



Application of Health Theories and Models of Health Education and Promotion in Nutritional Interventions for Pregnant Women in Iran: A Systematic Review

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ABSTRACT

Aims Pregnancy is an important part of a woman's life, and the growth of the fetus and its health depend on the health and well-being of the mother. Therefore, this study aimed to systematically investigate the studies conducted based on models and theories of health education and health promotion in pregnant women's nutritional interventions in Iran.

Information & Methods In order to access Persian articles in Iran and Iranian articles published abroad, related domestic banks (Magiran, SID, IranDoc), foreign (Web of Science, Scopus, Proquest, PubMed, Medlib) as well as Google Scholar search engine, the search was conducted between 1990 and 2019. The Cochrane checklist was used to evaluate the quality of the articles. To avoid bias in the study, the data were analyzed by two researchers entirely independently. Any disagreement between the researchers was examined by a third party.

Findings Out of 203 articles, finally, eight articles entered the final list. Thus, the final articles were based on the model of Health Belief, Social Cognitive Theory, BASNEF model, and Pender model of health promotion. The Health Belief Model was most used to improve the studied variables.

Conclusion Intervention program based on Models of health education and health promotion has a vital role in promoting the nutritional behaviors of pregnant women. Hence, paying attention to other models and theories of health education and health promotion can be helpful.

Keywords Health Education; Pregnant Women; Systematic Review

CITATION LINKS

[1] Survey of midwives' practice and its related factors toward ... [2] Nutrition-related information-seeking behaviours ... [3] Surveying pregnant women's nutritional status and ... [4] Maternal and child undernutrition and overweight ... [5] Evidence-based interventions for improvement of ... [6] Krause's food, nutrition, & diet ... [7] The effect of an educational package ... [8] Using of social cognitive theory: Predictors of ... [9] Application of theories/models of health education ... [10] The PRISMA statement for reporting systematic ... [11] Cochrane handbook for systematic reviews ... [12] EPOC resources: Data collection ... [13] Effectiveness of educational program based on ... [14] Impact of nutrition education in improving dietary ... [15] The effect of health belief model-based education ... [16] The effectiveness of nutrition ... [17] The effectiveness of an educational intervention ... [18] The effect of education based on Health Belief ... [19] Effect of nutrition education program on the ... [20] The study of educational program effect based ... [21] The health belief model and personal health ... [22] Effect of nutrition education based on health belief... [23] Investigation of the efficacy of health belief model ... [24] Interactive effects of constructs of perceived ... [25] Determinants of preventive behaviors of urinary ... [26] Perceived benefits and barriers of preventive behaviours ... [27] Health behavior and health education ... [28] Using social cognitive theory to determine ... [29] Relationship of social cognitive theory ... [30] Health education & promotion theories, models ... [31] Effects of education on self-monitoring of ... [32] Education based on BASNEF model; an affective ... [33] The impact of an educational program based on ... [34] The effect of educational intervention on ... [35] The effect of education based on BASNEF model ... [36] Health promotion in nursing ... [37] The effect of Pender's health promotion model ... [38] Effect of nutritional program on nutritional ...

Introduction

Pregnancy is one of the most sensitive and vital stages in women's lives that its proper treatment can cause the physical and mental development of pregnant women [1]. Pregnancy affects the lifestyle and nutritional behaviors of women and their families [2]. Therefore, maternal and infant health was one of the priorities of the 2010 Public Health Project. Recent research suggests that one of the most important and influential factors in the development of heart disease is hypertension and diabetes due to disorders in the growth and development of the fetus and infancy, and these disorders cause long-term changes in a person's physiology and metabolism [3]. There is compelling evidence about the importance of nutrition before and during pregnancy that ensures fetal growth, development, maternal health, and well-being [4]. Worldwide, more than 800,000 deaths in infants and 20% of stuttering in children under five years old are due to malnutrition in the womb, including a lack of protein and micronutrient energy [5]. It is well known that a pregnant woman's nutritional status affects her pregnancy and birth weight, which is related to infant mortality and long-term risks. Lack of nutrients received during pregnancy and low weight are associated with complications such as anemia, cretinism, neural tube defects, nyctalopia, congenital disorder, placental abruption, preeclampsia, hyperparathyroidism, intrauterine growth restriction, decreased immunity, etc. [6]. According to statistics, the level of training required by mothers during pregnancy according to the standard care program is not entirely desirable [7]. Healthy behavior is one of the multidisciplinary issues related to health and has an important impact on health. To influence this behavior, individuals' influential factors and capabilities, identification and reinforcement, and barriers must be reduced. Other intervention factors should then be used to promote nutritional behavior by setting specific priorities and health programs. It seems that standard training programs in health care systems do not have the desired effect on nutritional behaviors and require primary interventions, including the use of theory-based training and appropriate models; theories have great potential to increase health training programs [8]. Numerous studies have shown that the most effective curriculum is based on the theory-based approaches rooted in behavior change. The use of patterns and theories of behavior change increases the likelihood of increasing the effectiveness of health training programs and helps identify individual characteristics and the environment that somehow affect behaviors.

