Original Paper

The Effect of Educational Intervention Based on the Health Belief Model on Oral and Dental Health Behavior in Pregnant Women

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ABSTRACT

Introduction: The World Health Organization recognizes oral health as an integral part of public health and believes that untreated oral diseases may greatly affect the quality of life, especially in pregnant mothers who should maintain their health and their babies' health.

Objective: This study aimed to determine the effect of educational intervention based on a health belief model on oral and dental health behavior in pregnant women.

Materials and Methods: In this randomized clinical trial, 110 pregnant mothers attending 15 health centers in Rasht City, Iran (a total of 33 centers) were randomly allocated to case and control groups. After the analysis of pretest data (collected using a psychometric questionnaire), an intervention was designed and executed based on the Health Belief Model (HBM). Post-test was administered three months after the intervention and the obtained data were analyzed by using the Chi-square and independent and linear regression test.

Results: The majority of the mothers in the case (83.6%) and control (89.1%) groups were 18-30 years old and most mothers in the case (45.5%) and control (58.2%) groups had high school education. The Mean±SD score of awareness, different constructs of HBM, and performance increased significantly in the case group after the intervention (P<0.05). The Mean±SD score of performance was 35.45±12.52 in the case group before the intervention and it increased to 77.26±9.33 three months after the intervention (P<0.05).

Conclusion: The results showed that intervention based on this model enhanced oral and dental health behaviors. The results also suggested that the mothers lacked adequate awareness and had a poor performance in adopting oral and dental health behaviors. This model can be used as a framework for designing and implementing educational interventions to decrease dental caries.

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Highlights

● Oral and dental health is a crucial aspect of public health.

● Oral hygiene during pregnancy can impact maternal and fetal health.

● Teaching pregnant mothers can affect maintaining good oral hygiene.

● The training of pregnant mothers based on the health belief model in the present study affected their oral and dental health behaviors.

Plain Language Summary

Dental caries, as one of the most common diseases, threatens all age and sex groups, but some groups are more vulnerable. Maternal oral and dental diseases are indirect risk factors for premature birth and low birth weight. The factors that increase the likelihood of dental caries during pregnancy are overlooking oral health, consuming sweets, and changes in mouth acidity. Also, nausea and vomiting are common in early pregnancy and lay the grounds for caries. Hormonal and nutritional changes provide a suitable condition for gum diseases and dental caries in pregnant mothers. On the other hand, healthcare practices that are easily done in normal conditions may be hindered in pregnant women. This study aimed to determine the effect of educational intervention based on a special model on oral and dental health behavior in pregnant women. The awareness of the mothers was not enough before the intervention in our study and they had a poor performance in adopting oral health care behaviors. But after the intervention, their awareness increased. As for the frequency of brushing, about one-third of the mothers brushed their teeth once daily before the education but most of them brushed twice daily after the education. These results indicate the effect of education on oral health in pregnant mothers.

Introduction

Oral and dental health is an important aspect of public health. It is also one of the main programs of the World Health Organization (WHO) in the area of chronic disease prevention and health promotion. Additionally, the main objectives of oral hygiene become more specific for the enhancement of the quality of oral hygiene systems [1]. {MazloomiMahmoodabad, 2008 #41} Oral health is an important component of general health and its recognition is essential for designing oral and dental health interventions [2]. Overlooking oral and dental health results in many diseases like dental caries, gingivitis, dental plaque, and periodontitis [3]. Dental caries and periodontal diseases are among the most prevalent diseases in society [4].

It is hard to find people who lack dental caries in their lifetime [5]. In general, more than 99% of people have caries [6]. Although dental caries, as one of the most common diseases, threatens all age and sex groups, some groups are more vulnerable due to their special physiologic conditions [7, 8].

