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EFFECT OF AN EDUCATIONAL PROGRAM BASED ON HEALTH BELIEF MODEL ON PREVENTION OF PRETERM BIRTH AMONG NEWLY PREGNANT WOMEN

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ABSTRACT

Background: The birth of a preterm infant has a greater risk of developmental disabilities health, and growth problems than infants born at full term. The aim of the present study was toexamine the effect of an educational program based on health belief model on prevention of preterm birth among newly pregnant women

Design: A quasi-experimental study design was used (time series design) pre/post-test, two groups are studied.

Sample: A purposivesample of 100 women was included in the present study. Setting: The present study was conducted at Antenatal Outpatient Clinic in Benha University Hospitals.

Tools: *Datawere collected through two tools 1) An Interviewing Questionnaire sheetwhich include two parts; sociodemographic characteristics of studied sample and knowledge assessment sheet.2) Modified Health Belief Model Questionnaire.*

Results: *there was no statistically significant difference between study and control groups regarding demographic characteristics. There was no statistically significant difference regarding mean knowledge score before and after program implementation among the control group. Health belief model were greatly improved after intervention than pre intervention among study group while there were minimal improvement after intervention than pre intervention among control group. There was a positive statistically significant correlation between total knowledge and total health belief model in study group after program implementation.*

Conclusion: *The present study concluded that education program in early pregnancy could be positively associated with the decreased risk of preterm birth. Pregnant women should be trained and empowered to contribute positively in making pregnancy safer.*

Recommendations: *Establishing strategies to enhance the women's understanding of prevention preterm birth by applying this model to a large sample in various obstetrics and gynecological outpatient clinics..*

Keywords: Educational program, Health Belief Model, preterm birth,newly pregnant women.

1. INTRODUCTION

Preterm birth, defined as birth before 37 weeks of gestation, is the single most important determinant of adverse infant outcomes, in terms of survival and quality of life(***McCormick,2014).***Globally, it is the leading cause of perinatal preterm infants and neonatal mortality and morbidity particularly vulnerable to complications due to impaired respiration, difficulty in feeding, poor body temperature regulation and high risk of infection ***(Kinny,etal.,2014)****.*With the increasing contribution of neonatal deaths to overall child mortality, it is critical to address the determinants of poor outcomes related to preterm birth to achieve further reductions in child mortality***(Liu,etal.,2014).***

Every year, an estimated 15 million babies are born preterm (before 37 completed weeks of gestation), and this number is rising. Preterm birth complications are the leading cause of death among children under 5 years of age, responsible for approximately 1 million deaths in 2015. The death rate due to preterm birth ranges from 5-18% across 184 countries. Three-quarters of these deaths could be prevented with current, cost-effective interventions ***(liu, etal., 2016).***

The cause of preterm birth is often not known. Common risk factors include multiple pregnancies, infections and chronic conditions such as diabetes and high blood pressure; however, often no cause is identified. There could also be a genetic influence. Better understanding of the causes and mechanisms will advance the development of solutions to prevent preterm birth ***(WCG, 2016).***

Signs and symptoms of preterm labor include four or more uterine contractions in one hour before 37 weeks' gestation. In contrast to false labor, true labor is accompanied by cervical

shortening and effacement , Also, vaginal bleeding in the third trimester, heavy pressure in the pelvis, or abdominal or back pain could be indicators that a preterm birth is about to occur. Premature infants are at greater risk for cerebral palsy, delays in development, hearing problems, and sight problems. These risks are greater the earlier a baby is born **(National Institutes of Health,2015)**.

Prevention and management of preterm birth requires close collaboration between all cadres of health workers, obstetricians and pediatricians with midwives and neonatal nurses. Evidence-based interventions to prevent preterm births and reduce death and disability among preterm babies have been identified, now it is time to act. Measures to be advocated for and implemented by the obstetric health team include behavioral interventions to reduce smoking, prevent violence against pregnant women, and address other social stressors linked to increased risk of preterm delivery, prevention of iatrogenic, multiple pregnancy, promotion of adequate spacing between pregnancies, antenatal care packages for all pregnant women and identification and treatment of pregnant women at higher risk of preterm birth, strict infection control at preterm birth (**HNN,2020**).

Prevention of pre-term birth can occurred through pre conception care package, including family planning (e.g., birth spacing and adolescent friendly services), education and nutrition especially for girls and STI prevention. Ante natal care packages for all women as primary prevention, screening for and management of STIs, high blood pressure and diabetes; behavioral change for life style risks; and targeted care of women at increased risk of preterm birth. Provider education to promote appropriate induction and cesarean. Policy support including smoking cessation and employment safe guards of pregnant women (**FIGO   and IPA, 2012**).

