

Some of the Strongest Predisposing Factors on the Behavior of Tooth Brushing among Iranian School Age Children

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Abstract

Background

Oral Health is a criterion for general health. Oral diseases have a chronic process as well as multifactorial nature. Predisposing factors are the strongest factors in behavior formation at personal level. The aim of this study was to determine the strongest predisposing factors affecting oral health behavior among Iranian school age children.

Materials and Methods

This descriptive-analytical study was conducted on 441 students (9-12 years old) in Rafsanjan city, Iran. Researcher-made questionnaire was used as data collection tool designed based on the reviewing scientific references, text and qualitative research, consisted of three parts including 8 demographic questions, 8 predisposing factors (Knowledge, Attitudes, Perceived Susceptibility, Severity and Benefits, Subjective Norms, Motivation to Comply and Observational Learning) and checklist of weekly behavior of tooth brushing. Data were analyzed using SPSS version 16.0 software.

Results

Mean score of majority of constructs, except for Knowledge, were at optimum level. Frequency of tooth brushing behavior of twice and more per day was equal to 66.1%. There was a statistically significant positive relationship between tooth brushing behavior and Knowledge of students ($r=0.1$, $P<0.05$). According to multi-criteria regression analysis, Knowledge and perceived severity had the strongest predicting role in daily behavior of tooth brushing.

Conclusion

Perceived severity and knowledge were most important predisposing factor and predictor of tooth brushing behavior among children. Considering these factors in designing interventions to improve the behavior of brushing is recommended.

Key Words: Iran, Predisposing Factors, Students, Tooth Brushing Behavior.

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1- INTRODUCTION

Oral health touches every aspect of our lives, but is often taken for granted. Our mouth is a window into the health of our body (1). According to The European Association of Dental Public Health, promotion of dental public health is defined as the science and art of preventing oral diseases, promoting oral health and improving the quality of life through the organized efforts of society (2). Oral health is essential to general health and quality of life, 60–90% of school children and nearly 100% of adults have dental cavities (3). Oral and dental diseases such as decay and gingivitis would affect various aspects of human health such as food chewing disorder and digestive problems, bad breath, mouth cancer, growth retardation in children, speech problems, mental disorders, low self-esteem and confidence, reduced life expectancy and quality of life and the loss of more than 50 million hours of curriculum (4-8).

Oral and dental diseases such as dental cavity and periodontitis have behavioral specifications similar to systemic diseases with chronic process and multifactorial nature (9), so that they can be categorized into different dimensions including behavioral and non-behavioral factors. For instance, weak Knowledge and attitude is valuation rate of person for him/her health including improper diet such as eating high intake of sugary foods and low consumption of fruit, vegetables, and proteins, change in lifestyle, inaccessibility of children to oral and dental health services, social position and ignoring oral and dental health behaviors (lack of tooth brushing and non-use of floss) (3, 7, 10-14). To promote behaviors related to oral and dental health and to underpin a project in this field, factors affecting decision-making should be identified completely (3, 15). Undoubtedly, personal factors have a

vital role in behavior formation that might be predisposing factor for such behaviors. Predisposing factors lead to motivation or reason for a behavior. These factors consist of knowledge, attitude, beliefs, perceived values and needs, and abilities; indeed these are incentives of person's performance. From psychological perspective, these factors have emotional and cognitive aspects including knowing, believing, valuating, and having self-esteem or sense of efficiency (16, 17). It seems that these factors play a vital role in formation of oral and dental health behaviors (such as tooth brushing) like majority of behaviors and behavioral determinants.

Children and adolescences are the most valuable resource and capital of each society; hence, educational objectives of school will be realized if mental and physical health is realized. According to statistics (2011), average number of decayed, filled and missed permanent teeth of Iran's children is equal to 0.13, 0.004, 0.003, respectively, and total average is reported to 0.15 (18). Shooriabi et al. (2016), reported this indicator among Ahvaz children equal 5.8 (19). This index has been examined in Rafsanjan city that has been far from global index based on non-formal reports. According to undesired situation of this index among children and importance of personal factors in oral and dental health behaviors, this study was designed to determine some of the strongest predisposing factors on the behavior of tooth brushing among Iranian school age children.