The factors that increase the likelihood of dental caries during pregnancy are overlooking oral health, consuming sweets, hormonal changes causing gestational gingivitis, changes in mouth acidity, and nausea and vomiting that are common in early pregnancy and lay the grounds for caries [9]. Hormonal and nutritional changes provide a suitable condition for gum diseases and dental caries in pregnant mothers. On the other hand, healthcare practices that are easily done in normal conditions may be hindered in pregnant women [8, 10]. Nausea and vomiting in early pregnancy also predispose the expecting mother to dental caries and increase the odds of gingivitis. Oral and dental problems lead to disorders in nutrition and the digestive system as well as other systems [11].

Metabolic changes like changes in hormonal levels affect the oral metabolism of pregnant mothers and prepare the conditions for periodontal diseases [12]. Maternal periodontal diseases are indirect risk factors for preterm birth and low birth weight via transferring bacterial products like endotoxins and the inflammatory mediators produced by the mother [13, 14].

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The results of a study showed that while 96.8% of the mothers agreed with dental checkup during pregnancy, 55.9% undertook it [15]. Another study showed that only 35% of mothers performed oral and dental care during pregnancy [16]. In this regard, Saddki et al. reported that only 29% of the mothers had dental visits during pregnancy, and the mothers who reported dental visits were those who received education before pregnancy and were aware of the relationship between oral health and pregnancy outcomes [17].

Many expecting mothers believe that dental procedures during pregnancy are harmful to them or their babies [18]. Education and provision of prenatal care, safe delivery, and postpartum care are important components of reproductive health and play an important role in the health of pregnant mothers [19]. These studies indicate the need for educational interventions for oral hygiene improvement, and the first step in prevention is to enhance the culture of health and prevention in people [20].

Today, the health care providers' approach to health education has changed, and traditional educational interventions have been replaced with model-based educational interventions [3]. The Health Belief Model (HBM) is one of the most effective educational models for health improvement. This model was designed in the early 1950s and developed gradually since then. This model is mainly used for disease prevention [21, 22]. It uses the constructs of perceived severity, perceived susceptibility, perceived benefits, perceived barriers, cue to action, and self-efficacy to predict the behavior [23]. This model has been suggested as an effective model for oral health [24]. Regarding the importance of oral hygiene during pregnancy, this study aimed to determine the effect of educational intervention based on HBM on oral and dental health behavior in pregnant women.

Materials and Methods

The subjects of this randomized clinical trial study were selected from expecting mothers attending 15 health centers of Rasht City, Iran (a total of 33 centers), and randomly allocated to case and control groups. One hundred and ten samples were required according to a study by Shamsi in the area of postintervention performance (SD of health behavior 9.1 and 9.8 before and after education respectively) [7] and the test power is 80% and a confidence interval of 95%. From July 2015 to September 2015, a certain number of the participants proportional to the population coverage by the center were randomly selected using a simple random sampling method at each center.

The inclusion criteria were primiparity, lack of advanced oral, dental, and gingival diseases, ability to read and write, lack of occupation in fields related to dentistry, gestational week, and willingness to participate in the study. Initially, the selected sample was more than 110 to replace some pregnant mothers who did not wish to continue the research and underwent abortion.

The data were collected using a psychometric questionnaire developed by Shamsi et al. and with his permission [25]. It included questions on awareness, HBM constructs, and performance as follows: Perceived susceptibility with 8 questions (for example to what extent the mothers thought they had exposed to dental caries); perceived severity with 7 questions (about the consequences of dental caries for the mother or fetus), perceived benefits with 10 questions (on the advantages oral and dental health care behaviors and their benefits like prevention of dental caries, etc.), perceived barriers with 14 questions (items like costs, unfamiliarity with correct techniques of brushing and flossing, etc.), and self-efficacy with 8 questions (ability to brush and floss correctly, etc.). Finally, cue to action had 8 questions (accelerators of the need for health care in the mother such as the dentist, midwife, spouse, and so on). All questions were rated based on a 5-point Likert scale, and the questions of the cue to action were calculated as cumulative frequency.

