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Role of Oral Hygiene Beliefs in Regular Brushing among the 9-10 Years Old Female Students

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Abstract

Aim: Promotion of oral health in schools is one of the recommended polices of WHO. The aim of this study was to determine the role of Oral Hygiene Beliefs according to the Health Belief Model in regular brushing behavior, among the 9-10 years old female students.

Methods: This cross sectional study was conducted on the female students of Rasht-Iran in 2012. Applying the statistical estimation, the sample population was determined 265 who were selected from 22 schools using systematic sampling method. Nearly 12 students were selected from each school using simple randomized method. Data collection instrument was a questionnaire and the results were analyzed using descriptive methods, and analytical methods including Chi-square, Mann-Whitney U test and Logistic regression.

Finding: Among the samples, 17.4% brushed at least twice a day. The logistic regression analysis indicated that perceived severity (OR = 0.48, 95% CI = 0.27- 0.86, P = 0.014), perceived barriers (OR = 1.97, 95% CI = 1.29- 3.02, P = 0.002) and mothers' educational level (OR = 4.78, 95% CI = 1.24- 18.46, P = 0.023) were the significant predicting factors for tooth brushing twice a day or more. There are significant statistical correlations among the perceived severity of loosing good eating and good speaking, and perceived barriers of tiredness, laziness and impatience with desirable behavior. Overall 66.5% agreed with one of the two physical barriers: painful tooth brushing and gums bleeding.

Conclusion: Promoting educational level and educational programs for Iranian women are recommended. Planning useful educational interventions for the students of concrete operational stage is required attention to the application of Piaget's Theory of cognitive development. Educational interventions should focus on items of beliefs named above. At least 70 percent of Iranian people need to learn the correct ways of brushing teeth.

Key words: Oral Hygiene Beliefs, Perceived severity, Perceived barriers**,** Mothers' educational level, Brushing behaviour

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Introduction

Dental caries and periodontal diseases are the consequences of poor oral health [1]. Children's oral health has a significant impact on their quality of life [2]. Despite of the great worldwide improvements in the oral health, the related problems still remain unresolved both in developed and developing countries [3]. Regarding the statistical results of studies, number of the carried teeth among the Iranian 6-12 years old children who are one of the target groups in oral and dental health is high [4]. These years approaches toward dental caries control have switched from treatment to prevention [5]. People are generally aware of health risks, but they ignore preventive behaviors or adoption of health programs [6, 7]. The same is true about the Iranian people. According to the reports of the country's Health Ministry, most of people attempt to compromise the dental caries instead of preventing or curing them, even in families with high income. Hence, it seems that the problem relates to the culture and people's beliefs in health field which requires training and educational interventions [8]. One of the World Health Organization recommended policies is promotion of the students' oral health in schools for developing self-care practices and achieving healthy lifestyles [9]. Although, children at these ages learn and accept beneficial behaviors which maintain them during life including the oral and dental health [10, 11], educational intervention programs require understanding attitudes, beliefs and behaviors related to oral health [12]. Regarding the complex nature of the relationship among the attitudes, beliefs and health behaviors [13], the health education and promotion models have been used to explain the point [12].

In this study, we have evaluated the Oral Hygiene Beliefs concerning the perceived susceptibility, perceived severity, perceived benefits and perceived barriers in regular brushing. These beliefs explain and predict the health-related behaviors. They are four top constructs of The Health Belief Model (HBM) too [14, 15]. According to the literature, in spite of the public stands to achieve the most success of well-organized health programs efforts, in order to arouse the interest of people in easy participation in the programs, the willingness to take part has all too often been upsetting. HBM was developed as a result of the attempts, in this regard [16]. This model emphasizes on prevention; so it has been used to protect the health activities [17] and explain behavioral changes in dental health and the related belief patterns [18].

One of the effective behaviors resulted in dental caries among the students is tooth

brushing less than twice a day [19]. The desirable behavior in this study is tooth brushing at least twice a day; while different studies reveal that the rate in Iran is less than fifty percent. The rate is very different in the world [20-24].