2- MATERIALS AND METHODS

2-1. Study design and population

This descriptive-analytical study was conducted on 441 children (aged 9-12 years old). The setting of this target group were chosen secondary school course (fourth, fifth, and sixth grade students) in

Rafsanjan city, Kerman province, South East of Iran.

2-2. Methods

At first, received a letter of introduction and coordination was done with school administrators. Then educational grade was selected and parents were invited to participate in the coordination meeting. This session, we present objectives of plan and obtain parental consent. Also, the checklist of children's tooth brushing behavior in the past week was completed. Then we go to the classrooms and expressed study objectives. After completing the questionnaires, the data were analyzed using SPSS software.

2-3. Measuring tools: validity and reliability

Data collection tool consisted of three parts including 8 demographic questions (age, gender, grade, job and literacy level of parents and income status), predisposing factors and checklist for evaluation of tooth brushing behavior over one week. Predisposing factors were identified based on the review of scientific references, texts and using a qualitative research (Interpretation the perspective of dentists, parents, and health teachers of schools), and 8 factors including knowledge, attitude, perceived susceptibility, severity and benefits, subjective norms, motivation to comply, and observational learning were examined (**Table.1**).

Face and content validities of a group consisting of 10 experts (experts in health education and health promotion and dentists), were examined and confirmed. To determine reliability of tool, test-retest method (during 14-day), and interclass consistency of a 57-member group were used. Interclass correlation coefficient of questionnaire was obtained to 0.84 for Knowledge, and Cronbach's Alpha Coefficient obtained to 0.72 for attitude, to 0.66 for perceived susceptibility, to 0.9 for

perceived severity, to 0.78 for perceived benefits, to 0.73 for subjective norms, to 0.77 for motivation to comply, with 0.85 for observational learning, and total Cronbach's Alpha Coefficient obtained to 0.85. Other specifications of the data collection tool are mentioned in **Table.1**.

To evaluate behavior of tooth brushing, the checklist was used that its validity was confirmed by experts. This checklist assessed the behavior of tooth brushing (Morning, Noon, and Night) over one week. This checklist was completed by parents before completing student's questionnaires; accordingly, parents were invited and asked to explain the behavior of tooth brushing of their children after explaining research objectives and trust building. This behavior was explained by parents based on the results obtained from qualitative section to promote accuracy of behavior response.

2-4. Inclusion and exclusion criteria

Inclusion criteria were student and parents' consent and exclusion criterion was incomplete response to checklist and questions.

2.5-Ethical consideration

Some of ethical considerations at this study include: respecting confidentiality, anonymous of questionnaires, providing beneficiaries with results, reserving material and intellectual rights of research team.

2-6. Data Analyses

Data were analyzed using SPSS version 16.0 software accompanied by statistical tests of Pearson Correlation to investigate the correlation between independent and dependent quantitative variables (predisposing factors and tooth brushing behavior) and Multivariate regression in order to identify the strongest predisposing factors affecting the tooth brushing behavior at significance level of 0.05.

Table-1: Tools specification of predisposing factors associated with tooth brushing behavior

Variables	Number of Questions	Scale responsiveness	How responsiveness	Scores range
Knowledge	24	Multiple choice	Self-reported	0-24*
Attitude	7	Likert**	Self-reported	7-21*
Perceived susceptibility	3	Likert	Self-reported	3-9*
Perceived severity	10	Likert	Self-reported	10-30*
Perceived benefits	11	Likert	Self-reported	11-33*
Subjective norms	3	Likert	Self-reported	3-9*
Motivation to comply	3	Likert	Self-reported	3-9*
Observational learning	3	Likert	Self-reported	3-9*

*Earn a higher score represents greater knowledge and comprehension; ** All Likert response scale of the instrument, three-part includes completely agree, no idea and completely disagree.