The performance section included 14 questions in different areas like the way of brushing and flossing, regular dental visits, use of fluoride mouthwash after nausea and vomiting. The first two items were evaluated using direct observation of the mother's performance on dental models. The mothers' self-reports were used to record their performances in other areas. The score of the questions in the constructs of perceived susceptibility, severity, benefits, barriers, and self-efficacy ranged from 1 to 5 (1. completely disagree; 2. Disagree; 3. No idea; 4. Agree; 5. completely agree). The total score of each construct was calculated out of a score of 100. (Each correct behavior received a score of 1 and each wrong behavior received a score of 0 in the performance checklist).

After collecting data, the multivariate linear regression analysis was used to identify the educational needs and to determine the construct that should be used in educational sessions. After needs assessment in this stage and according to the designed model, an educational intervention by the researcher was designed for the intervention group (10-15 people in each group in 6 sessions for 30-45 minutes). The educational intervention based on the model was composed of a combination of direct edu-

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cation, including group discussion, lecture, question and answer, brainstorming, practical demonstration, and indirect education such as educational pamphlet booklet.

The purpose and content of the training were based on the training goals and the resources of the Ministry of Health and Medical Education, including what mothers need to know about how to get oral and dental care during pregnancy. The data were collected from case and control groups 3 months after the intervention. The data collection steps are shown in Figure 1. The obtained data were described as mean with standard deviation for quantitative and frequency with percentage for qualitative variables. Multivariate linear regression analysis was used to identify the educational needs and to determine the constructs that should be used in educational sessions. Two groups were compared using the independent t-test and Chi-square test based on the type of variables and the normality of the data. All analysis was performed in SPSS version 16. After completing the data collection process, the prepared training pamphlet was provided to the control group members.

Results

The majority of the mothers in the case (83.6%) and control (89.1%) groups were 18-30 years old. The gestational age of 67.3% and 78.2% of the mothers in the case and control group was 14-28 weeks. The results showed that most mothers in the case (45.5%) and con-

trol (58.2%) groups had a high school education. Most mothers had health insurance and were housewives, and most of their husbands were self-employed. As for the frequency of brushing, 38.2% of the mothers brushed their teeth once daily before the intervention and 83.6% of them brushed twice daily after the intervention in the case group. Also, 38.2% of the mothers brushed once daily before the intervention and 49.1% of them brushed twice daily after the intervention in the control group. Regarding flossing, 67.3% of the mothers in the case group did not floss before the intervention but 70.9% of them flossed twice daily after the intervention with no significant difference. Also, 52.7% of the mothers in the control group did not floss before the intervention and 58.2% of them flossed once daily after the intervention. The frequency of brushing and flossing increased in both groups but the increase was significantly greater in the case group versus the control group.

Regression analysis was used to determine the predictability and preparation of educational material. Regression analysis revealed that awareness and perceived susceptibility and perceived barriers as independent variables explained 20% of the variance of performance as a dependent variable in pregnant women (Table 1). It should be mentioned that based on regression analysis, the predictability power of awareness (β=0.382) and the constructs of perceived susceptibility (β=-0.263) and perceived barriers (β=-0.367) were more than other items. Regression analysis results were not significant

