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Factors predicting the oral health behaviors of the Iranian students in the District 1 Tehran, Iran

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Aim: The purpose of this examination is determining the predictors of oral health behaviors among Iranian students in district 1 Tehran based on the health belief model with added commitment to plan construct. **Methods:** This cross-sectional study was conducted on 351 four grade female students in the first district of Tehran, Iran in 2017. The multi-stage random cluster sampling method was used to recruit students. The inclusion criteria were being in four – graded level of elementary schools of the 1st district in Tehran, being female students aged between 9-11 years and being physically and psychologically healthy student. Logistic regression analysis was used to identify the variables that predict oral health behaviors. **Results:** Totally, (N= 31.8%) students reported that they were brushing less than twice a day and (N= 55.2%) students claimed using of dental floss once a week or less than once a day. The results indicated that perceived self-efficacy (OR=1.46, 95% CI=0.57-3.78, P<0.001), commitment to plan (OR=1.13, 95% CI=1.04-1.23, P<0.001) and cues to action (OR=1.42, 95% CI=1.14–1.76, P=0.002) were the significant predicting variables of brushing twice a day, and use of dental floss once a day or more (OR=1.02, 95% CI=0.23-3.53, P=0.003). **Conclusion:** This study has shown the effectiveness of the health belief model with added commitment to plan construct to predict oral health behavior in female students. Thus, it seems that the model as a acceptable framework for designing training programs to improve oral health behavior in students.

Keywords: Health Behavior. Health Education, Dental. Iran. Oral health. Students.

Introduction

Oral disorders are the most common health problems. Studies have shown that one of the commonest problems of early life is dental caries and oral diseases. Oral health is a part of the public health and essential issue to enhancing the quality of life[1]. De Faria Campestrini et al.[2] study shows that it is not enough to merely convey information about the functions of the oral cavity and describe the characteristics of diseases that affect it when attempting to develop healthy public attitudes toward health habits and it is needed educational preventive programs[2].Primarily based on this fact that prevention and training are the satisfactory manners of promoting oral health collectively, it has been argued that extra prematurely preventive measures and interruption on disease evolution could be more effective[3].

Distribution and severity of oral conditions vary in different parts of the world and this is also real for specific geographic conditions within the equal country or area[3]. According to a countrywide oral health survey which performed in 2012, indicated a high level of carries inside the primary dentition and the mean DMFT (full) index rated as 5.16/0.38 in 6-year-old children[4].

Behavioral factors are shown as the best care in early childhood period..Brushing and flossing are the very best methods to reduce the incidence of plaque[5].

In addition, health education is considered a critical method for health promotion-through voluntary wonderful adjustments of individuals within healthy life. Additionally health education can improve familiar and community behavior, producing political behaviors that allow the development of new strategies to promote health and enhance the quality of lifestyles of the population[6-7].The implementation and effectiveness of educational preventive programs have become important because of the perception of risk factors for oral diseases, knowledge acquisition and consequently behavioral changes[7].

In health education; the use of models and theories of health behavior to designing interventions is recommended because they can cause powerful health education programs. In fact, the models provide a framework for expertise regarding how people analyze healthy messages and the way they behave and why humans behave as they distinguish[8].The Health Belief Model(HBM) is a comprehensive model that can be used for organizing educations. The HBM is one of the first models which were advanced for regulating health-related behaviors[9]. On this version there are specific patterns of social-cognitive predictors can also appear (Figure 1) the construct of "Commitment to Plan of Action" from "Health Promotion Model Added to HBM model.

The model assumes that different factors, consisting of the perceived severity of health trouble, perceived benefits, and perceived barriers preventing people from assignment preventive behaviors, affect health related beliefs and behaviors[10].The purpose of this examination is determining predictors of oral health behaviors like teeth brushing and dental floss rate in Iranian students in district 1 Tehran based on HBM with added commitment to plan construct.