3- RESULTS

Number of participants was equal to 441 members (40.6% male and 59.4% female). Literacy level of majority of participants was diploma. Other demographic features are presented in **Table 2**; so that earn a higher score represents greater knowledge and comprehension. Mean score of Knowledge was equal to 10.2 ± 3.1 , which is less than median score of knowledge and represents an undesirable status. In this study only less than 2% of students had desirable and acceptable knowledge level. The most important weakness points included knowledge of students about mental, psychological and social complications of inadequate oral and dental health. Mean score of attitude 18.5 ± 2.1 , perceived susceptibility 7.3 ± 1.4 , perceived severity 23.5 ± 4 , perceived benefits 29.4 ± 3.2 , subjective norms 8.2 ± 1.1 , motivation to comply 7.5 ± 1.5 , observational learning 7.1 ± 1.1 and

behavior of tooth brushing was equal to 6.4 ± 4 over a week. In this study, the mean score of knowledge was less than average and the mean score of other predisposing factors were favourable and close to the upper range. Also, frequency of tooth brushing behavior twice and more over a day was equal to 66.1% and tooth brushing less than twice over a day was equal to 33.9%. According to Pearson correlation test, there was a significant relation between behavior of tooth brushing and Knowledge of students ($r=0.1$, $P<0.05$). According to multivariate regression analysis, of predisposing factors, knowledge and perceived severity had been the strongest predictors of tooth brushing behavior. With per unit increases in knowledge, probability of tooth brushing behavior will increase 1.09; and per unit decrease in perceived severity, probability of tooth brushing behavior will increase 0.91 (**Tables 3, 4**).

Table- 2: Frequency distribution of demographic characteristics

Variables	Frequency distribution of demographic characteristics N (%)				
	Age (year)	9-10 163(38.2)	10-11 148(34.7)	11-12 116(27.2)	
Gender	Girl 262(59.4)		Boy 179(40.6)		
	Educational Grade	Fourth 122(27.7)	Fifth 176(39.9)	Sixth 143(32.4)	
Father's Literacy Level	Illiterate 8(2.1)	Primary 29(7.7)	Guidance 68(18)	Diploma 157(41.6)	Academic 115(30.5)

Mother's Literacy Level	Illiterate	Primary	Guidance	Diploma	Academic
	2(0.5)	43(11.3)	63(16.5)	152(39.9)	121(31.8)
Father's Job Status	Unemployed	Worker	Employee	Self-Employee	Retired
	9(2.1)	63(14.8)	161(37.7)	176(41.2)	17(4)
Mother's Job Status	Housewife			Employed	
	292(66.5)			147(33.5)	
Self-report family income	Excellent	Good	Moderate	Weak	
	122(29.4)	203(48.9)	79(19)	11(2.7)	

Table-3: Correlation between predisposing factors and tooth brushing behavior

Variables	Mean ± SD	Pearson correlation coefficient								
		Knowledge	Attitude	Perceived susceptibility	Perceived severity	Perceived benefits	Subjective norms	Motivation to comply	Observational learning	Tooth brushing behavior
Knowledge	10.2±3.1									
Attitude	18.5±2.1	0.26**								
Perceived susceptibility	7.3±1.4	0.16**	0.36**							
Perceived severity	23.5±4	0.27**	0.15**	0.008						
Perceived benefits	29.4±3.2	0.22**	0.33**	-0.001	0.48**					
Subjective norms	8.2±1.1	0.24**	0.37**	0.13**	0.3**	0.44**				
Motivation to comply	7.5±1.5	0.05	0.18**	0.03	0.34**	0.44**	0.38**			
Observational learning	7.1±1.1	0.01	0.03	-0.01	0.26**	0.3**	0.26**	0.33**		
Tooth brushing behavior	6.4±4	0.1	0.04	-0.03	0.02	0.03	0.01	0.004	0.03	1

** Correlation is significant at the 0.01 level (2-tailed),

* Correlation is significant at the 0.05 level (2-tailed).