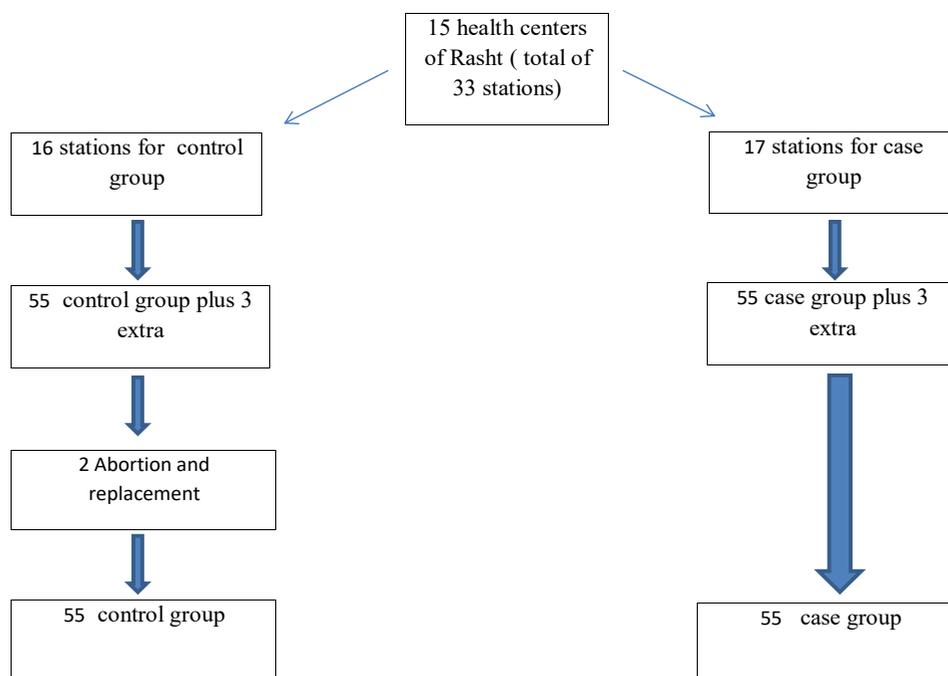**Figure 1.** CONSORT (Consolidated Standards of Reporting Trials) flow diagram

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Table 1. The predictive power of knowledge and constructs of the health belief model in performance

Variable	B Standardized	Sig.*
Knowledge	0.382	0.001
Perception sensitive	-0.263	0.02
Perceived severity	0.145	0.3
Perception benefits	-0.270	0.09
Perception barriers	-0.367	0.001
Perception self-efficacy	0.162	0.09

*Multivariate linear regression

Table 2. Comparison of the mean scores of Health Belief Model constructs before and after the intervention in the study groups

Model Structure	Groups	Mean±SD	
		Before the Intervention	After the Intervention
Knowledge	Case	44.44±14.39	87.6±11.65
	Control	49.41±13.73	63.72±13.12
Sig.*		0.067	0.0001
Perception sensitivity	Case	72.09±9.47	90.04±5.64
	Control	75.86±11.94	83.68±10.53
Sig.*		0.069	0.0001
Perceived severity	Case	80.47±6.41	94.3±5.12
	Control	80.16±9.03	86.07±7.24
Sig.*		0.836	0.0001
Perception benefits	Case	84.18±6.72	96.32±4.53
	Control	84.65±8.39	87.89±7.66
Sig.*		0.745	0.0001
Perception barriers	Case	48.04±9.16	30.07±7.47
	Control	49.9±10.33	44.14±9.69
Sig.*		0.32	0.00001
Perception self-efficacy	Case	74.86±10.51	95.22±4.14
	Control	81.72±10.39	85.18±9.52
Sig.*		0.001	0.0001
Performance	Case	35.45±12.52	77.26±9.33
	Control	39.6±18.58	49.6±14.37
Sig.*		0.172	0.0001

* t-test

Table 3. Frequency of internal and external cues to action regarding adopting oral health behaviors before the intervention

External Cues to Action (Promoting Oral Health Behaviors)	No. (%)		Sig.*
	Case	Control	
	Before the Intervention	Before the Intervention	
Midwife clinic	9 (16.4)	15 (27.3)	
Doctor	9 (16.4)	11 (20)	
Dentist	10 (18.2)	11 (20)	
Spouse	15 (27.3)	12 (21.8)	0.3
Parent	-	-	
Friends	-	-	
Magazines and Media	12 (21.8)	6 (10.9)	
Pamphlets and booklets	-	-	

Internal Cues to Action (Promoting Oral Health Behaviors)	No. (%)		Sig.*
	Case	Control	
	Before the Intervention	Before the Intervention	
Toothache	6 (10.9)	3 (5.5)	
Fear of having to Decay	18 (32.7)	27 (46.1)	0.16
Fetal health	19 (34.5)	11 (20)	
A sense of peace and joy	12 (21.8)	14 (25.5)	

* Chi-square test

for other constructs. Therefore, perceived susceptibility should increase for the mothers to find themselves exposed to the risk of dental caries. Besides, awareness should increase to boost perceived susceptibility. On the other hand, the barriers should be removed for the mothers to improve their performance.