Health education to reduce the risk of preterm birth include proper nutrition, avoiding stress, seeking appropriate medical care, avoiding infections, and the control of preterm birth risk factors (e.g. working long hours while standing on feet, carbon monoxide exposure, domestic abuse, and other factors). Self-monitoring vaginal pH followed by yogurt treatment or clindamycin treatment if the pH was too high all seem to be effective at reducing the risk of preterm birth (**WikiDoc,2016**).

The health believe model, one of the most widely used conceptual frameworks in research on health behavior. It contains several primary concepts by which individuals evaluate themselves to take action to change their behaviors. According to this model, if a person believes that he or she is susceptible to a condition or disease (perceived susceptibility), believes that the condition would have potentially serious consequences (perceived severity), believes that the benefits of taking action outweigh the barriers (perceived benefits and barriers), believes that he or she can engage in a behavior (self-efficacy), is ready to take action, and could be potentiated by cues to action (cue to action), he or she is more likely to take action to change **(Champion &Skinner , 2010)**.

Nurses have a great role in prevention of preterm birth through health education programs for all pregnant women that should be focus on helping women to achieve a healthy lifestyle modification and manage chronic conditions during pregnancy. Counseling mothers with a set of nursing interventions that aim to identify and modify social and biomedical behavioral risks to mother's health or outcome of pregnancy throughout prevention and management" such as immunizations, maintains a healthy pregnancy weight and exercise regimen, gets adequate sleep and cessation smoking and alcohol. Additionally nurse should be also encompasses maternal psychosocial factors, such as psychological wellbeing, support of family and counseling Proper nursing care helps in reducing risk factors and reduces adverse pregnancy outcomes **(Sally etal., 2019)**

1.1. Significance of the study

Preterm birth is the most common cause of death among infants. Globally, an estimated 15 million babies are born before 37 completed weeks of gestation annually. Rates are generally highest in low- and middle-income countries, and increasing in some middle- and high-income countries, particularly the Americas. In**Egypt,** preterm birth is estimated as 136,900 neonates and 8,100 neonates die from preterm birth complications**(WHO, 2018).**Complications of preterm birth are the leading direct cause of neonatal mortality, accounting for an estimated 27% of the almost four million neonatal deaths every year, and act as a risk factor for many neonatal deaths due to other causes, particularly infections *(Liu et al,2016).*Preterm birth and its sequelae are responsible for 75% of perinatal mortality in the U.S*.(WHO,2014).*Therefore the prevention of preterm birth is a major health care priority. Research studies indicate that health education in ante natal period is an integral part of prevention of preterm birth especially important since early recognition of signs and symptoms of preterm labour and immediate medical and nursing interventions may prevent preterm birth.

Health education modality that presents information about preterm birth prevention may be the key to changes in women's knowledge and beliefs as well as preventive behaviors. Moreover, the HBM is one of the models that commonly used as a guiding frame for health behavior interventions, therefore, this research was planned to evaluate the effects of health education program based on HBM on knowledge, health beliefs and intent to practice preventive health behaviors of preterm births. In addition, this study didn't conduct at Benha University Hospital. So, this study was conducted.

1.2. Aim of the study

The aim of this study was to examine the effect of educational program based on health belief model on prevention of preterm birth among newly pregnant women. This aim was achieved through:

- Assessing pregnant women's knowledge, and health beliefs about prevention of preterm birth .
- Designing and implementing educational program based on health belief model according to pregnant women's needs.
- Evaluating educational program effect on pregnant women's knowledge and health beliefs regarding preterm birth prevention.

1.2.1. Hypothesis

The pregnant women who received educational program based on health belief model would predicted to improve their knowledge regarding preterm birth prevention and positive changes of health beliefs about preterm birth prevention as revealed by pre and posttests scores compared with the control group.

2. SUBJECTS AND METHOD

Design: A quasi-experimental study design was used (time series design) pre/post-test, two groups are studied.

Setting: This research was conducted in Obstetrics & Gynecological Outpatient Clinic at Benha University Hospital which includes one room divided into diagnostic and examination areas. As well as, waiting area for women admission where the researcher interviewed the recruited women to implement educational program based on health belief model regarding prevention of preterm birth among primigravida women. This clinic provides services of Obstetrics and Gynaecologicalcare, It starts from 9.00 A.m. to 12.00 P.m.

2.1. Sampling

Type: A purpose sample.