Readiness to act is defined in terms of the individual's point of view about susceptibility (believe in acquiring oral diseases) and seriousness (believe in extent of consequences of the oral diseases), [14, 25]. Aggregation of the perceived susceptibility and severity is the perceived threat which has an important role in many health behaviors [26]. The direction that the action will take is influenced by the beliefs about benefits (the advantages of the regular brushing) of the known available alternatives in reducing the harmful state. If the readiness to act is high and the barriers (belief concerning costs of performing the regular brushing) are seen as relatively weak, the action in question is likely to be taken [14, 25].

The researches which examine the Oral Hygiene Beliefs in dental field are in contradiction with the predictive power of its constructs, for example among these researches [12, 18, 23, 24, 27-32], some of them reported the predicting power of perceived susceptibility [12, 23, 24, 29], perceived severity [12, 27, 28, 30], perceived benefits [12, 27, 32] and perceived barriers [12, 18, 24, 27, 29, 30, 32] have predicting power in oral health behaviors, while the others suggest that these are not significant construct of predicting these behaviors. Because of these contradictory findings, the researches of this study wanted to determine the constructs that have predicting power in tooth brushing frequency among these preadolescents. The aim of this study was to determine the role of Oral Hygiene Beliefs according to the HBM in regular brushing among the 9-10 years old female students (grade four).

Methods

The Medical Ethics Committee of Tarbiat Modares University confirmed this study. The study was cross sectional conducted on the female students of grade four (9-10 years old) in Rasht (a metropolitan in north of Iran in 2012 (for one month). Applying the statistical estimation, the sample population was determined 265 who were selected from 22 schools using systematic sampling method. Nearly 12 students were selected from each school using simple randomized method. The researcher was present while completing the questionnaire, to help students. The inclusion criterion was being female student of grade four and the exclusion criterion was dislike to participate in the study. Fortunately, all of

selected students accepted this invitation.

Data collection instrument was a questionnaire prepared based on the previous studies [18, 20, 27, 32] and the results of the research team meetings were compiled. The questionnaire has eight items in relation to the demographic variables, 20 items to the Oral Hygiene Beliefs (HBM constructs) based on the Likert's five-score scale [18, 33, 34]. The items were related to the perceived susceptibility with three questions (3-15), the perceived severity with seven questions (7-35), the perceived benefits with three questions (3-15), the perceived barriers with seven questions (7-35), and 1 item on brushing behavior frequency. The questionnaire was presented to eight health education experts and two dentists who were faculty members of the university, in order to evaluate its validity and their opinions were considered. Then Cronbach's alpha coefficient was used to evaluate the questionnaire's reliability. The values for the constructs were as follows: perceived susceptibility (77%), perceived severity (81%), perceived benefits (71%) and perceived barriers (85%). The performance measurement was conducted based on the number of brushings per day as a healthy behavior.

For data collecting in each school, the personnel were assured that this project is just an academic study and it has not related to school evaluation and controlling health care staffs activities. Then at each school, 30-40 minutes spent to get students' confidence and their participation to answer the questions honestly. We confirmed that the science progress depends on such researches. Also the students were explained that if they answer honestly, they will help the researchers achieve proper information and improve knowledge.

Data analysis was conducted using SPSS and descriptive statistics including frequency, mean, median, standard deviation as well as analytical statistic tests including Chi- square, Mann-Whitney U test and logistic regression.

Results

In this study 17.4% of the students were brushing twice a day or more (desirable behavior); while 82.6% were brushing less than twice a day (27.1% once a day, 55.5% less than this). Demographic variables showed that more than fifty percent of parents had moderate educational level (secondary school, high school, and diploma), i.e. 57.1% of mothers and 56.6% of fathers. The occupation of 81.3% mothers was housekeeper and 37.9% fathers was private. Table 1 shows the results of demographic variables including parents' educational level and occupation for two groups of students, one with desirable brushing behavior and another with undesirable

brushing behavior. Using Chi- square test showed statistically significant correlation between the mothers' educational level and the desirable behavior (P = 0.0001).