Table 2 presents no significant difference between the two groups except in perceived self-efficacy before the intervention while the difference was significant after the intervention.

Tables 3 and 4 show the relative frequency distribution of internal and external cues to action in case and control groups before and after the intervention. Before the intervention, there was no significant difference in external and internal cues to action between the two groups while after the intervention, internal and external cues to action became significant in both groups.

Discussion

Considering the results, the awareness of the mothers was not enough in our study and they had a poor performance in adopting oral health care behaviors. The difference in the mean score of awareness between the two groups before the intervention did not differ significantly. However, the mean score of awareness increased after the intervention and the difference in the mean score of awareness was significant between the two groups. Although the mean score of awareness increased significantly in the control group after the intervention it could be due to the arousal of curiosity in the control group following the distribution of the questionnaire among them persuading them to seek answers to the questions, which eventually increased their awareness. In Shamsi et al. study, the mean score of awareness increased, and the difference was significant [7]. Moreover, Mohebi reported that the mean score of awareness in the case and control group increased, and the difference was significant in the post-test [4].

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Table 4. Frequency of internal and external cues to action regarding adopting oral health behaviors after the intervention

External Cues to Action (Promoting Oral Health Behaviors)	No. (%)		Sig.*
	Case	Control	
	After the Intervention	After the Intervention	
Midwife	-	21 (38.2)	
Doctor	12 (21.8)	8 (14.5)	
Dentist	19 (34.5)	8 (14.5)	
Spouse	9 (16.4)	12 (21.8)	0.0001
Parent	-	(5.5)3	
Friends	6 (10.9)	-	
Magazines and media	6 (10.9)	3 (5.5)	
Pamphlets and booklets	3 (5.5)		

Internal Cues to Action (Promoting Oral Health Behaviors)	No. (%)		Sig.*
	Case	Control	
	After the Intervention	After the Intervention	
Toothache	6 (10.9)	-	
Fear of having to Decay	(21.8)12	30 (54.5)	0.001
Fetal health	16 (39.1)	11 (20)	
A sense of peace and joy	21 (38.2)	14 (25.5)	

*Chi-square test

Haerian showed a significant increase in the level of awareness in both groups after health education [2]. However, the results of the Hajimiri study revealed that the level of awareness decreased in the control group and increased significantly in the case group following education [26].

The level of awareness has increased in most studies but the mean score of awareness is different in various investigations. This difference may be related to maternal age at the provincial level. Moreover, this difference can be attributed to differences in the study populations or economic status. The awareness of the mothers may also be different depending on the education they receive from the personnel in each geographical location.

The score of oral health performance did not have a significant difference between case and control groups before the intervention. However, the score of performance increased in both groups after the intervention, leading to a significant difference between the two groups. Finally, the results of the study showed that following the HBM intervention, the performance of the case group improved significantly. An improvement in the performance was also observed in the control group, which was probably due to the curiosity arousal and awareness raising. However, the increase was greater in the case group, indicating the effect of education based on the HBM.

In our study, the mothers showed a weak performance in adopting oral health care behaviors. The effective factors in this regard may be physiological, hormonal, or physical changes of the mothers during pregnancy, which keeps them from adopting appropriate oral health care behaviors besides causing exhaustion and tiredness.

Likewise, Hajimiri et al. [26] and Sohrabi Vafa [27] reported a significant increase in performance in the case group following education. In the Bahri study, the two groups had no significant difference in the score of performance before the intervention while the score of short-term performance immediately after the intervention was significantly higher in the case group compared to the control group [28].