The effectiveness of health training programs depends on the correct use of the theories and models used in health training. Therefore, today, the use of theories and patterns of behavior change is essential for health training professionals and health

promotion [9]. The present study aims to review the studies based on the patterns and theories in nutritional interventions of pregnant women in Iran in a systematic manner.

Information and Methods

This systematic review study was conducted based on Iranian research articles published in national and international journals. The study began based on the PRISMA statement [10]. The Internal Article Bank (Magiran, Iranmedex, SID & IranDoc), foreign article bank (Web of Science, Scopus, Proquest, PubMed & Medlib), and Google Scholar search engine with keywords of pregnant women, nutrition, training intervention, model/theory of health training and health promotion in both Persian and English language were used in order to access Persian articles published in the country. Iranian articles published abroad in 1990-2019. The inclusion criteria were the interventional nature of the articles, the use of model nutrition studies, the theory of health training, and health promotion in Iranian pregnant women.

To review the articles, first the titles (independently), then the abstracts and the whole text were reviewed. To avoid any bias in the study, the search process, selection of articles, and qualitative evaluation of articles, and data extraction were performed by two researchers separately. Any disagreement between the researchers was re-examined by a third researcher (which article should be selected or deleted). Articles were selected based on the PRISMA checklist; thus, 27 items for the checklist and each item, three options were considered: (not applicable, not reported and reported) which the title, summary, methods, results, and discussion were questioned. The obscure parts of an article were read several times to get a correct understanding of the report. Cochrane evaluation checklist was used to evaluate the quality of articles since all articles were of intervention type [11]. Biases in selection, performance, diagnosis, data collection and reporting, and other biases were examined [12] (Table 1). In choosing the training model, comprehensiveness in the application of all constructs of each model was also considered.

Two hundred three articles related to the nutrition of pregnant women, models, and theories of health education and health promotion were found. Of these articles, 87 articles were excluded due to the repetition. Out of the remaining 116 articles, the abstracts of all studies were reviewed, and 19 articles were deleted due to irrelevance. In the second stage, the full text of the remaining 97 articles was examined. Of these articles, 73 articles were excluded from the study process due to not using the model/theory of health education and health promotion, not using training intervention, and not implementing education intervention during

pregnancy. Then, 24 articles entered the qualitative evaluation stage, and finally, eight articles were used [13-20] (Figure 1).

Table 1) Review articles based on the Cochrane Evaluation Checklist

Reference	Adequate sequence generation	Allocation concealment	Blinding	Incomplete data addressed	Free of selective reporting	Free of other bias	Percent of "yes" answers
Bashirian <i>et al.</i> [13]	Y	N	Y	?	Y	Y	66
Goodarzi Khoigani <i>et al.</i> [14]	Y	?	?	Y	?	Y	50
Karimi <i>et al.</i> [15]	Y	?	N	N	Y	Y	50
Sharifirad <i>et al.</i> [16]	Y	Y	Y	Y	?	?	66
Ramezanpoor <i>et al.</i> [17]	Y	Y	Y	N	Y	Y	83
Ziaee <i>et al.</i> [18]	N	Y	Y	Y	Y	?	66
Mohebi <i>et al.</i> [19]	Y	?	?	Y	?	Y	50
Arabi <i>et al.</i> [20]	Y	Y	Y	N	Y	Y	83