Table 1 Comparison of Parents' educational level and job among the students with and without desirable brushing behavior

Times of brushing behavior Parent's educational level and job		Brushing less than twice a day (undesirable behavior) No (%)	Brushing twice a day or more (desirable behavior) No (%)	P
Mother's educational level	Illiterate/Primary school	50 (22.8)	3 (6.5)	<0.0001
	secondary school/high school/diploma	125 (57.1)	24 (52.2)	
	higher	44 (20.1)	19 (41.3)	
Father's educational level	Illiterate/Primary school	36 (16.4)	5 (10.9)	0.35
	secondary school/high school/diploma	124 (56.6)	24 (52.1)	
	higher	59 (27.0)	17 (37.0)	
Mother's job	Housekeeper	178 (81.3)	32 (69.5)	0.25
	Employee/Worker/Private	41 (18.7)	14 (30.5)	
Father's job	Employee	69 (31.5)	19 (41.3)	0.44
	Worker	67 (30.6)	12 (26.1)	
	Private	83 (37.9)	15 (32.6)	

The mean values of the constructs were as follows: perceived susceptibility 8.57 ± 3.11, perceived severity 26.55 ± 4.78, perceived benefits 13.08 ± 2.66 and perceived barriers 19.64 ± 6.63. Mann-Whitney U test showed statistically significant differences between those who were brushing twice a day or more and those who were brushing less than twice a day (table 2) concerning the perceived severity (P = 0.001) and perceived barriers (P = 0.0001).

In order to found out the relation between the desirable behavior (brushing at least twice a day), and independent variables, the logistic regression analysis was carry out with perceived severity, perceived benefits, perceived barriers and mothers' educational level. In agreement with results of the table 3, one unit increase in the perceived severity increased the possibility of desirable behavior 2.07 times (OR = 0.48, 95% CI = 0.27- 0.86, P = 0.014) and one unit increase in the perceived barriers increased the possibility of undesirable behavior 1.97 times, (OR = 1.97, 95% CI = 1.29- 3.02, P = 0.002). One unit decrease in mothers' educational level from higher than diploma degree to illiterate/primary school degree, increased the possibility of undesirable behavior 4.78 times (OR = 4.78, 95% CI = 1.24- 18.46, P = 0.023).

Table 2 Comparison of the Oral Hygiene Beliefs among the students with and without desirable brushing behavior

	Brushing less than twice a day	Brushing twice a day or more	P
	Mean (SD)	Mean (SD)	
Perceived susceptibility	8.53 (3.07)	8.74 (3.32)	0.65
Perceived severity	26.16 (4.80)	28.44 (4.25)	0.001
Perceived benefits	12.96 (2.71)	13.63 (2.33)	0.11
Perceived barriers	20.32 (6.61)	16.38 (5.79)	<0.0001

Table 3 Predicting factors in undesirable behavior among students based on the logistic model

	B	SE	Wald statistics	OR (95% CI)	P
Perceived Severity	-0.73	0.30	6.04	0.48 (0.27- 0.86)	0.014
Perceived Benefits	-0.04	0.23	0.03	0.96 (0.61-1.52)	0.856
Perceived Barriers	0.68	0.22	9.80	1.97 (1.29- 3.02)	0.002
Mother's educational level					
Higher than diploma				1 (ref.)	
Illiterate/Primary school	1.57	0.69	5.14	4.78 (1.24-18.46)	0.023
Secondary school/high school/diploma	0.64	0.39	2.70	1.90 (0.88-4.10)	0.100

Table 4 Comparison of the perceived severity and perceived barriers statements which have significant statistical correlations among the students with and without desirable brushing behavior

	Brushing less than twice a day (n = 219)			Brushing twice a day or more (n = 46)			
Statements	**Strongly disagree/ Disagree** N (%)	**No opinion** N (%)	**Strongly agree/ Agree** N (%)	**Strongly disagree/ Disagree** N (%)	**No opinion** N (%)	**Strongly agree/ Agree** N (%)	**P**
Perceived severity							
With Caries teeth, I could not eat well.	45 (20.5)	36 (16.4)	138 (63.1)	6 (13.0)	1 (2.2)	39 (84.8)	0.015
If I lose my teeth, I cannot speak well.	105 (47.9)	49 (22.4)	65 (29.7)	15 (32.6)	8(17.4)	23 (50.0)	0.034
Perceived barriers							
If I am tired, I will not brush my teeth	97 (44.3)	40 (18.3)	82 (37.4)	38 (82.6)	3 (6.5)	5 (10.9)	<0.0001
I am too lazy to brush my teeth regularly	104 (47.5)	40 (18.3)	75 (34.2)	34 (73.9)	7(15.2)	5 (10.9)	0.003
Sometimes, I am impatient to brush my teeth.	71 (32.4)	49 (22.4)	99 (45.2)	30 (65.3)	6 (13.0)	10 (21.7)	<0.0001