Size: Include 100 primigravida pregnant women. The sample size was calculated according to the following formula *Yamane, (1967).*

$$n = \frac{N}{1 + N(e)^2}$$

Where :

n = the sample size

N = the finite population

e = level of significance or (limit of tolerable error). Error = 0.05

I = unit (a constant),

Inclusion Criteria;

1. Primigravidain the first or second trimester of pregnancy.
2. No prior diagnosis of chronic disease.
3. Pregnant women agree to participate in the research.
4. Age between 18 and 35 years.

Exclusion criteria :

1. Women with chronic diseases were excluded.
2. Complicated pregnancy were excluded.

2.2. Tools of data Collection:

Tools were designed by the researchers after reviewing current & past, local and international related literature by using periodicals journal, magazines, books and computer search to construct the tool of the study.

The following two tools were used for data collection:-

2.2.1. A structured interviewing questionnaire:

It was consisted of two parts:

Part 1: Socio-demographic characteristics of pregnant women including: (Age, Education, Occupation, Residence, Income, Previous participation in educational program classes about preterm birth prevention…etc.).

*Part 2:*Assessment of pregnant women's knowledge regarding preterm birth and its prevention, It was adopted from [**WHO,2014**]. This part was used before and after implementation of the HBM which included 18 questions about preterm birth and its prevention which include definition, clinical picture, causes, risk factors, complications, prevention and management etc.

Scoring system of knowledge: a correct answer was scored "one" and the incorrect "zero". The knowledge score was calculated by adding the scores for the correct answers. The total score of each section was calculated by summation of the scores of its items. The total score for the knowledge of a participant was calculated by the addition of the total score of all sections.

The mean and standard deviation was calculated. As well As women total knowledge score was classified as the following:

- Adequate ≥ 70 % of total knowledge score.
- Inadequate < 70 % of total knowledge score .

2.2.2. Modified Health Belief Model Questionnaire: (Was adapted from

Wayne, 2019). Designed to measure pregnant women psychological readiness to take positive action regarding prevention of preterm birth. It including seven subscales for health belief

Part I: Composed of the main four HBM constructs:

Subscale (1) **perceived susceptibility of preterm birth**, it consisted of (7) items as (chances of having preterm birth are high, physical health makes it more likely that I will have preterm birth, etc.

Subscale (2) **perceived severity of preterm birth**, it consisted of (6) items as (afraid to think of having preterm birth, preterm birth affect my baby life and would be more serious., Psychological and financial Problems would experience   etc.,

Subscale (3) **perceivedbenefits of educational program** ,it consisted of (6) items from as (Keeping periodical prenatal visits prevents future problems for me., Reducing physical stress ,avoiding smoking, alcohol and drug abuse reduce risk of PTB., Importance of maintaining self-care activities and a healthy life style during pregnancy would decrease risk of PTB, There are many benefits of attending educational program to learn how to prevent PTB .etc.,

*Subscale (4)***perceived barriers** to prenatal visits and attending educational program ,it consisted of (6) items as (Keeping prenatal care appointments is difficult to me , it needs a lot of money and time, There is too much conflicting nutritional information to know how to eat a healthy diet., starting new habit hard for you to do , It costs too much to eat right during pregnancy,etc.

*Subscale (5)Cues to action subscale*it consisted of (6) items as (eat a well-balanced diet, follow medical orders, do things to improve my health , look for a new health information, keep prenatal visits and follow the recommended health education , maintain periodic dental exams , try to discover health problems early, have a regular check-up and follow recommendations to keep healthy).

2.3. Scoring system

Health belief model questionnaires scale including 3-level Likert scale to rate the items from agree "3" to disagree"1" respectively The probable range of scores for each subscale is 6 to 18with a possible total score ranges from 42 to 126. For the four subscales, higher scores indicating extremely healthy beliefs. But for subscale concerning barriers, higher scores indicate more negative healthbeliefs.

The level of health beliefs was classified as the following:

- Poor perceived when the total score was less than 60%.
- Averageperceived when the total score was 60% to less than 75%.
- Goodperceived when total score was 75% to 100%.

2.4. Tools validity

Content validity was done by 5 jury panel expertise in the field of maternity nursing and obstetric medicine specialty to assure content validity. The questionnaire was modified according to the panel judgment on clarity of sentences and appropriateness of content. The reliability was done.

2.5. Reliability

The reliability of the tool was measured by the Cronbach'salpha of knowledge questionnaire was 0.85 and 0.72 for modified health belief model which indicates a high internal consistency of an instrument.

