increasing people's knowledge level and improving their attitudes on the prevention of oral and dental diseases is necessary. Meanwhile one of the common models in predicting healthy behaviors such as oral health is HBM (7-11). The aim of this study was to investigate determinants of tooth brushing among primary school students based on HBM.

Methods

This cross-sectional study was conducted among 300 primary school students in Shadegan city, the south of Iran, during 2016. The sample size was calculated at 95% significance level according to the results of a pilot study and a sample of 300 was estimated. Subjects were informed about the goal of the research. In addition, they reported their willingness to attend the study. Of the population of 300, 288 (96%) signed the consent form and voluntarily agreed to participate in this study, which has been approved by the institutional review board at the Abadan school of Medical Sciences, Abadan, Iran (IR. ABADANUMS.REC.1395.88).

Questionnaire
Questionnaire included three sections that comprised 38 questions and items: 7 questions for demographic factors, 3 items about oral health behavior and 28 items for HBM variable.
A: The background variables assessed in this study included: age, gender, age father and mother, father and mother educational level, number of family members.
B: Oral health care behavior questionnaire: to assess oral health behaviors among the participants, we used three items "do you do daily tooth brushing". In order to facilitate the participants' responses to the question we used a standardized scale, ranging from 0 (never), 1 (one brush), 2 (twice brush each day), 3 (after each meal).
C: HBM scale was designed based on standard items (7-11). Three items were designed to measure perceived susceptibility about oral disease (e.g. "may I also be suffering from oral diseases."). Four items were designed to measure perceived severity abut side effects of oral disease (e.g., "oral diseases cause stink of my mouth."). Five items were designed to perceived benefit of performing oral health behaviors (e.g., "if I had oral health I established better communication with my friends"). Seven items were designed to evaluate perceived barriers to performing oral health behaviors (e.g., "going to the dentist is too expensive for me"). Four items were designed to measure perceived self-efficacy in performing oral health behaviors (e.g. "how sure are you in your ability to do daily tooth brushing"). Six items were designed as cues to action for performing oral health behaviors (e.g., source of performing oral health behaviors were: family, teacher, friends, etc.). In order to facilitate the participants' responses to each item, susceptibility, severity, barrier, benefit, and self-efficacy were standardized to a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Cues to action items were standardized to yes or no scale. Alpha Cronbach's coefficient was used to estimate reliability of susceptibility, severity, barrier, benefit, self-efficacy and behaviors. Split-half was used to estimate reliability of cues to action. Constructs reliability were: perceived susceptibility (α=0.70); perceived severity (α=0.71); perceived benefit (α=0.74); perceived barrier (α=0.77); perceived self-efficacy (α=0.80); and cues to action (α=0.79).

Results

The mean age of respondents was 9.91 years [SD: 1.26], and ranged from 7 to 12 years. The mean age of fathers of respondents was 40.04 years [SD: 5.40], and mothers was 33.69 years [SD: 5.20]. In addition, 48.3% (139/288) of participants were male, and 51.7% (149/288) were female. Nearly 44.8% (129/288), 49.7% (143/288), and 5.6% (16/288) of the respondents reported that their fathers were under diploma, diploma and academic education, respectively.

In addition, 26.4% (76/288), 63.2% (182/288), and 10.4% (30/288) of the respondents reported that their mothers were under diploma, diploma and academic education, respectively.

Almost 39.6% (114/288) of the participants reported history of referred to the dentist in the last year at least once. Furthermore, use of dental floss after each brushing was reported among 10.4 % (30/288) of the participants. In addition, daily tooth brushing after each meal was reported 30.6 (88/288) among participants.

Our result indicated family (22.6% of participants), dentist (18.4% of participants), and health center stuff (17.7% of participants) as the most effective factors that persuaded them to perform oral health behaviors. A Backward step-wise model was used to determine predictors of background variables on tooth brushing among participants. As can be seen in Table 1, finally on the 6th step the procedure was stopped and the best model was selected. Among the background variables, sex, and mother education were the most influential predictive factors for tooth brushing (Table 1).