Y=Yes; N= No; ?= Ambiguous

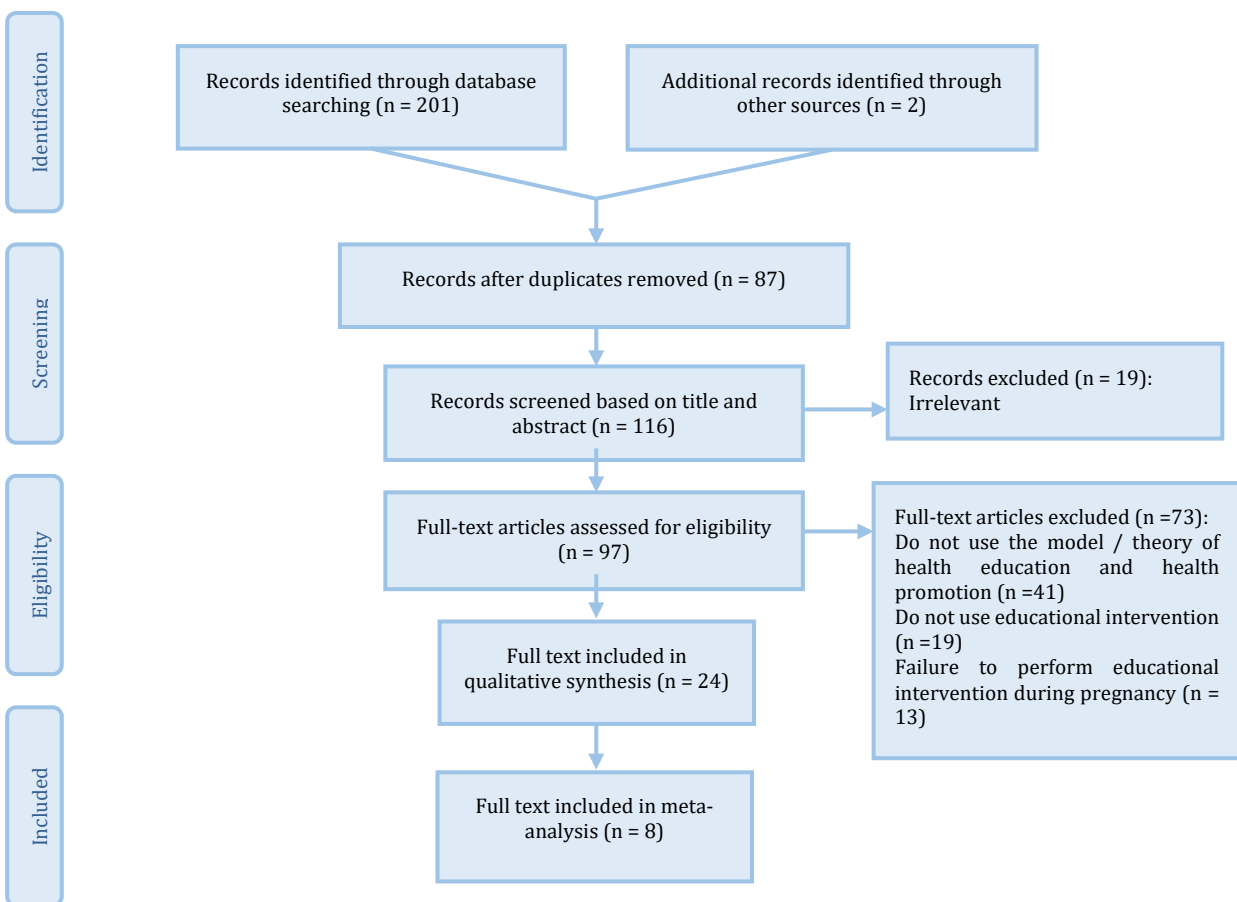


Diagram 1) Systematic entry chart for articles

Findings

Finally, eight articles were analyzed. All studies were trained according to the criteria. The studies were quasi-experimental and clinical trials performed on pregnant women referred to health centers and comprehensive health centers, primiparous pregnant women, and pregnant women with gestational diabetes. Of the studies, 4, 1, 1, 1, and 1 article were about women referring to the health centers, primiparous pregnant women, pregnant women with diabetes, and pregnant women referring

to comprehensive health centers in the suburbs, and pregnant women in the district 3 of Tabriz, respectively. Among the studies, four studies used the Health Belief Model, two studies used the cognitive-social theory model, 1 study used the Pender health promotion model, and 1 study used the BASNEF model. In these studies, education interventions were performed to promote maternal and fetal nutritional health. In these studies, the target group was selected so that they did not predict pregnancy as much as possible during the intervention. All studies used the

experimental and control groups to prove the effectiveness of education interventions. Most of the interventions were done in education (lectures, group discussions, questions and answers, counseling, booklets, pamphlets, leaflets, posters, role-playing, and brainstorming). The duration of various interventions was from 2 weeks to 6 months, and in most interventions, follow-up was at least one month. The outcome of the interventions included a wide range of improvements in the state of structures such as awareness, attitude, perceived sensitivity, perceived benefits, perceived barriers, self-efficacy, social norm, abstract norms, and enabling factors and behavioral intent.