2.6. Ethical considerations:

All ethical issues were considered, the aim of the study explained to each woman before applying the tools to gain their confidence and trust. An oral consent obtained from each woman to participate in the study and withdraw when she needs .The study not having any physical, social or psychological risk on the participant. The data collected and treated confidentially.

2.7. Pilot study

The pilot study carried out on 10% of total sample to evaluate efficiency, reliability and clarity of tools, simple modifications were done then women involved in the pilot study were included in the main sample.

Results of the pilot study: After conducting the pilot study, it was found that:

- The tools were clear and applicable; however, few words were modified.
- Tools were relevant and valid.
- No problem that interferes with the process of data collection was detected.
- Following this pilot study the tools were made ready for use.

2.8. Procedure

Official permissions were taken to carry out the study. The aim of the study was explained to the selected subjects. Informed consents were obtained from selected subjects and the aim of the study was explained to them. Data were collected throughout the period from beginning of November 2019 till the end of February 2020 covering 4 months.

2.8.1. Program

A. assessment phase

This phase encompassed interviewing pretest group. At the beginning of interview the researchers greeted the pregnant woman, introduced themselves to each woman included in the research, provided the woman with all information about the research such as (purpose, duration, & educational program) and take oral consent to participate in the research. Data were collected by the researchers through administration of the tools *firstly*: A structured interviewing questionnaire tool including socio-demographic data and women's knowledge regarding preterm birth and its prevention , *Secondly*: Modified Health Belief Model questionnaire tool , Average time for the completion of each woman interview was around (25-30 minutes). Average number collected was (1-4) women per day.

B. Planning phase

Based on the results obtained from the pretest group during the assessment phase, educational program was developed. Sessions number and its contents, different methods of teaching, and instructional media were determined accordingly to pretest and pregnant women needs.

C. implementation phase

Data were collected from beginning of November 2019 till the end of February 2020 covering 4 months.

The researchers visit the previous setting 3 days per week from 9.00 A.m. to 12.00 P.M approximately 1-4 pregnant women with inclusion criteria interviewed after taking permission, aim of study and ethical consideration were explained. The program were given in several sessions implemented according to the date obtained from the pregnant women during her antenatal follow-up visits and each session took about (45-60) minutes. At the beginning of the first session women were oriented with the educational program regarding prevention of preterm birth. Each woman was informed about the time of the next session at the end of session.**The first session** began during the women' first visit that follow the interviewing phase and included: definition, causes, clinical picture, possible complications, risk factors for preterm birth and possible interventions.The **second session** began during the pregnant women' second visit that follow the interviewing phase and included: Modified Health BeliefModel Questionnaire**:**designed to measure pregnant women psychological readiness to take positive action regarding prevention of preterm birth.Different methods of teaching were used such as discussion, brainstorming. Instructional media included video contain all contents of sessions **The third session** began during the pregnant women' third visit that follow the interviewing phase and included:preventive behavior to prevent preterm birth .

D. Evaluation phase

The effectiveness of the application of educational program regarding prevention of preterm birth was based on assessing the improvement in pregnant women" knowledge using the same format of tools which used during the assessment phase for pretest group. health beliefs model, and intention regarding preterm birth prevention. This was achieved through comparing the pre-test with the post-test immediately after the implementation of the program.

Administrative design

An official approval to conduct this study was obtained from dean of faculty of nursing to Director of the University Hospital, then the researchers were interview each study participant and were obtain an informed consent before starting the data collection.

Statistical design

The data were collected, organized, coded, computerized and analyzed by using appropriate statistical methods and tests, results were presented in suitable tables and figures using appropriate statistical techniques & tests of significance.

3. RESULTS

Table (1): Reveals demographic characteristics of studied women. It was cleared that Mean age was 25.72±4.47and 24.76±5.26 years for study and control groups respectively.48% and 36% of both groups respectively had secondary education. 76% and 70% of study and control group respectively not working. Furthermore 68% of the study group and 64% of control group were rural areas residence. In addition, 70% of study group and 72% of control group had insufficient monthly income. Also, 84% and 92% of both groups respectively nothing participate in any preterm birth prevention program. Finallythere was no statistically significant difference between study and control groups regarding their demographic characteristics.

Table (2): Reveals that no statistical significant difference between study and control group preeducational programregarding knowledgeof prevention pre term birth, compared to highlysignificant difference post educational program.

Table (3): Demonstrates that, there was no statistically significant difference regarding mean knowledge score before and after program implementation among the control group.

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Meanwhile, a highly statistically significant difference (p-values < 0.001) was observed before and after program implementation among the study group.