Table 1: Multiple logistic regression analysis for background variables on tooth brushing

Variables	Crude OR (95 % CI)	P value	Adjusted OR (95 % CI)	P value
Sex				
Male	1	-	1	-
Female	2.624 (1.547 – 4.453)	< 0.001	2.603 (1.506 – 5.400)	0.001
Mother Education				
Under Diploma	1	-	1	-
Diploma	2.814 (1.382 – 5.730)	0.004	2.766 (1.344 – 5.692)	0.006
Academic	8.727 (3.305 – 23.044)	< 0.001	8.571 (3.179 – 23.111)	< 0.001

Table 2 shows the correlations and significance levels at the 0.01 and 0.05 were the criteria for the analysis. Our results showed that for the sample, behavior was significantly related to cues to action (r=0.420), and self-efficacy (r=0.530). In addition, behavior was inversely correlated with barrier (r=-0.352). However there was no significant correlation between behavior with susceptibility (r=0.051), severity (r=0.111), and benefit (r=0.016). Self-efficacy was significantly related to susceptibility (r=0.328), severity (r=0.337), benefit (r=0.232), and cues to action (r=0.327). Furthermore, self-efficacy was inversely significant correlated with barrier (r=-0.246). In addition, cues to action was significantly related to susceptibility (r=0.212). However there was no significant correlation between cues to action with severity (r=0.030), barrier (r=-0.027), and benefit (r=0.054). Benefit was significantly related to susceptibility (r=0.208), severity (r=0.445), and inversely correlated with barrier (r=-0.199). Also, severity was significantly related to susceptibility (r=0.546). Finally, there was no significant correlation between barrier with severity (r=0.032), and susceptibility (r=-0.066).

Table 2: Correlation between HBM constructs

Component	Mean (SD)	Range	X1	X2	X3	X4	X5	X6
X1. Susceptibility	11.54 (2.30)	3-15	1					
X2. Severity	15.66 (2.82)	4-20	0.546**	1				
X3. Barrier	19.21 (6.03)	7-35	0.032	-0.066	1			
X4. Benefit	19.13 (3.83)	5-25	0.208**	0.445**	-0.199**	1		
X5. Cues to action	2.93 (2.06)	0-6	0.212*	0.030	-0.027	0.054	1	
X6. Self-efficacy	11.65 (4.65)	4-20	0.328**	0.337**	-0.246**	0.232**	0.327**	1
X7. Behaviors	2.85 (1.65)	0-7	0.051	0.111	-0.352**	0.016	0.420**	0.530**

* Correlation is Significant at the 0.05 Level (2-Tailed). ** Correlation is Significant at the 0.01 Level (2-Tailed).

Logistic regression analysis and backward stepwise method was calculated for predictability of HBM variables on tooth brushing. As mentioned in statistical analyses, a step-wise model procedure was conducted and finally on the 5th step the procedure stopped and the best model was selected, among the HBM variables: Cues to action with odds ratio estimate of 1.371 [95% CI: 1.009, 1.865], and self-efficacy with odds ratio estimate of 1.291 [95% CI: 1.117, 1.492], were more influential predictors of tooth brushing (Table 3).

Table 3: Logistic regression analysis for HBM variables related to tooth brushing

Variables	B	S.E.	Odds Ratio	95% Confidence Intervals		P-value
Final Model, Step 3				Lower	Upper	
Self-efficacy	0.255	0.074	1.291	1.117	1.492	0.001
Cues to action	0.316	0.157	1.371	1.009	1.865	0.044