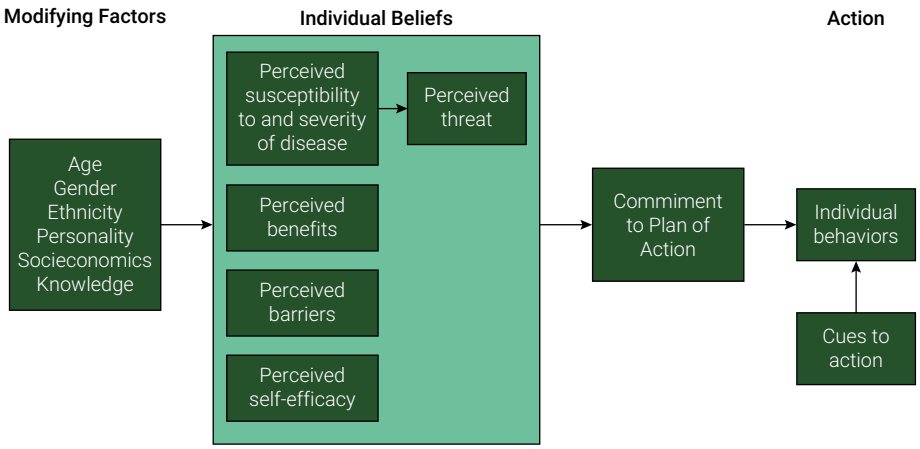

Figure 1. Flow Diagram of the expanded Health Belief Model with the construct of "Commitment to Plan of Action" from "Health Promotion Model.

Materials and methods

Study design and participants

This was a cross-sectional study which was conducted on the grade four female students (9-11 years) of schools in the first district of Tehran on April 21, 2017, for 2 months. To obtain samples from 33,179 female students (grade four) studying in this Urban-rural, a Multi-stage random cluster sampling method was used.

In the first stage, out of 162 schools (145 urban schools and 17 rural schools), 10 schools [urban schools (N=6) and rural schools (N=4)] were randomly selected. In the second stage, from351 students based on the population rate of each school in the sample of each school were randomly selected. According to dropping 43 students totally 308 eligible students were selected (Table 1).

The inclusion criteria were being in four – graded level of elementary schools of the 1st district in Tehran, being female students aged between 9-11 yearsand being physically and psychologically healthy student. The exclusion criterion was student or parent's disagreement to be studied or not to responding to the study questionnaire (Figure 2).

The researcher was available while completing the questionnaire to help the students. The students were educated to answer truly. To assess the predictors of brushing, and use of dental floss, all the Health Promotion Model added to HBM model constructs (Figure 1) were examined as risk factors which could influence the probability of occurrence brushing, and use of dental floss and were interpreted through odds ratio (OR). The odds ratio was used to determine whether particular exposures like HPM added to HBM model constructs could be risk factors for occurrence of the outcome like behaviors. Logistic regression analysis was used to identify the variables that predict oral health behaviors. To determine the relationship between different HPM added HBM model constructs with each other and with brushing, and use of dental floss behavior, R Spearman was used because K-S test showed the data were non-parametric. To predict the factors influencing brushing, and use of dental floss behavior logistic regression analysis was applied.