Figure (1): Show that total knowledge score regarding preterm birth prevention were greatly improved postprogram than pre program among study group while there were minimal improvement postprogram than preprogram among control group.

Table (4) shows that, there was no statistical significant difference regarding the five main HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues) before program implementation betweenstudy and control group. However, a highly statistically significant difference (p-values < 0.001) was observed regarding the five main HBM constructs after program implementation between study and control group.

Figure (2): Illustrates that health belief model regarding preterm birth prevention were greatly improved after intervention than pre intervention among study group while there were minimal improvement after intervention than pre intervention among control group.

Table (5): Clarifies that, there was a positive statistically significant correlation between total knowledge and total health belief model in study group after program implementation and no statistically significant between study group before program and in control group before and after program implementation

Table 1 Frequency distribution of studied women (study and control) regarding demographic characteristics (N=100).

	Study (N=50)		Control (N=50)		X^2	p-value
	No	%	No	%		
Age						
<25	17	34.0	25	50.0		
25-	22	44.0	12	24.0	4.63	0.09
30+	11	22.0	13	26.0		
Mean ±SD	25.72±4.47		24.76±5.26			
Education						
Read and write	6	12.0	13	26.0		
Primary education	11	22.0	15	30.0		
Secondary education	24	48.0	18	36.0	5.975	.113
University education	9	18.0	4	8.0		
Occupation						
Not working	38	76.0	35	70.0	0.457	.499
Working	12	24.0	15	30.0		
Residence						
Rural	34	68.0	32	64.0	0.178	.673
Urban	16	32.0	18	36.0		
Income						
Insufficient	35	70.0	36	72.0	0.049	.826
Sufficient	15	30.0	14	28.0		
Previous participation inPTB preventionprogram						
No	42	84.0	46	92.0	1.515	.218
Yes	8	16.0	4	8.0		

Table 2 Percent distribution of studied women regarding their knowledge pre and post program

Items	Pre program				X2	p-value	Post program				X2	p-value
	study		Control				study		control			
	Correct	incorrect	correct	incorrect			correct	incorrect	Correct	incorrect		
	%	%	%	%			%	%	%	%		
Definition	20.0	80.0	16.0	84.0	.27	.603	96.0	4.0	42.0	58.0	34.0	.000
Causes	12.0	88.0	8.0	92.0	.44	.505	92.0	8.0	58.0	42.0	15.4	.000
Clinical pictures	22.0	78.0	12.0	88.0	1.77	.183	92.0	8.0	58.0	42.0	15.4	.000
Risk factors for preterm birth	22.0	78.0	12.0	88.0	1.77	.183	92.0	8.0	58.0	42.0	15.4	.000
Preterm birth complications	20.0	80.0	16.0	84.0	0.27	.603	88.0	12.0	66.0	34.0	6.83	.009
Preterm baby can survive	26.0	74.0	22.0	78.0	0.21	.640	84.0	16.0	56.0	44.0	9.33	.002
Problems for Premature babies	26.0	74.0	12.0	88.0	3.18	.074	90.0	10.0	58.0	42.0	13.3	.000
Good weight for preterm baby	20.0	80.0	16.0	84.0	0.27	.603	90.0	10.0	66.0	34.0	8.39	.004
Premature baby can grow	26.0	74.0	22.0	78.0	0.21	.640	92.0	8.0	76.0	24.0	4.76	.029
Risk for preterm birth	22.0	78.0	12.0	88.0	1.77	.183	94.0	6.0	68.0	32.0	10.9	.001
Warning signs	30.0	70.0	14.0	86.0	3.73	.053	92.0	8.0	66.0	34.0	10.1	.001
Prevention of preterm birth	28.0	72.0	14.0	86.0	2.95	.086	86.0	14.0	66.0	34.0	5.48	.019
Signs and symptoms	26.0	74.0	22.0	78.0	0.21	.640	84.0	16.0	70.0	30.0	2.76	.096
Stress cause preterm birth	28.0	72.0	14.0	86.0	2.95	.086	92.0	8.0	72.0	28.0	6.77	.009
preterm birth diagnosis	12.0	88.0	8.0	92.0	.44	.505	88.0	12.0	62.0	38.0	9.01	.003

Table 3 Comparison between total knowledge among study and control group pre and post program

Total knowledge	Study		Control		t	p-value
	Mean	±SD	Mean	±SD		
Pre	4.2400	3.64529	3.7200	1.56544	1.49	0.141
Post	13.5200	1.34377	9.4400	1.88615	12.45	0.000**

