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# THE EFFECT OF NUTRITIONAL EDUCATION BASED ON PENDER'S HEALTH PROMOTION MODEL ON NUTRITIONAL BEHAVIOR OF PREGNANT WOMEN: A QUASI EXPERIMENTAL RESEARCH

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**Abstract:**
*The health behavior of a pregnant woman, including adequate nutritional behaviors and supply of all the necessary nutrients. The objective of this study was examined the effect nutritional education based on Pender's Health Promotion Model on nutritional behavior of pregnant women referred to health centers in Hamadan city, Iran, 2016. This study was a quasi-experimental study, and its plans for the two groups (experimental and control groups). 100 women referred to health centers in Hamadan city who were experiencing their first pregnancy were randomly assigned to two experimental and control groups. Written informed consent was obtained from all participants. In this study, nutritional education, behavior, within four 45-60 minutes session in two weeks, was performed. Data were gathered using three questionnaires: demographics, Pender's HPM constructs, and nutritional behavior. The validity and reliability of questionnaires were confirmed. Four educational sessions were performed in the experimental group. Through three stages (before, immediately, and six weeks after interposition) these groups were evaluated. Analysis of the data was performed by SPSS/16, statistical tests such as t-test, paired t-test, chi-square and repeated measurement test was used. Results of this study showed that two groups have no considerable difference in terms of age, education, job, type of housing, family income and sport (P>0.05). The mean scores of the two groups were matched based on Pender's HPM. The scores after the intervention in both nutritional behaviors and Pender's Health Promotion Model components than the control group significantly increased (P<0.001). The results showed that the Pender's HPM-based training can positively affect and improve the pregnant women's nutritional behaviors. Therefore, it is recommended that the nutritional behaviors should be changed through promoting people's knowledge about nutrition during pregnancy.*

**Key-words:** *Education; Pregnant women; Pender's Health Promotion Model.*

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## INTRODUCTION:

The health behavior of a pregnant woman, including adequate nutritional behaviors and supply of all the necessary nutrients, exert an effect on the health of a woman, development of the fetus, and the occurrence of diseases among the offspring at the age of maturity [1, 2]. In the urban environment, pregnant women more frequently consumed vegetables, milk and dairy products, sea fish and whole meal cereal products, drank more liquids, as well as more fruit and/or vegetable juices, and more often used the supplementation with folic acid, even before becoming pregnant. No significant differences were found in the consumption of fruits, pulses, products which are the source of complete proteins, confectionery products and sweets, according to the place of residence [3, 4]. Practicing health-promoting behaviors is one of the best approaches to maintain health. Health-promoting behaviors include activities that enable people to monitor their health. In this regard, the results of different studies show that education and intervention about nutrition can be effective if it emphasizes behavior rather than just knowledge [4]. Pender's health promotion model (HPM) is one of the widely used models to plan for and change unhealthy behaviors and promote health. Different studies have highlighted the efficiency of this model to control unhealthy behaviors [5]. The HPM is based on social cognitive theory according to which cognitive-perceptual factors (perceived benefits, barriers, and self-efficacy) influence engagement in health-promoting behaviors. Modifying factors (demographic characteristics, interpersonal influences, and behavioral factors) are considered to interact with each other to influence cognitive perceptual processes [6]. The Pender's HPM consists of variables that comprise the main part of the interventions. These components provide a rich source of interventional content and strategies [4]. The objective of this study was examined the effect nutritional education based on Pender's Health Promotion Model on nutritional behavior of pregnant women referred to health centers in Hamadan city, Iran, 2016.