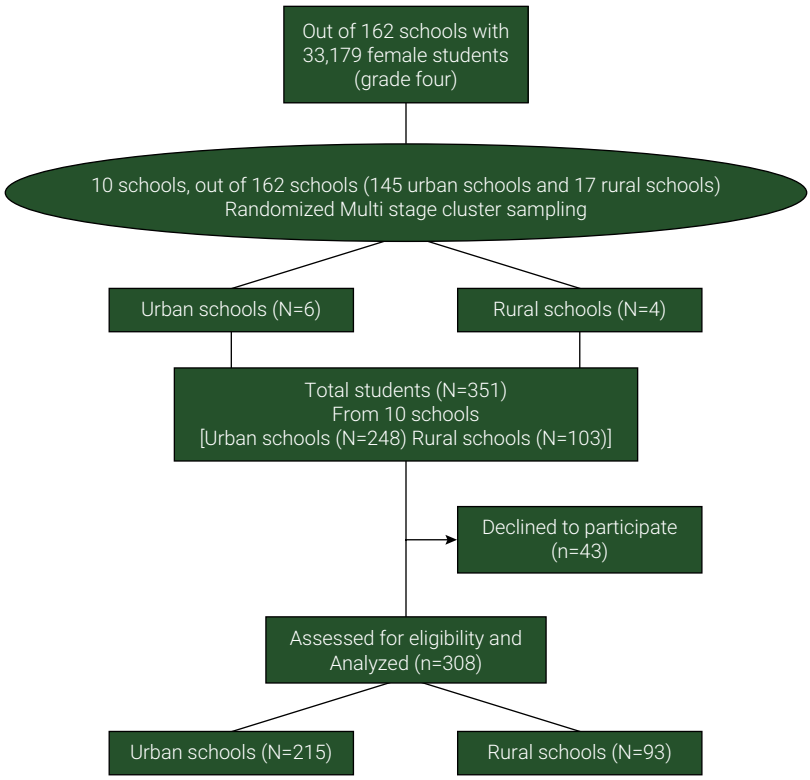

Figure 2. Flow diagram of student's recruitment.

Results

Totally, 308 students took part in the study. The mean age of the subjects was 9.32 ± 0.8 years. The demographic variables of the study population are shown in Table 1 and Table 2. About 31.8% of the students (n =98) reported that they were brushing behavior less than twice a day, and 170 students (55.2%) reported that they brushed their teeth once a week or after using dental floss or less than once a day. While 210 students (68.2%) reported that they brushed at least twice a day, 138 students (44.8%) reported that they were using dental floss at least once a day. The results indicated that perceived self-efficacy (OR=1.46, 95% CI=0.57-3.78, P<0.001), Commitment to plan (OR=1.13, 95% CI=1.04-1.23, P<0.001) and cues to action (OR=1.42, 95% CI=1.14–1.76, P=0.002) were the significant predicting variables which is the key predictor of brushing twice a day, and use of dental floss once a day or more (OR=1.02, 95% CI=0.23-3.53, P=0.003).

First stage

The recognition of effective demographic variables on oral health behaviors Chi-square statistics was used. The related data are shown in Tables 1 and 2. Based on the results given in Table 1, the father's educational level (p=0.03), and income (P = 0.04) had a significant relationship with the students' brushing behavior.

Table 1. Demographic characteristics affecting of the students brushing behavior

Demographic variables	Brushing frequency	
	Less than twice a day	Twice a day or more
	N (%)	N (%)
	98(31.8)	210(68.2)
Father's educational level		
Primary	20(20.4)	54(25.7)
High school	35(35.7)	66(31.4)
Higher educational	43(43.9)	90(42.9)
P-value	**0.03**	
Mother's educational level		
Primary	23(23.5)	43(20.5)
High school	31(31.6)	80(38.1)
Higher educational	44(44.9)	87(41.4)
P-value	**0.07**	
Father's job		
Private	75(76.6)	147(70)
Employee	23(23.4)	63(30)
P-value	**0.08**	
Mother's job		
Un Employed	50(51)	110(52.4)
Employed	48(49)	100(47.6)
P-value	**0.1**	
Income		
Low	10(10.2)	16(7.6)
Appropriate	13(13.3)	17(8.1)
Well	16(16.3)	87(41.4)
Excellent	59(60.2)	90(42.9)
P-value	**0.04**	

The children's use of dental floss was significantly related to the father's job (P = 0.04), father's educational level (P = 0.03) (Table 2).

Using a logistic model for testing, the effect of six structures of HBM and demographic variables had a significant relationship with oral health behaviors. Tables 3& 4 show the data used in the model. In order to find out the relationship between oral health behavior and independent variables, simple and multiple logistic regression analyses were carried out with structures of HBM and demographic variables that were significant. Mother's education (P =0.005), income (P =0.007), self efficacy, commitment to plan (P <0.001) and cues to action (P =0.003) predicted the students' behavior of dental floss using at least twice a day (Tables 3).

However, after adjustment, only perceived self-efficacy, commitment to plan, cues to action remained significant, so that one unit increase in perceived self efficacy increased the possibility of teeth brushing behavior at least twice a day by 1.42 times, commitment to plan by 1.02 times cues to action by times.