(t) Independent t test .
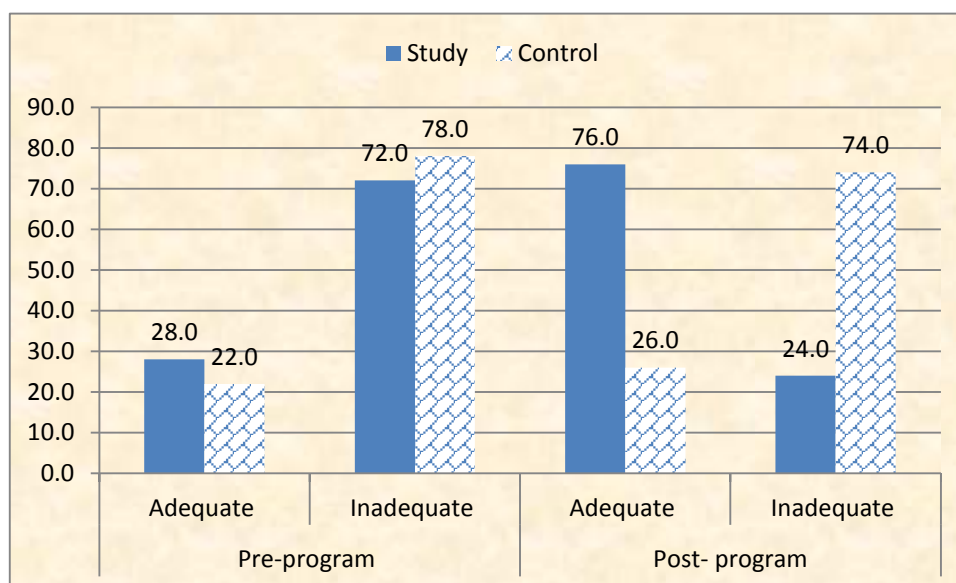
**A highly statistical significant difference (p ≤ 0. 001)

Figure 1 Frequency distribution of studied women (study and control groups) regarding their knowledge pre and post program

Table 4 Comparison between total health belief model among study and control group pre and post program

	Pre program				t	p-value	Post program				t	p-value
	Study		Control				Study		Control			
	Mean	±SD	Mean	±SD			Mean	±SD	Mean	±SD		
Total perceived	10.60	±1.39	10.94	±1.33	1.41	0.18	18.18	±1.62	17.10	±1.71	3.23	.002
Total severity	11.86	±1.30	11.74	±1.54	0.90	0.21	14.60	±1.26	11.76	±1.37	3.51	.000
Total benefits	13.84	±1.86	12.34	±2.11	1.26	0.08	17.40	±0.85	16.32	±1.55	4.29	.000
Total barrier	12.24	±2.09	11.96	±1.61	1.76	0.41	15.62	±1.04	14.06	±1.67	5.59	.000
Total cues	14.32	±1.70	13.50	±1.47	2.97	0.32	17.12	±0.87	15.04	±1.85	7.18	.000
Total	62.86	±4.32	64.48	±4.10	2.50	0.06	82.92	±2.84	77.18	±3.87	8.43	.000

(t) Independent t test .

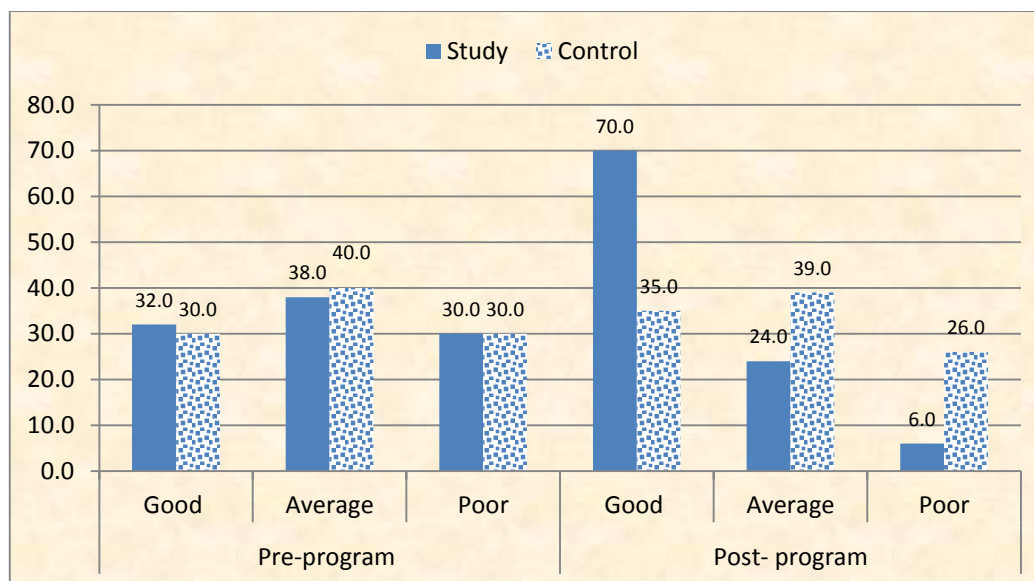**A highly statistical significant difference (p ≤ 0. 001)