## MATERIALS AND METHODS

This quasi-experimental study was conducted was conducted to review the effect of nutritional education based on Pender's Health Promotion Model on nutritional behaviors of pregnant women referred to health centers in Hamadan city, Iran, 2016. Hundred pregnant women who were experiencing their first pregnancy stratified randomly in to two fifty – member groups of case and control, in order to access a uniform sample in terms of social, economic and cultural conditions. Written informed consent was obtained from all participants. The recruitment took place between October 2015 and March 2016. Also, in order to prevent the information exchange between the two groups, only a case group or a control group was selected from each health center. Finally, four health centers were considered as case groups and the other 4 centers were considered as control groups. A standard questionnaire was used to collect data based on the Pender's Health belief model. The first part of the questionnaire was associated with demographic questions such as age, employment status, education level, family income, type of housing and exercise. The second part of the questionnaire was an inventory on the components of the Pender's HPM, including perceived benefits (11 items), perceived barriers (11 items), perceived self-efficacy (12 items), and behavior-related affect, (11 items), interpersonal influences (12 items), and situational influences (5 items) with five-point Likert scale (5: very high, 4: high, 3: relative, 2: low, and 1: very low); and commitment to action (12 items) with four-point Likert scale (1: never, 2: sometimes, 3: often, and 4: always). The third part of the questionnaire was nutritional behavior inventory consisting of 20 items with four-point Likert scale (1: never, 2: sometimes, 3: often, and 4: always). To ensure the content validity, the inventories were developed using reliable scientific resources and 10 experts confirmed their content validity. The reliability of the inventories was determined using test retest. The educational content was designed in accordance with the structures of the Pender's HBM. Educational content was prepared tailored to the research objectives and participant's educational needs (based on the pre–test). The intervention included four 45-60 minutes education sessions about nutritional behaviors. The training sessions were held every week in the form of 8 player groups. Each session included a combination of lectures, group discussion, questions and answers and power point displays. Moreover, educational pamphlets were given to the participants at the end of the last session. Both groups were assessed immediately after counseling sessions (Second stage of intervention). We evaluated the two groups six weeks after the intervention in order to examine the behavior continuity and endurance of the given trainings (the third stage of intervention). The control group did not receive any training and was only invited to the special sessions to fill out the questionnaires. However, due to ethical considerations, a training session on nutritional education was held for this group after the completion of the study. At the end we compared the results obtained in these three steps and analyzed the collected data using. Analysis of the data was performed by SPSS/16, Descriptive

statistics were employed to summarize the demographic data, which was presented using frequency tables and expressed as percentages, mean and standard deviation. The Spearman Colomograph test using to confirm the normalization of data and repeated measurement test. P<0.05 was considered as significant. The study was performed according to the Helsinki declaration protocol. The objectives of the study were explained to the women, and informed consent was obtained from all participants. Pregnant women could leave the study at any time. The study was approved by the Ethical Committee of Hamadan University of Medical Sciences, Hamadan, Iran (approval number: 9412187277).

## RESULTS:

Hundred participants were enrolled in this research. Table 1 demonstrates demographic characteristics of participants. The two groups were identical at the beginning of the study. Kolmogorov-Smirnov test demonstrated that two groups have no considerable difference in terms of age, education, job, type of housing, family income and sport (P>0.05). Baseline characteristics of the research population are shown in table 1. There were no important differences between the two groups in terms of the average scores of the different structures of this model before the interpolation (P>0.05). The outcomes indicated considerable difference between the score of perceived benefits, perceived barriers, behavior-related affect, perceived self-efficacy, situational influences, commitment to action and nutritional behaviors of subjects in the case group before and after intervention according to repeated measurement (P<0.001), whereas there was no considerable difference in perceived benefits, behavior-related affect, perceived self-efficacy, interpersonal influences, situational influences and nutritional behaviors of subjects in the control group (Table 2). However in performance, nutritional behaviors increased significantly two months after intervention in case group (P=0.04). This change was not observed in control group (Table 2). According to analysis of variance with repeated measures, the changes in mean score of nutritional behaviors before, immediately and 6 weeks after interposition was considerable (P=0.009, F=3.29).

**Table 1: Characteristics of women in control and case groups**

| Characteristics | Control (n=50) | Case (n=50) | P- value |
|---|---|---|---|
| **Age (years) (%)** | | | 0.60 |
| 20 | 1(2) | 0 | |
| 20-30 | 37(74) | 41(82) | |
| 30 | 12(24) | 9(18) | |
| **Education (%)** | | | 0.787 |
| Undergraduate | 26(52) | 24(48) | |
| Postgraduate | 24(48) | 26(52) | |
| **Job (%)** | | | 0.617 |
| Housewife | 41(82) | 39(78) | |
| Employed | 9(18) | 11(22) | |
| **Type of housing (%)** | | | 0.47 |
| Rent or mortgage | 24(48) | 28(56) | |
| personal | 25(50) | 22(44) | |
| **Family income (%)** | | | 0.618 |
| <500000 | 10(20) | 7(15) | |
| 500000-1000000 | 29(58) | 26(55) | |
| >1000000 | 11(22) | 14(30) | |
| **Exercise (%)** | | | 0.68 |
| Yes | 27(54) | 29(58) | |
| No | 23(46) | 21(42) | |