Discussion

This study has systematically reviewed the articles based on health education models and health promotion theories.

The Health Belief Model is one of the effective patterns in health education that considers behavior as a function of the knowledge and attitude of the individual. According to the constructs of this model, a person perceives a health-threatening issue as a result. Using this model was to study the rejection of health issues by people and explain the behavior of people who thought they would never get sick [21]. Among the studies, four studies used the Health Belief Model. In the study of Mohebbi *et al.* [19], all model constructs were used, but the process of performing education intervention by structures was not well explained. The intervention results in this study showed that all model constructs after the intervention program had a significant increase compared to the control group. Of course, it was not clear which constructs were emphasized before the intervention. In this study, the construct of self-efficacy was not examined. According to the reported numbers, perceived barriers were seen as the most effective construct. According to this study, the application of the Health Belief Model to nutrition education was practical to gain the recommended weight in pregnant women. Then, nutrition education promoted awareness, sensitivity, intensity, perceived threats and benefits, and nutrition performance. According to the mother's BMI (Body Mass Index), the desired weight gain was maximized, and weight gain contrary to the standard was minimized.

Although perceived sensitivity and perceived intensity constructs were identified as the most effective constructs in a study conducted in Ethiopia, the construct of perceived benefits was also introduced as one of the important factors of impact, which in the study of Sharifi Rad *et al.*, the construct of perceived benefits was introduced as the most effective construct [16, 22]. In this study, the healthy behavior of pregnant mothers was assessed based on the statements of pregnant women, which can be one of the limitations of this study. In the study of Karimi

et al. [15], the scores obtained from the components of the Health Belief Model in the intervention group increased significantly after the intervention compared to the control group; so that the performance of mothers with diabetes was adequate compared to the type of diet consumed and improved their performance. However, the follow-up time was short (2 months), and for more certainty, it was better to follow the results for a longer time. The results showed that the construct of perceived barriers was the most important component of the model in performing the recommended behavior, which was following the studies of Dehdari *et al.* [23], Sadeghi Tajdano *et al.* [24], and Mazlumi Mahmoudabad *et al.* [25].

In the study of Ziaee *et al.* [18], all model constructs have been used. The effectiveness of the education program based on the Health Belief Model increased awareness, perceived sensitivity, perceived severity, perceived benefits, and reduced barriers to nutrition modification and thus promoted the proper nutritional behavior of pregnant mothers. Perceived sensitivity, behavior, and awareness constructs were reported with a significant increase in the intervention group. Although it was better, this study would be followed up for a longer time. In this study, despite the increase in self-efficacy after the intervention, one of the limitations of the study was education based on the study of factors related to the individual (knowledge, attitude, etc.) in adopting healthy behaviors and the need to implement a Health Belief Model to increase self-efficacy in pregnant women.

One of the most compelling theories used to predict and express nutritional behaviors is Albert Bandura's Social Cognitive Theory. While stating the predictors and practical principles in shaping behavior, knowledge structures, outcome expectations, outcome values, self-efficacy, social support, self-regulation, and situational perception, this theory is introduced as the most important determinants and guidelines in designing educational interventions.

Accordingly, the cognitive-social theory assumes that behavior, including nutritional behaviors using: a.) Individual factors such as attitudes, beliefs, self-efficacy, health concerns, physical satisfaction; b.) Behavioral factors such as nutrition patterns, weight control behaviors, participation in food preparation, and participation in shopping. c.) Social or interpersonal factors such as access to healthy nutrition at home, eating with family, and friends' support for healthy nutrition are explained [27].