Figure 2 Frequency distribution of studied women study and control group regarding their total health belief model pre and post program

Table 5 Correlation between total knowledge and total health belief model among study and control groups pre and post program

		Total knowledge			
		Pre		Post	
		r	p-value	r	p-value
Total health belief model	Study	0.26	0.85	0.62	0.005*
	Control	0.27	0.65	0.71	0.42

4. DISCUSSION

Globally preterm birth is leading cause of perinatal and neonatal mortality and morbidity. Preterm infants are particularly vulnerable to complications due to impaired respiration, difficulty in feeding, poor body temperature regulation and high risk of infection .With the increasing contribution of neonatal deaths to overall .Preterm birth is on the rise in most countries and is now the second leading cause of death globally for children under five, after pneumonia .

The preterm infant causes significant health consequences to the infant and economic costs for families and communities. Advances in prenatal and neonatal care have improved the survival for preterm infants but those infants who do survive have a greater risk of developmental disabilities, health, and growth problems than infants born at full term .About 75% of perinatal deaths and 50% of neurological abnormalities are directly related to preterm .

The major risk factor of preterm birth was absence or inadequate prenatal care, low monthly income, no contraceptive use, cesarean delivery, and clinical complications during pregnancy .

The HBM, one of the most widely used conceptual frameworks in research on health behavior, has been used by health-care educators to predict, describe, and explain behavior related to health care based on the perceptions and belief patterns of individuals. The HBM contains several primary concepts by which individuals evaluate themselves to take action to change their behaviors.

The aim of the current study was to examine the effect of educational program based on health belief model on prevention of preterm birth among newly pregnant women. The study

findings revealed acceptance of research hypothesis, which indicate the pregnant women who received educational program based on health belief model would predicted to improve their knowledge regarding preterm birth prevention, positive changes of health beliefs about preterm birth prevention.

Regarding the socio demographic characteristics: in the present study findings there was no statistically significant difference between study and control groups regarding demographic characteristics.This results mean that the two groups under study are homogenous.The current study in the same line with *.yaldasoleimanekhtiarietal,(2014):* who studied" Effect of a Self-care Educational Program Based on the Health Belief Model on Reducing Low Birth Weight Among Pregnant Iranian Women and found that no significant differences in any of the socio demographic characteristics between the two study groups (i.e., the intervention and the control groups) (P > 0.05). Also this study disagreeswith *.MoosaAbbaspouretal,(2016)* :who studied the Effectiveness of an Educational Intervention Based on the Health Belief Model in Preventing High-Risk Behaviors Among Pregnant Women and found that age p value for two groups were 0.38 and the educational status p value were 0.8. and between-pregnancy time interval p value were 0.79 .Also This study similar to *.Khoramabadi et al., 2016).*They conducted their studies to detect the impact of education intervention based on HBM on different health behavior among pregnant women. They pointed out that, there was no significant difference between the intervention and the control groups regarding their age, educational level, monthly income andoccupation

Regarding knowledge among study and control groups pre and post program: The present study showed no statistical significant difference between study and control group pre educational program regarding knowledge of prevention pre term birth , compared to highly significant difference post educational program. This result may be due to educational program seems to play a basic role in improving the knowledge of pregnant women about prevention pre term birth. Also due to the pregnant women interest to educational program for newly pregnant women and concern for their health and the health of the fetus and may be due to the majority of the sample secondary education this enhance ability of newly pregnant women to understand issues during educational program. These results agreed with*MoosaAbbaspouretal,(2016)* who studied the Effectiveness of an Educational Intervention Based on the Health Belief Model in Preventing High-Risk Behaviors Among Pregnant Women and found that the posttest mean difference of knowledge score was significantly greater in the intervention group than in the control group (P < 0.001). This finding also supports the effectiveness of HBM-based educational intervention in improving pregnant women's knowledge about the prevention of preterm birth. These results agreed with *Kaveh, M.H.,etal,(2014)*who studied "impact of education on nutrition and exercise on the level of knowledge and metabolic control indicators of Gestational Diabetes Mellitus Patients " who reported that the mean level of knowledge increased significantly after training program.