Many studies have shown the effectiveness of the HBM in producing preventive behaviors, but their constructs

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with the power of predictability are different (maybe due to the aforementioned reasons). In the Shamsi study, self-efficacy and barriers were the key predictors of oral health care behaviors [8]. In Badri Garegari study, the findings showed that self-efficacy for the use of dental floss, perceived susceptibility, and perceived barriers of the use of dental floss were 3 predictors of the use of dental floss [20]. Moreover, in another study, they reported that demographic variables like age, economic status, and frequency of tooth brushing and flossing explained up to 41.2% of the variance of preventive behaviors [29]. Self-efficacy and perceived barriers explained 29% of the variance of behavior in Mazloomi study on students in Yazd, Iran [1], and 16% of the variance in another study performed on students in Qazvin [30].

Therefore, the constructs of this model can be used as a reference framework for designing oral health educational interventions in pregnant mothers.

The HBM intervention in the present study improved oral health behaviors in pregnant mothers. This intervention caused positive significant changes in the awareness and constructs of the HBM and decreased the perceived barriers. One of the limitations of this study was the use of self-reports to collect part of the data related to other attitudes. Moreover, the results of this study were obtained from pregnant mothers attending Rasht health centers and may not be generalized to all pregnant mothers, especially mothers who visit private dental clinics for severe dental problems. Therefore, pregnant mothers visiting private dental clinics should also be evaluated in future studies to obtain generalizable results. But, the constructs of this model can be used as a reference framework for designing oral health educational interventions in pregnant mothers. The findings also suggested that the mothers lacked adequate awareness and had a poor performance in adopting oral and dental health behaviors. Therefore, considering the sensitivity and susceptibility of the mothers, appropriate plans should be designed and executed to prevent oral and dental diseases in this group.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles were observed in this research. The study participants were informed about the purpose of the research and its procedure and signed an informed consent form. They were also assured about the confidentiality of their information. Moreover, they were allowed to leave the study whenever they wished,

and if desired, the results of the research would be available to them. The study protocol has been approved by the Ethics Committee of Guilan University of Medical Sciences. The research protocol was registered at the Iranian Clinical Trial Registry (code: IRCT2015072423294N1).

Authors contributions

Study designing: All authors; Conceptualization and supervision: Abdolhosein Emami Sigaroudi and Rabiollah Farmanbar; Support for the study design: Golpar Radafshar; Data collection, assembly, possession of raw data, drafting the final report: Sahar Nickbin Poshtamsary; Data analyses: Zahra Atrkar Roushan; Approval of the final manuscript, and accountability and all aspects of the work: All authors.

Conflict of interest

The authors declare that they have no conflict of interests.

References

[1] 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) (Persian)]. Journal of Birjand University of Medical Sciences. 2008; 15(3):40-7. http://journal.bums.ac.ir/article-1-341-en.html

[2] Haerian-Ardakani A, Mohmedi M, Mazloomi Mahmodabad SS, Akbari S, Zare D. [Comparison of the effect of oral health education delivered by a dental student and health volunteers on the knowledge, attitude and performance of housewives (Persian)]. The Journal of Toloo-e-Behdasht. 2013; 12(3):184-93. http://tbj.ssu.ac.ir/article-1-715-en.html

[3] Moini B, Ghaderi A, Hazavehie SM, Allahverdipour H, Moghimbeigi A, Jalilian F. [A comparative study of peer education and trainer education on the basis of Health Belief Model (HBM) in improving oral health in Sanandaj boys' elementary schools (Persian)]. The Journal of Toloo-e-Behdasht. 2013; 12(2):1-13. http://tbj.ssu.ac.ir/article-1-553-en.html

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[4] Mohebbi SZ, Yazdani R, Mirmolaei ST, Tartar Z, Janeshin A. [Effect of an educational intervention about midwifery students' knowledge and preparedness on oral health care in pregnant mothers (Persian)]. Journal of Dental Medicine. 2013; 26(4):306-13. http://jdm.tums.ac.ir/article-1-5099-en.html