In the study of Bashirian *et al.* [13], the results of the study before the intervention showed that among the constructs of cognitive-social theory, the constructs of outcome expectation, outcome value, awareness, and self-regulation had a significant role in explaining the variance of appropriate nutritional behavior among pregnant mothers and they were the best predictors of behavior. So that, the educational goals

of the intervention were formulated based on it. The education intervention based on a cognitive-social theory emphasizing improving pregnant women's expectations and outcome values led to increased social support, improved self-regulation, and improved self-efficacy. It thus promoted the nutritional behaviors of pregnant women, which are consistent with other studies [28, 29]. Although the follow-up time was two months after the intervention and the time was short, however, the simultaneous use of several appropriate education methods and a combination of lectures, questions and answers, PowerPoint and pamphlets, preparation of food programs, reminder text messages in the target group, and created more interaction. However, this study focused only on individual factors and did not investigate the environmental factors.

In the study of Ramezanpour *et al.* [17], the level of awareness, self-regulation, and expectation of outcome in the intervention group increased significantly. So that the daily consumption of fruits and vegetables in the experimental group increased immediately after education. However, no significant improvement was observed in 3 months after education g. However, based on cognitive-social theory, the designed intervention had prevented the severity of consumption reduction in the intervention group. The results of this study were not consistent with the results of the study of Bashirian *et al.* [13], which one of the reasons was the number of education g sessions and the method of study; so that the number of education g sessions in the study of Bashirian has been more. Also, in the study of Bashirian *et al.* [13], the SMS method was used to remind the provided teachings, which is not following the research of Ramezan Pour *et al.* [17]. The influential factors on the result were the limitations at the time of intervention, non-involvement of pregnant women during the program, limitations for pregnant women to participate in education g sessions due to their physiological, physical condition, and the small number of samples.

The BAZNEF model has been the subject of beliefs, attitudes, abstract norms, and enabling factors to change health behavior [30]. In this model, special attention is paid to beliefs, attitudes, and behavior by the individual in planning behavior change and stability. Indeed, this attention is focused on external beliefs, abstract norms, and enabling factors that lead to the decision or continuation of the desired behavior [31].

In the study of Arabi *et al.* [20], the strategies used in each construct were well described. So that during the education g sessions, participants' questions were answered through questions and answers and creating the right attitude, and their behavioral intent was cleared by asking the question. The critical point was that if the behavior were not intentional, it would be re-trained. In this study, the education g program based on the BASNEF model was able to improve the

nutritional performance of pregnant women in the five food groups of bread and cereals, meat and protein, fruits, vegetables, and dairy products, which is consistent with other studies [32-35].

Interpersonal influences (family, peers, support system, and cultural and social norms), and situational effects (environmental cues that trigger specific actions and available items), are also parts of the environmental framework that can disrupt or facilitate health-promoting behavior. Competitive demand may reduce the commitment to a care plan, especially when studies are urgent and comprehensive. However, if health practices are absorbed and welcomed by the person (preferences), the commitment to the health promotion program will be strengthened.

In the study of Goodarzi *et al.* [14], the mean scores in the constructs of perceived benefits, self-efficacy, situational influencers, interpersonal (husband support), and behavioral-related emotions increased. In the case of reducing the perceived barriers, the results were inconsistent with the study of Khodavisi *et al.* [37] and Shubiri *et al.* [38], and this was due to the special treatment of gastrointestinal diseases and, in some cases, high prices, which required public policies in this regard. In this study, the most effective structure was not mentioned.

Failure to review abstracts published in national and international congresses, limited access to some databases, lack of access to the full text of the article can be considered one of the limitations of this study that have been effective in selected articles. It is suggested that in addition to the models and theories reviewed in this study, researchers must look at other models and theories for education g nutritional interventions to pregnant women to make a more comprehensive view of education g interventions on this crucial and sensitive target group.

Conclusion

Most studies based on patterns and theories of health education g and health promotion have positively affected increasing positive nutritional behaviors in pregnant women. Among the models and theories used in these studies, the most common use was the Health Belief Model, in which the effects of perceived benefits were reported as the most effective construct in further studies. The best advantage of using models and theories in nutrition training for pregnant women is knowing what has led mothers to adopt appropriate nutritional behaviors. Besides, researchers will know that this issue and further intervention will improve this behavior among mothers. On the other hand, a review of studies in Iran showed that the variety of models and theories in training interventions in pregnant women in Iran was not very significant. Finally, the results of this study show that codified and combined training based on patterns and theories of health training and

health promotion has had a significant impact on promoting the nutritional behaviors of Iranian pregnant women.

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