Table-4: Result of Multivariate Regression Analysis for Correlation of Tooth Brushing Behavior

Variables	B	S.E	Wald	df	Sig	Exp (B)	95% CI for EXP (B)	
							Lower	Upper
Constant	1.59	1.48	1.15	1	0.28	4.9		
Knowledge	0.08	0.04	3.87	1	0.04	1.09	1.00	1.19
Attitude	0.02	0.07	0.08	1	0.77	1.02	0.88	1.17
Perceived susceptibility	-0.15	0.09	2.36	1	0.12	0.85	0.7	1.04
Perceived severity	-0.08	0.04	4.08	1	0.04	0.91	0.84	0.99
Perceived benefits	0.57	0.05	1.17	1	0.27	1.05	0.95	1.17
Subjective norms	-0.04	0.14	0.09	1	0.76	0.95	0.72	1.26
Motivation to comply	0.01	0.1	0.01	1	0.89	1.01	0.83	1.23
Observational learning	0.05	0.08	0.5	1	0.47	1.05	0.9	1.24

B: Regression coefficient; SE: Standard error in regression; Wald test: Statistical significance for each of the independent variables; DF: Degree of Freedom; Exp (B): Odds ratios; CI: Coefficient interval for Exp (B).

4- DISCUSSION

It is required to identify effective factors in order to improve behaviors related to oral and dental health and underpin a project in this field. Formation of health behaviors can be affected by predisposing, enabling and reinforcement factors. Predisposing factors are intensives and reasons for a behavior before its occurrence. These factors consist of knowledge, attitude, beliefs, values, perceived needs, and abilities of persons (16). In this research, Knowledge, attitude, susceptibility, perceived benefits and severity, subjective norms, motivation to comply and observational learning were examined as predisposing factors to shape behavior of tooth brushing. Knowledge has a key role as the first step in behavior change process. In this research, Knowledge of students was at undesired and unacceptable level that is directly related to behavior of tooth brushing; according to multivariate regression analysis, this factor was the second strong predictor of tooth brushing behavior among children. The major weakness of Knowledge among students was lack of information about negative effects, lack of moral and dental health and symptoms of dental cavity. In research conducted by Haleem et al. (2013), mean score of Knowledge of 10-12 years old children had an undesired status (20).

It is recommended that researchers design and implement interventional programs to promote knowledge of children in field of oral and dental health such promoting knowledge of dental cavity implications and improper oral and dental health, because Knowledge promotion would shape scientific attitudes and perceptions. Also, some media programs associated with children and adolescences can be employed to promote Knowledge of children in this field adding moral and dental health subjects to curriculum or school-based intervention programs.

Attitude is another predisposing factor, which means to some extent the considered behavior is desired, optimal, beneficial or joyful for the person so that this factor is related to judgments of the person about effects and implications of the behavior (16). In this research, children had an optimal attitude toward results and effects of tooth brushing (such as believing in behavior of tooth brushing as an optimal behavior, believing in effectiveness of toothbrush and toothpaste) in health of their teeth within promotion of oral and dental health, but there was not any significant correlation between attitude and behavior of tooth brushing among children. Although Ebrahimipour et al. (2014) have reported higher attitude as the factor affecting behavior shaping in their study (21), which has been approved by other studied (22, 23). In the research of Keikhaee et al., there was a significant relation between self-efficacy, barriers and oral-dental health behavior and there was not any significant correlation between attitude, perceived threat and oral-dental health behavior (24). Possibly, high score obtained in this research (18.5 out of 21), has been one of reasons for non-correlation between this variable and oral-dental health behavior among children.