[5] Emami Moghadam Z, Ajami B, Behnam Vashani HR, Sardarabady F. [Perceived benefits based on the health belief model in oral health related behaviors in pregnant women, Mashhad, 2012 (Persian)]. The Iranian Journal of Obstetrics, Gynecology and Infertility. 2013; 16(44):21-7. [DOI:10.22038/IJOGI.2013.654]

[6] Mehri A, Morowatisharifabad M. [Utilizing the Health Promotion Model to predict oral health behaviors in the students of Islamic Azad University of Sabzevar (2008) (Persian)]. Journal of Dental Medicine. 2009; 22(1):81-7. http://jdm.tums.ac.ir/article-1-157-en.html

[7] Shamsi M, Hidarnia AR, Niknami Sh, Rafiee M, Karimi M. [The effects of educational programs based on health belief model on oral health behavior of pregnant women in Arak city (Persian)]. Avicenna Journal of Nursing and Midwifery Care. 2012; 20(2):12-22. http://nmj.umsha.ac.ir/article-1-1110-en.html

[8] SHamsi M, Hidarnia A, Niknami S. [Predictors of Oral Health Care in Pregnant Women Based on Health- Belief Model (Persian)]. Journal of Health System. 2012; 8(4):624-34. http://hsr.mui.ac.ir/index.php/jhsr/article/view/494

[9] Ilderabadi E. [Text book of community health nursing 1, 2, 3 (Persian)]. Tehran: Jame-e-Negar; 2014. http://opac.nlai.ir/opac-prod/bibliographic/3638118

[10] Shamsi M, Hidarnia AR, Niknami Sh. [A survey of oral health care behavior in pregnant women of Arak: application of health belief model (Persian)]. Journal of Mazandaran University of Medical Sciences. 2012; 22(89):104-15. http://jmums.mazums.ac.ir/article-1-1085-en.html

[11] Hajikazemi ES, Hossein Mohseni Sh, Oskouie SF, Haghani H. [The association between knowledge, attitude and performance in pregnant women toward dental hygiene during pregnancy (Persian)]. Iran Journal of Nursing. 2005; 18(43):31-8. http://ijn.iums.ac.ir/article-1-7-en.html

[12] Torabi M, Karimi Afshar SA, Sheikhzadeh A, Karimi Afshar M. [Assessment of oral health indices in Kerman adults aged 35-44 years (Persian)]. Journal of Isfahan Dental School. 2009; 5(2):93-8. http://jids.mui.ac.ir/index.php/jids/article/view/158

[13] Little JW, Falace DA, Miller CS, Rhodus NL. Pregnancy and Breast Feeding.in: Little and Falace's Dental management of the medically Compromised patient. 8th ed. Canada: Elsevier; 2013. pp. 271-83. "http://dl.qatre.net/files2/Little_and_Falaces_Dental_Management_of_the_Medically_Compromised_Patient_8th_edition_2013.

[14] Newman MG, Takei HH, Klokkevold PR, Carranza FA. Carranza s clinical periodontology. Canada: Elsevier; 2015. pp. 437-47.

[15] Bamanikar S, Kee LK. Knowledge, attitude and practice of oral and dental healthcare in pregnant women. Oman Medical Journal. 2013; 28(4):288-91. [DOI:10.5001/omj.2013.80] [PMID] [PMCID]

[16] Keirse MJNC, Plutzer K. Women's attitudes to and perceptions of oral health and dental care during pregnancy. Journal of Perinatal Medicine. 2010; 38(1):3-8. [DOI:10.1515/jpm.2010.007] [PMID]

[17] Saddki N, Yusoff A, Hwang YL. Factors associated with dental visit and barriers to utilisation of oral health care services in a sample of antenatal mothers in Hospital Universiti Sains Malaysia. BMC Public Health. 2010; 10:75. [DOI:10.1186/1471-2458-10-75] [PMID] [PMCID]