**Categorical variables data are given as frequency (percentage). P value for the difference between groups.**

**Table 2: Mean scores of knowledge Pender's Health Promotion Model components before and after intervention in the case and control groups**

| Model components | Groups | Pre-Test | Post-Test | 6 weeks Later | F | P-Value* | P-Value** |
|---|---|---|---|---|---|---|---|
| Perceived benefits | Case (n=50) | 43.23±4.59 | 44.67±3.65 | 45.05±4.31 | 7.99 | 0.002 | 0.006 |
| | Control (n=50) | 43.20±4.60 | 43.48±5.09 | 43.48±4.60 | 2.52 | 0.10 | |
| Perceived barriers | Case (n=50) | 26.22±7.80 | 28.16±7.31 | 29.44±7.10 | 15.22 | 0.001 | 0.001< |
| | Control (n=50) | 24.47±7.29 | 24.45±7.35 | 25.09±6.96 | 15.33 | 0.001 | |
| Behavior-related affect | Case (n=50) | 25.48±5.33 | 26.54±4.98 | 26.76±5.14 | 3.46 | 0.04 | 0.013 |
| | Control (n=50) | 24.82±5.80 | 24.84±5.87 | 24.84±5.71 | 1.76 | 0.18 | |
| Perceived self-efficacy | Case (n=50) | 42.31±7.83 | 41.86±6.32 | 42.52±6.56 | 3.09 | 0.04 | 0.154 |
| | Control (n=50) | 41.59±6.70 | 41.83±6.61 | 41.46±6.46 | 0.02 | 0.94 | |
| Interpersonal influences | Case (n=50) | 42.31±7.83 | 41.86±6.32 | 42.52±6.56 | 0.97 | 0.34 | 0.985 |
| | Control (n=50) | 41.95±6.70 | 41.83±6.61 | 41.46±6.46 | 4.22 | 0.03 | |
| Situational influences | Case (n=50) | 18±3.98 | 18.95±3.50 | 19.25±4.03 | 3.62 | 0.04 | 0.330 |
| | Control (n=50) | 17.37±5.26 | 17.75±5.17 | 17.81±5.17 | 1.21 | 0.28 | - |
| Commitment to action | Case (n=50) | 27.07±4.20 | 27.63±4.23 | 28.02±4.67 | 6.44 | 0.003 | 0.001< |
| | Control (n=50) | 25.83±4.62 | 25.76±4.62 | 22.62±4.18 | 393.13 | 0.001 | - |
| Nutritional behaviors | Case (n=50) | 31.90±4.37 | 32.24±4.78 | 32.76±4.43 | 3.29 | 0.04 | 0.009 |
| | Control (n=50) | 29.81±4.82 | 29.83±4.85 | 29.96±4.62 | 1.34 | 0.26 | - |

***Repeated measure; **Interaction time &group; The values are given as mean ± SD.**

## DISCUSSION:

This study showed that one of the main ways to improve nutritional behaviors during pregnancy is using community based intervention strategies. This study was showed the effect nutritional education based on Pender's Health Promotion Model on nutritional behavior of pregnant women referred to health centers. The outcomes indicated considerable difference between the score of perceived benefits, perceived barriers, behavior-related affect, perceived self-efficacy, situational influences, commitment to action and nutritional behaviors of subjects in immediately and 6 weeks after the intervention in the case group in compared with control groups. In the study by Sharifirad et al. [7] and Karimy et al. [8] , the score mean of perceived benefits and barriers in intervention group significantly improved in compared with control group that were consistent with our study. Shakeri (2013)[9], and Pashaee (2005)[10], reported similar studies in Iran and in the studies, nutrition education program in pregnant women in intervention group improved nutritional behaviors in compared with control group. Mirmolaei et al. in 2010 showed the education effect on nutritional behaviors in pregnant women program. In this study score mean in case group in compared with control group significantly increased and educational program improved nutritional behaviors [11-13]. All above studies confirmed our research. According to the results of this study, women during pregnancy need to be consulted and trained about nutrition behaviors in health and treatment centers by holding

didactic classes. Furthermore, it is recommended that programs should be made on the effects of mass media, especially television, and socio cultural factors on nutritional behaviors, obesity, and prevalence of chronic diseases during pregnancy. The limitation in this study was small sample size which may not be generalizable to other groups and communities. Therefore, we proposed that this study is conducted at wider range.

## CONCLUSION:

The results showed that the Pender's HPM-based training can positively affect and improve the pregnant women's nutritional behaviors. Therefore, it is recommended that the nutritional behaviors should be changed through promoting people's knowledge about nutrition during pregnancy, so that inappropriate nutritional behaviors are replaced with appropriate nutritional ones.

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## CONFLICT OF INTEREST:

No potential conflict of interest relevant to this article was reported.

## CONTRIBUTORS:

FS and KHD conceived the idea, planned the study, and drafted the manuscript. KHD, SN and MF helped acquisition of data and did statistical analysis. All authors contributed significantly to the submitted manuscript.

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