Attitude is a set of beliefs and perceptions and of predisposing beliefs in health behavior, belief in vulnerability and belief in severity of an implication as well as perceived benefits of health behavior can be employed as the incentive and attitude to change health behavior (16). In this research, mean scores of perceived susceptibility, severity and benefits of children were acceptable so these factors can lead to formation of an acceptable attitude of children toward oral and dental health behaviors. Although, there was not any significant correlation between these variables and oral and dental health behaviors, multivariate regression analysis indicated perceived severity as a strong

predisposing factor that can predict behavior of tooth brushing among children. In this regard, Alexandrina et al. (2014), have reported a relation between emotional negligence and tooth brushing behaviour; also, Kabiri et al. have reported a relation between susceptibility, perceived severity and benefits, with oral-dental health behavior (22, 23). Although Buglar et al., have introduced barriers and self-efficacy as predictors of tooth brushing behavior (25). According to the age of participants and their related conditions, attitude, perceived susceptibility, and severity of them might have no scientific reason; it means that such behavior might just be their personal opinion regardless of scientific information although some attitudes and perceptions such as believing in being at risk, and believing in serious implications of no confirmatory of oral and dental health might shape more logical and sustainable behavior in children. Accordingly, we recommend scientific methods such as interviews to assess attitudes and perceptions of children. If necessary, implemented intervention programs with discussion groups and explain the experiences methods for the formation of attitudes and perceptions rational and sustainable. Also, recommended the use of family-based intervention programs.

Subjective norms are other predisposing factors considered in this research. Subjective norms are the perceived social pressures by the person to behave, so it is the reflection of social influence on person that can lead to behavior intention accompanied by motivation to comply (16). Mean score of these two variables were high among children; however, there was not any correlation between these variables and behavior of tooth brushing among children that such results have been reported in some other studies (10, 24); although Ebrahimpour et al., have mentioned subjective norms as factor

affecting considered behavior (21), that its reason might be attention, accuracy, hints and tips of parents that might lead to obtain high scores in these variables. Multivariate regression analysis also indicated these variables as weak predictors for oral and dental health behavior. Observational learning is the 8th predisposing factor. Bandura introduced three factors affecting learning that one of them was observational learning (26); seemingly, observational learning can play a vital role in shaping behavior of children. Mean score of observational learning in tooth brushing behavior of children (7 out of 9), was at optimum level. Students learn from parents and friends as ideal persons so this variable can be considered as an effective factor in shaping tooth brushing behavior, although there was not any significant relation between this variable and tooth brushing behavior. However, other studies have underlined the role of friends and family in formation of other behaviors (13, 27). Frequency of tooth brushing behavior (65%), had an optimal level, Similar to this study, Charkazi et al. (2016), frequency of tooth brushing behavior among teens reported 73 percent and 62 percent in the Hosseini et al study (28, 29).

But the main question is whether this behavior is done correctly; hence, it is recommended examining the skill of correct tooth brushing. According to multivariate regression analysis, of predisposing factors, Knowledge and perceived severity were the strongest predictors of this behavior at personal level. It means that an increase in Knowledge would lead to 1.09 unit increases in behavior of tooth brushing; whereas, this relation is reverse when perceived severity is considered, so that an increase in perceived severity in children would lead to 0.9 decreases in tooth brushing behavior. It should be noted that excessive increase in perceived severity

among children would direct them to fear control process and denial of negative implications of non-performance of such behavior. Hence, children should be guided to control the risk considering their age and characteristics having required susceptibility to create such perceptions. Since such behavior is related to personal and environmental factors, it is recommended conducting some studies to evaluate influential power of behavioral factors on behavior of tooth brushing, to identify the strongest factor and to determine scientific interventions considering needs. It is suggested that other social factors such as the family should be considered, that the importance of their role has been emphasized in other studies (30, 31).

4-1. Limitations of the study

How responsiveness of questions (self-report), and considering just the predisposing factors as influential factors in the behavior of brushing were limitations of the present study.

5- CONCLUSION

Personal factors, as predisposing factors, can have a vital role in shaping the behavior. In this research, predisposing factors associated with behavior of tooth brushing among children were extracted and examined based on the review of scientific texts and references and qualitative research. The obtained results showed that Knowledge and perceived severity are two predisposing factors and strong predictors in shaping tooth brushing behavior in children. It is recommended conducting studied to identify enabling and reinforcement factors of such behavior and examining their correlations with tooth brushing behavior of children in order to provide scientific results that can be used for interventional programs by Stakeholders.

6- CONFLICT OF INTEREST: None.

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