[18] Kandan PM, Menaga V, Kumar RRR. Oral health in pregnancy (guidelines to gynaecologists, general physicians & oral health care providers). The Journal of the Pakistan Medical Association. 2011; 61(10):1009-14. [PMID]

[19] Hajipour L, Hosseini Tabaghdehi M, Taghi Zoghi Z, Behzadi Z. [Empowerment of pregnant women (Persian)]. Journal of Holistic Nursing and Midwifery. 2016; 26(3):16-24. http://hnmj.gums.ac.ir/article-1-751-en.html

[20] Badri Garegari R, Salake Hadadian N. [The role of self-efficacy and factors of health belief model in dental patients' brushing and flossing (Persian)]. Nursing and Midwifery Journal. 2011; 9(3):130-8. http://unmf.umsu.ac.ir/article-1-374-en.html

[21] Sheeran P. The Health Belief Model.in: Conner M, Norman P.editors.Predicting and changing Health Behaviour. 3th ed. London: McGraw-Hill; 2015. pp. 30-69.

[22] Solhi M, Shojaei Zadeh D, Seraj B, Faghih Zadeh S. [A new model for oral health education (Persian)]. The Journal of Qazvin University of Medical Sciences. 2000; 3(4):3-11. http://journal.qums.ac.ir/article-1-605-en.html

[23] Safary M, SHojaizade D, GHofranipoor F, Hidarnia A, Pakporhajiagha A. Health Belief Model in: Theories, models and methods of health education and health promotion. 2th ed. Tehran: Publish sobhan; 2012. PP. 53-63.

[24] Solhi M, Shojaei Zadeh D, Seraj B, Faghih Zadeh S. The application of the health belief model in oral health education. Iranian Journal of Public Health. 2010; 39(4):114-9. [PMID] [PMCID]

[25] Shamsi M, Hidarnia AR, Niknami Sh, Rafiee M. [Development and psychometric assessment of an oral health instrument based on health belief model in pregnant women (Persian)]. Journal of Arak University of Medical Sciences. 2012; 15(6):45-56. http://jams.arak-mu.ac.ir/article-1-1418-en.html

[26] Hajimiri Kh, Sharifirad GR, Hasanzadeh A. [The effect of oral health education based on health belief model in mothers who had 3-6 year old children on decreasing dental plaque index in Zanjan (Persian)]. Journal of Advances in Medical and Biomedical Research. 2010; 18(72):77-86. http://zums.ac.ir/journal/article-1-1224-en.html

[27] Sohrabi Vafa M, Moeini B, Hazavehei SMM, Soltanian AR, Rezaei L. [The effect of education based on Health Belief Model (HBM) in decreasing dental plaque index among first grade of middle-school girl students in Hamadan (Persian)]. Nursing and Midwifery Journal. 2013; 11(8):639-48. http://unmf.umsu.ac.ir/article-1-1521-en.html

[28] Bahri N, Iliati HR, Bahri N, Sajjadi M, Boloochi T. [Effects of oral and dental health education program on knowledge, attitude and short-time practice of pregnant women (Mashhad-Iran) (Persian)]. Journal of Mashhad Dental School. 2012; 36(1):1-12. [DOI:10.22038/JMDS.2012.831]

[29] Shamsi M, Hidarnia AR, Niknami Sh, Atarha M, Jadidi R. [Oral health of pregnant women in Arak, Iran (Persian)]. Payesh. 2013; 12(4):355-65. http://payeshjournal.ir/article-1-357-en.html

[30] Pakpour-Hajiagha A, Heidarnia A, Hajizadeh E. [Oral health status and its determinants in a sample of Iranian adolescents in Qazvin (2010) (Persian)]. The Journal of Qazvin University of Medical Sciences. 2011; 15(3):54-60. http://journal.qums.ac.ir/article-1-1154-en.html