Discussion

The findings of the present study indicated that 30.6% and 10.4% of the participants used brush and dental floss respectively after each meal. In addition, 25% of them said that they would use sodium fluoride mouth rinse at least once a day. In this regard, in the study by Mazloomi et al 37.5% of the students used dental floss daily and 11.1% had visited dentists once each six months (7). In the study by Varenne et al the findings indicated that 58% of the rural and urban children aged 12 in Burkina Faso did not brush at all (12). In the study by Keikhaee et al 4.2% of the students used sodium fluoride mouth rinse (13). Considering the importance of the use of fluoride for the prevention of tooth decay and free distribution of sodium fluoride rinse in schools, the need for more efforts for education in this regard is felt. Overall, these findings indicate that status of the adoption of behaviors that improve oral health is not favorable in Iran and there is a necessity to pay more attention to this issue and to provide appropriate education in this regard.

The findings indicated that, among background factors, being a female and mother's education were very important factors in predicting brushing after meal. In this regard, Mehri and Morowatisharifabad showed significant statistical difference between the means of dental and oral health behaviors based on the parents' education (14). In addition, Kawamura et al conducted a study on Japanese students and their findings indicated that female students adopted oral health care behavior more than male students (15). These findings show the necessity of providing males with more education.

Paying attention to oral health is a school health priority and the first step in planning for dental and oral health is determining the factors that impact it. This study was conducted with the aim of determining the status of performing oral health behaviors (daily brushing after each meal, the use of dental floss, the use of fluoride mouth rinse and visiting a dentist) and the beliefs related to observing oral health using HBM. Our findings indicated that self-efficacy and cues to action were the strongest predictors. These findings are highly consistent with other studies on this subject. For example, Mehri and Morowatisharifabad pointed out in their study that the direct effect of self-efficacy on oral health behaviors had been more than that of other variables. Also, in their study employing HBM, Buglar et al explored beliefs on dental care including brushing and flossing. Their study was conducted on 92 individuals visiting dental clinics in Australia. Their findings indicated that barriers and self-efficacy significantly predicted oral health behaviors in the participants (9). In another study, Anagnostopoulos used HBM to analyze brushing behavior. Their study was conducted on 125 patients at dentist offices and their findings indicated that self-efficacy and perceived severity were strong predictors of brushing behaviors in the participants (10). The study by Karami et al also indicated that self-efficacy was the strongest predictor of performing oral health behaviors in students at elementary schools in Ahvaz (11). Self-efficacy is recognized as an important factor in adopting preventive behaviors and it is a behavioral perception that increases the probability of adhering to a work plan and health-improving behaviors (16). In this study too, the mental perception of the students in performing behaviors that improve oral health as self-efficacy was explored and the results indicated that the sense of self-efficacy has a significant role in performing oral health care behaviors. Our findings indicated that the behaviors that improve oral health did have a significant correlation with perceived susceptibility, severity and benefits. These findings are consistent with the findings obtained by Mazloomi et al (7). In this regard, it can be said that individuals, especially children and adolescents, may perceive the seriousness of health issues but they do not probably see themselves as susceptible to the risk and have few susceptibility beliefs regarding the risks around them. In other words, they view themselves as immune to the health risks and threats (17,18). Children's and adolescents' encounter with their peers who are dealing with oral and dental disease problems may impact their beliefs and may encourage them to adopt behaviors related to oral health .

Our findings indicated that family was the main source of information for students regarding behaviors that promote oral health. In this regard, Karami et al too showed that parents were the students' main source of information in oral health behaviors (11). Also, in many studies on different healthy behaviors the role of external supports and incentives has been shown to be positive in a way that reminding by acquaintances is an important determinant in adopting oral health care impacts on the behavior of children. In addition, family forms the cognitive and social dimensions in individuals and results in the improvement of favorable and reminding behaviors and key signs for creation of favorable behaviors; therefore the role of family especially that of parents should be paid attention to in interventional programs for oral health behaviors.

Limitations
The low number of samples that reduces the generalizability of the results is one limitation . Also, the collection of data through questionnaire can be accompanied by a percentage of error. In addition, the lack of exploring missing teeth and dental plaques was another limitation of the present study.