Alsoregarding total knowledge among study and control groups pre and post program:in the present study findings there was no statistically significant difference regarding mean knowledge score before and after program implementation among the control group. Meanwhile, a highly statistically significant difference (p-values < 0.001) was observed before and after program implementation among the study group.The knowledge about pre term birth causes reported by the study participants were conveniently classified into maternal, paternal and social causes. Maternal causes arerelated to factors duringpregnancy, paternal causes are factors believed to be from the father and social causes are perceived as general factors. These findings are also reported.

In similar severalstudies as riskfactors for preterm birth.*.Gondwe, A.,etal(2014).*Early deliveries that has been reported in the study as one of the maternal causes of preterm birth has

been documented to have had public health consequences to the mother and baby globally. Also this study supported by findings.*Dowa districtin Malawi National Family Planning Association (2002).* Who stated78% of the study participants were concerned about the increase in teenage pregnancies in the district.

This study disagreed with *abbasrahimi(2014).* Who studied Effect of a Self-care Educational Program Based on the Health Belief Model on Reducing Low Birth Weight Among Pregnant Iranian Women and found that Before the intervention, the majority of women in the intervention and control groups (91.9 and 92.6%, respectively) had a good level of knowledge regarding self-care activities during pregnancy, Also this study similar to the results of*yaldasoleimanekhtiarietal,(2014).*found there were no significant differences in the mean score of knowledge between the two study groups (*P* > 0.05).

Also this study similar to*alirezadidarloo (2017):*Whostudied effect of intervention based on health believe model on the change in nutritional behavior of pregnant mother with iron deficiency anemia it is considered one cause of pre-term birth, also One of the causes of anemia and iron deficiency pregnant women may be inappropriate patterns of food intake that can lead to deficient levels and low absorption of iron. and found p value for study and control group pre intervention was 0.73 and post intervention was <0.001. Mothers who are ignorant of the factors that predispose premature birth could be helped to prevent premature birth in future by giving them health education on proper nutrition during pregnancy, family planning to improve birth spacing .   Educational program would reduce the proportion of vulnerable neonates and in the long run reduce neonatal mortality.

As regarding total health belief model among study and control groups pre and post program:in the present study findings there was no statistical significant difference regarding the five main HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action) before program implementation betweenstudy and control group. However, a highly statistically significant difference (p-values < 0.001) was observed regarding the five main HBM constructs after program implementation between study and control group. this study in the same line with*hamidehmohaddesietal.,(2017):*who studied effect of intervention based on health believe model on the change in nutritional behavior of pregnant mother with iron deficiency anemia it is considered one cause of pre term birth and found that no statistical significant difference regarding the five main HBM constructs (perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action) p value forperceived susceptibility preprogram was 0.88 and post program was < 0.001) for perceived severity was 0.75 and post program < 0.001.forperceived benefits was 0.86 and post program < 0.002 for perceived barriers was 0.88 and post program< 0.001 and finally cues to action was 0.48 preprogram and post program was < 0.001.

Correlation between total knowledge and total health belief model among study and control groups pre and post program: in the present study findings there was a positive statistically significant correlation between total knowledge and total health belief model in study group after program implementation and no statistically significant between study group before program and in control group before and after program implementation. The results of the present study agree with.*Abd El Aziz,etal(2016:*)confirmed that, there was a positive highly statistically significant correlation between health beliefs and health behavior in both study and control group pre and post program implementation. Also this finding is consistent with.*Yossif& EL Sayed(2014)*: who stated that there was a statistically significant correlation between total health beliefs score and total intention score to practice health preventive behavior in both study and control groups pre and postprogram implementation.

5. CONCLUSION

Education program in early pregnancy could be positively associated with the decreased risk of preterm birth. Pregnant women should be trained and empowered to contribute positively in making pregnancy safer. Implementation of such programs among pregnant women that do not need major techniques and materials may help to reduce adverse outcomes of pregnancy for women and her fetus.

6. RECOMMENDATIONS

1. 1-Increasing awareness about importance of pre-term birth andthe complicationsamong newly pregnant women

2. Health Believe Model should be an essential part of preterm birth prevention.It is a useful framework for investigating health behaviors and identifying key health beliefs.

3. Establishing strategies to enhance the women's understanding of prevention preterm birth by applying this model to a large sample in various obstetrics and gynecological outpatient clinics.

ACKNOWLEDGEMENTS

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