Table 2. Demographic characteristics affecting of the students dental floss using

Demographic variables	Dental floss frequency	
	Once a week or less than once a day	Once a day or more
	N (%)	N (%)
	170(55.2)	138(44.8)
Father's educational level		
Primary	38(22.4)	34(24.6)
High school	65(38.2)	48(34.8)
Higher educational	67(39.4)	56(40.6)
P-value	**0.03**	
Mother's educational level		
Primary	33(19.4)	33(23.9)
High school	67(39.4)	47(34)
Higher educational	70(41.2)	58(42.1)
P-value	**0.5**	
Father's job		
Private	164(96)	89(64.5)
Employee	126(74)	49(35.5)
P-value	**0.04**	
Mother's job		
Un employed	115(67.6)	73(52.9)
Employed	55(32.4)	65(47.1)
P-value	**0.8**	
Income		
Low	30(17.7)	24(17.4)
Appropriate	32(18.8)	22(15.9)
Well	31(18.2)	24(17.4)
Excellent	77(45.3)	68(49.3)
P-value	**0.2**	

The results showed that the students' use of dental floss behavior was significantly related to the mother's job (P = 0.006), father's educational level (P = 0.004), income (P = 0.007) perceived self efficacy (P < 0.001), commitment to plan (P < 0.001), and cues to action (P = 0.003). When they were separately entered into the model (Table 4) nevertheless, after adjustment, mother's job (P = 0.012) and self efficacy (P = 0.016) and cues to action (P = 0.002) were found to be significantly related to the use of dental floss once a day or more. The increase of perceived self efficacy by one unit, the possibility of using dental floss at least once a day would increase by 1.30 times (OR = 1.30, 95% CI = 0.99-2.34, P = 0.016).

Discussion

The current survey was designed to investigate the predictors to oral health behaviors in Iranian students in district 1 Tehran based on the health belief model with added commitment to plan construct. Consistent with this examine findings, other research

Table 3. Factors predicting brushing behavior at least twice a day among of students

Brushing behavior	*B*	Simple OR (95% CI)	P-Value	*B*	Multiple OR (95% CI)	P-Value
Mother's educational level			0.005			0.108
Primary	0.16	1 (0.40-2.51)	1.32	0.19	1.14(0.54-2.65)	0.26
High school	0.47	1.60(0.92-2.78)	0.63	0.38	1.46(0.57-3.78)	0.02
Higher educational	0.57	1.78(0.66-4.74)	0.01	0.52	1.65(0.97-2.83)	0.01
Income			0.008			0.123
Low	0.18	1.12(0.52-2.63)	0.12	0.15	1.01(0.53-1.90)	0.24
Appropriate	0.23	1.24(1.14-1.38)	0.18	0.20	1.13(0.53-2.64)	0.18
Well	0.28	1.36(0.47-3.68)	0.02	0.25	1.18(0.41-2.59)	0.01
Self-efficacy	0.38	1.46(0.57-3.78)	<0.001	0.35	1.42(1.14-1.76)	0.012
Commitment to plan	0.18	1.13(1.04-1.23)	<0.001	0.15	1.02(0.36-2.52)	0.014
Cues to action	0.16	1.02(0.23-3.53)	0.003	0.12	1 (0.87-1.26)	0.023

OR = odds ratio, CI = confidence interval

Table 4. Factors predicting use dental floss behavior at least once a day among of students

Dental floss behavior	*B*	Simple OR (95% CI)	P-Value	*B*	Multiple OR (95% CI)	P-Value
Mother's job			0.006			0.012
Father's educational level			0.004			0.113
Primary	0.18	1.20(0.54-2.70)	0.61	1.19	0.78(0.37-1.69)	0.23
High school	0.47	1.60(0.92-2.78)	0.01	0.28	1.36(0.47-2.68)	0.01
Higher educational	2.61	0.74(0.33-1.65)	0.03	0.52	1.65(0.97-2.83)	0.01
Income			0.007			0.104
Low	-0.56	0.56(0.18-1.72)	0.31	0.45	1.31(0.83-2.43)	0.28
Appropriate	-0.034	0.96(0.31-3.01)	0.95	0.20	1.15(0.55-2.66)	0.23
Well	0.13	1.14(0.35-3.65)	0.81	0.21	1.12(0.35-2.53)	0.01
Self-efficacy	0.53	1.78(0.66-4.74)	<0.001	0.36	1.30(0.99-2.34)	0.016
Commitment to plan	0.18	1.13(1.043-1.23)	<0.001	0.15	0.89(0.38-1.54)	0.21
Cues to action	0.16	1.02(0.23-3.53)	0.003	0.14	1.02(0.89-3.44)	0.002