Along with all 265 participants, 45.3% agreed with this statement of perceived severity: "With Caries teeth, I could not eat well." This was the highest percent of students' agreement among the statements of perceived severity. This is one of the two statements of perceived severity that showed statistical significant correlations among the students with and without desirable brushing behavior according to the Chi-square test (table 4): "With Caries teeth, I could not eat well (P = 0.015); If I lose my teeth, I cannot speak well (P = 0.034).

Among the 265 sample students 71.7% agreed with the statement of: "Tooth brushing takes my time." In spite of this was the highest percent of students' agreement among the statements of

perceived barriers, it was not significant between two groups of students, with and without desirable brushing behavior. Comparison of the results of three other statements had statistically significant correlations among the students with and without desirable brushing behavior and it is shown in table 4 according to the Chi-square test: "If I am tired, I will not brush my teeth (P = 0.0001); I am too lazy to brush my teeth regularly (P = 0.003); Sometimes I am impatient to brush my teeth (P = 0.0001)". The results also showed that 50.8% agreed (16.3% had no opinion) with: "If I am tired, I will not brush my teeth.", 51.9% agreed (17.8% had no opinion) with: "I am too lazy to brush my teeth regularly." and 38.1% agreed (20.8% had no opinion) with: "Sometimes I am impatient to brush my teeth."

In perceived barriers, two physical barriers statements: "Tooth brushing is painful. My gums will bleed when I brush." were not statistically significant between two groups of students, but 41.1% agreed with painful tooth brushing and 39.6% agreed with gums bleeding. Overall 66.5% agreed with one of these two physical barriers during brushing.

Discussion

A survey in the literature of the world and Iran reveals very different percentages of students who were brushing a day regularly. Liu et al. in a recent study in Beijing-China reported that 98% of students brush at least once a day (24% once a day, and 74% twice a day or more) [21]. While Varenne et al. announced that 12% of students in rural areas of Burkina Faso brush at least once a day [22]. Saied-Moallemi et al. declared that 46% of the students in Tehran brush at least twice a day [20]. Hazavei et al. showed that 38.1% of the Hamadan students brush twice a day and 33.6% brush once a day [24]. And according to the study of Ramezankhani et al. in Dezful, 55.7% of the students brush at least once a day [23]. In our study less than half of the students were brushing once a day and just nearly one sixth of the students reported that they had desirable behavior or were brushing twice a day or more. These findings reveal necessity of planning educational interventions.

Analysis of the Oral Hygiene Beliefs and demographic variables predicting power shows that one unit increase in the perceived severity increases the possibility of desirable behavior more than two times. Review the literature in this field including studies of Solhi et al. Anagnostopoulos et al. Kühner and Raetzke, Stokes et al. Mazloomi and Roohani, Shamsi et al. show the significant difference between the construct and desirable behavior [12, 27-30, 35], but fewer studies such as those of Buglar

et al. and Hazavei et al. do not confirm the finding [18, 24]. Buglar et al. suppose that people do not consider dental caries as critical as other conditions. However, such results could be rooted in the differences of target groups in studies, as in Buglar et al. study whose participants were dental patients, so maybe they were weak in the perception of dental caries severity [18].