Conclusion

Cues to action and self-efficacy may be the most effective determinants of tooth brushing among primary school students.

References

1. Bozorgmehr E, Hajizamani A, Malek Mohammadi T. Oral health behavior of parents as a predictor of oral health status of their children. ISRN dentistry. 2013; 2013.

2. Petersen PE, Stella YL. Health promoting schools: an opportunity for oral health promotion. Bull world health organ; 2005. 83(9): 677-684.

3. Park YC, Lee SY, Kim DH, Jee SH. Intrusion of posterior teeth using mini-screw implants. American Journal of orthodontics and dentofacial orthopedics. 2003; 123(6): 690-94.

4. Antonarakis GS, Patel RN, Tompson B. Oral health-related quality of life in non-syndromic cleft lip and/or palate patients: a systematic review. Community dental health. 2013; 30(3):189-95.

5. Karki AJ, Monaghan N, Morgan M. Oral health status of older people living in care homes in Wales. British dental journal. 2015; 219(7):331-4.

6. Sahba S, Ghadimi S. Measuring the quality of life. J Dent Sch. 2006; 23 (4):599-605

7. Mazloomi Mahmoodabad SS, Roohani Tanekaboni N. Survey of some related factors to oral health in high school female students in Yazd, on the basis of health behavior model (HBM). J Birjand Univ Med Sci. 2008; 15 (3):40-47 (Persian)

8. Walker K, Jackson R. The health belief model and determinants of oral hygiene practices and beliefs in preteen children: a pilot study. Pediatric dentistry. 2015; 37(1):40-5.

9. Buglar ME, White KM, Robinson NG. The role of self-efficacy in dental patients' brushing and flossing: testing an extended Health Belief Model. Patient education and counseling. 2010; 78(2):269-72.

10. Anagnostopoulos F, Buchanan H, Frousiounioti S, Niakas D, Potamianos G. Self-efficacy and oral hygiene beliefs about toothbrushing in dental patients: a model-guided study. Behavioral Medicine. 2011; 37(4):132-9.

11. Karami K, Shakerinejad G, Kabiry B. Effect of education based on health belief model on students' oral health behavior change. SJIMU. 2014; 21 (7):134-141(Persian)

12. Varenne B, Petersen PE, OuattaraS. Oral health behavior of children and adults in urban and urban and rural areas of Burkina faso, Africa. Int Dent J 2006; 2:61-70.

13. Keikhaee R, Rakhshani F, Izadi S, Hashemi Z. Survey of oral health behaviors and its associated factors in female students of primary schools in Zabol based on health belief model. Journal of Zabol University of medical sciences and health services. 2012: 33-41 (Persian)

14. Mehri A, Morowatisharifabad M. Utilizing the Health Promotion Model to predict oral health behaviors in the students of Islamic Azad University of Sabzevar (2008). JDM. 2009; 22 (1): 81-87 (Persian)

15. Kawamura M, Takase N, Sasahara H, Okada M. Teenagers' oral health attitudes and behavior in Japan: comparison by sex and age group. Journal of oral science. 2008; 50(2):167-74.

16. Eldredge, LKB, Parcel GS, Kok G, Gottlieb NH. Planning health promotion programs: an intervention mapping approach. John Wiley & Sons, 2011.

17. Mirzaei-Alavijeh M, Heydari ST, Ahmadi-Jouybari T, Jalilian F, Gharibnavaz H, Mahboubi M. Socio-Demographic and Cognitive Determinants of Breast Cancer Screening. International Journal of Advanced Biotechnology and Research (IJBR). 2016; 7(4): 1684-1690

18. Mirzaei-Alavijeh M, Jalilian F, Baghiani Moghadam M, Hatamzadeh N, ZinatMotlagh F, Dahaghin N. Knowledge, Attitude and Practice of Elementary Schools Students about Oral Health in Yazd. Iranian Journal of Pediatric Dentistry. 2013; 9 (1):43-50