OR = odds ratio, CI = confidence interval

has mentioned a significant relationship between the education level of mother and father As Aggarwal et al.[11] study. Contrary to the Pourhaji et al.[8] study that showed there was no significant relationship between education level and oral health behaviors[1], a significant relationship between income, father's job, dental floss behavior and brushing behavior in students same as Phanthavong et al.[12] study.

This study indicated that perceived self-efficacy, cues to action, and commitment to plan were the significant predictors which is the key factor of teeth brushing and brushing behavior at least twice a day, use of dental floss and brushing behavior once a day or more. According to the data, respectively the study carried out by Rahnama et al.[13] study and Hazavei et al.[14] study showed that self-efficacy, cues to action had the highest percent of total variance observed in dental health behaviors.

However, there was a constrained correlation between oral health perceptions and elevated perceived benefits in Solhi et al.[15] study. Buglar et al. study on the role of self efficacy in dental patients' brushing and flossing, found that, barriers emerging, and self efficacy significantly predicted brushing and flossing behaviors[16].

However, like the current study it had no significant relation with perceived benefits and in contrast to current study with no relation to cues to action[17]. Theses differences might be due to different gender and age rangeof the participants.

Within the Reisi et al. study, besides to perceived barriers (with negative correlation), all constructs of HBM were definitely associated with oral health behaviors. Self-efficacy was the most powerful predictor of oral health behavior[18]. The Kasmaei et al. findings recommend that perceived objective severity and perceived psychological barriers play an important position in adopting acceptable health behavior among younger young people[19].

Moreover, according to the present study, numerous researches have revealed that commitment to plan has been as the best predictor variable for actual oral health behaviors[19-20].Therefore, strategies for enhancing commitment to plan in practice, such as strengthening self-extinguishing techniques, enhance commitment, pursuit of commitment and focus groups discussion could lead to more effective oral health behaviors programs for Iranian students and should be considered in future intervention[20-21].These programs could propose that highly commitment to plan individuals exert greater efforts to empowering individuals to prevent them from returning to unhealthy behavior[22]. Pender stated that more commitment to plan could have a much impact on continuing health promotion behaviors[23].

In this study, the variables of cues to action with a positive relationship were demonstrated to be significant predictors for oral health behaviors among the Iranian students. This finding is supported by many previous studies which found that cues to action are stimuli that trigger appropriate health behaviors. Cues to action can be either internal, that is, the perception of bodily states, or external, that is, stimuli from the environment, such as interpersonal interactions or the mass media[24-25].In the current study, there was also a relationship between self-efficacy and oral health behaviors. Similar to the present study, self-efficacy was the most predictive factors of oral health behaviors. These results are consistent with previous studies[26-28].

There are several limitations to this study. First, this study was a cross-sectional design in addition to assessing oral health behaviors as self-report, in which humans typically might record the behavior better than the real amount. Furthermore, the sample of this study were selected from volunteered individuals, so that it's results might not be generalized to all Iranian student groups. In this study, psychological tests for the studied participants were not done. Therefore, it is suggested to consider this assessment in future studies to see if there would be some correlations with the prediction of the behavior.

This study has shown the effectiveness of the health belief model with added commitment to plan construct to predict oral health behavior in female students. herefore, it seems that the model as a framework for designing training programs to improve oral health behavior can be used. The finding of this study provides needed data assisting the development of model-based behavioral prevention interventions to encourage students' oral health behavior.

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Finance/Disclosure

None declared.

Conflict of Interest

"The authors acclaimed that they have no rivaling interests".

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