In this study, the perceived severity needs educational interventions [36]. This construct has a strong cognitive component and requires that one's belief about the serious negative consequences resulting from undesirable behavior to be built [15, 26]. As the result shows, in our participants well eating and speaking are important factors for choosing the desirable behavior among the perceived severity statement, so educational programs should consider influencing them. According to the literature, one of the suitable methods to influence perceived severity is lecture with slideshow [15]. It is recommended that during working with children in this age group (the concrete operational stage throughout the age 7 to about age 12) it would be better that teachers reduce the formal education as possible. If we assume that children will learn at a verbal level that is mistake because we think that a child learns just like us, therefore the course content has a higher level of understanding for the student. For this purpose teachers should try to put themselves in the position of children and provide learning opportunities with preparing different activities like direct educational experiences or educational materials that students could understand and belief the educational contents, for example by touching or seeing [37-39].

One score increase in the perceived barriers increases the possibility of undesirable behavior almost two times. This inverse relationship has been shown by many studies including Buglar et al. Solhi et al. Hazavei et al. Mazloomi and Roohani, Shamsi et al. Zamani, Vakili et al. Morowati Sharifabad and Shirazi, Stokes et al. [12, 18, 24, 27, 29-32, 40], but Anagnostopoulos et al. Kühner and Raetzke do not support this result [28, 35]. Reducing perceived barriers, as the most important construct which predict the behaviors [15], is one of the best plans to affect oral self-care [18]. Increasing the perceived severity through educational interventions decreases the perceived barriers indirectly and it should be considered in educational programs, but is not often possible easily to influence these. To modify barriers, students must be brainstorming all real and imagined barriers. Then, they must discuss in a large group about how each barrier can be overcome [15]. Planning useful educational

interventions for this age group (the concrete operational stage) is required attention to the application of Piaget's theory of cognitive development. Because children in this age group could be successful to accept the views of others during interacting with their peers. Meanwhile, because social interaction is possible throughout the use of language, it causes the development of child's verbal comprehension. Children learn from interaction with others and begin to think logically. So this interaction should be empowered and the most useful one is when a child builds an equal relationship with others. This relationship often observed in interaction with peers [37, 38].

According to the results of the comparison of the perceived barriers, the three statements have significant statistical correlations among the students with and without desirable brushing behavior: If I am tired, I will not brush my teeth (Tiredness); I am too lazy to brush my teeth regularly (Laziness); and sometimes, I am impatient to brush my teeth (Impatience). In addition, separately almost thirty percent of the students declared that tiredness or laziness are not barriers for teeth brushing behavior and nearly forty percent suggested that being impatience is not a barrier for this behavior.

Attention to the physical barriers showed that two statements: "Tooth brushing is painful. My gums will bleed when I brush." were not statistically significant between two groups with undesirable and desirable brushing behavior, but nearly 70 percent agreed with one of these two physical barriers during brushing. It means that at least 70 percent of students are brushing practices in incorrect ways. This result can be extended to their families and Iranian people too. Overcome this problem needs to learn the correct ways of brushing teeth. All of these conclusions represents that above psychological and physical barriers have the essential role on desirable brushing behavior frequency and its correctness. Therefore it should be considered as the key point in educational interventions.

In this study, the probability of an undesirable behavior in children whose mothers have no education or have primary education level is nearly five times that of students whose mothers have educational level higher than diploma. So that mothers' educational level has a high predictive power of the frequency of desirable daily brushing behavior in the students. Many studies confirm that tooth care habits among children of 6-12 years old, are seriously affected by mothers' educational level, their knowledge, attitude and attendance [20, 41-45]. Therefore, the necessity of promoting the women's educational level in

our country is emphasized as well as necessity of planning group educations and individual consultation programs. They are in need of appropriate and strategic planning with high quality and supervision on their execution. In addition revising the current plans of Education Ministry and Health and Medical Education Ministry are required. This will be realized just through coordinating of these two ministries.

Conclusion

Low percent of the desirable behavior reveals necessity of the educational interventions. Promoting educational level and educational programs for Iranian women are recommended. Planning useful educational interventions for the students of concrete operational stage is required attention to the application of cognitive development. Cooperation between Education Ministry and Health and Medical Education Ministry is needed as well. Educational interventions should focus on perceived severity and perceived barriers items that have significant statistical correlations among the students with and without desirable brushing behavior. At least 70 percent of Iranian people need to learn the correct way of brushing teeth.

Competing interests

The authors declare that they have no competing interests.

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