Investigating the Effect of Positive, Intermediate and Negative Enabling and Training Factors Affecting Physical Activity in Pregnant Women

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Research

Abstract

Background

Physical activity during pregnancy period is one of the issues with priority during pregnancy period. Researches show that women reduce their physical activity during this period and are unaware of the benefits on the health of the mother and embryology. Although researchers regarding physical activity during pregnancy have prepared many guidelines; it is not however clear why pregnant women do not perform physical activity and the effectiveness factors that facilitate the desired behavior.

Methods

The research population included all pregnant women aged 18 to 40 years with gestational age of 12-38 weeks referring to the healthcare centers in District 5 of Tehran Municipality, from 22 districts of the city who had eliminated their physical activity during pregnancy. Questionnaires of physical activity assessment questionnaire after educational intervention in pregnant women (PPAQ) and a questionnaire designed based on the results of the needs assessment and the dimensions of the PEN-3 model were used for assessment. This study is a Research Clinical Trial (RCT). Due to the nature, a quasi-experimental research design (pre-test, post-test) with the control group was used in this research.

Results

Based on the obtained results, the intervention based on E-learning has a significant effect of enabling factors to increase physical activity in pregnant women in the experimental group. In addition, the intervention based on E-learning has a significant effect on the training factors in order to increase physical activity in pregnant women in the experimental group.

Conclusion

Based on the research results, it can be said that there is a statistically significant difference between the experimental and control groups in the scores obtained from training factors in the pretest and the experimental group. Furthermore, it can be said that there is a statistically significant difference between the experimental and control groups in the scores obtained from the enabling factors in the pre-test and the experimental group.

Background

Certain periods in women's life, such as pregnancy and afterwards, expose them naturally to a greater reduction of physical activity than men. Many researchers have realized that exercise during pregnancy is associated with "improved quality of life, depression, self-confidence, increase and a positive mental image of the body, weight control during pregnancy, and pain reduction" (1). Previous studies have shown that women who have given birth have less activity than women of the same age who did not have pregnancy experience (2).

During the pregnancy period, 80% of women experience some degrees of psychosocial stress for adaptive behavior and 20% suffer from severe mental disorders (3). Hypertension is also observed in 20% of first pregnancies. Hypertension composes the second cause of mortality. In severe preeclampsia, the perinatal mortality rate rises to 60%. Exercise by helping speed up blood flow in the lower extremities and preventing it from stopping, prevents deep vein thrombosis. In addition, a high prevalence of depression up to 60% has been reported in developing countries, and due to the low index of physical growth, physical activity will lead to a positive effect on depression (4). In developing countries, one woman in 3–5 women have major mental health problems during pregnancy period and post-delivery, while this ratio is about one in ten in developed countries (5). In line with the Third Millennium Development Goals and based on an international commitment from 1990 to 2015, many countries, including Iran, have been committed to taking steps to reduce the mortality rate of mothers. On the other hand, it should be known that improving the conditions for normal delivery is a fundamental step to promote the health of mothers in the country (6). The lack of mobility and physical activities during pregnancy period increase the probability of placenta Previa, diabetes, hypertension, the probability of cesarean section and so on in women (7). A meta-analysis in 2015 shows that regular exercise during pregnancy period on average is associated with an increased likelihood of a normal delivery (8).

Physical activity as any movement and mobility of the body that is done by skeletal muscles and by consuming energy, should not be confused with exercise and includes activities such as playing, walking, doing housework, gardening, dancing, and so on (9). The American College of Obstetricians and Gynecologists and the Center of Disease Prevention recommends healthy pregnant women to follow standard exercise programs. The American Association of Obstetricians and Gynecologists (ACOG) stated in 2002 that pregnant women, in the absence of medical and obstetric disorders, could perform physical activities most days of the week that has no potential side effects for the fetus and does not create direct harm to the mother's abdomen with medium intensity and with a limited time of about 30 minutes (10). Proper and adequate physical activity during pregnancy period has a significant effect on the health of the mother and the fetal growth process. It has been shown that physical activity affects prenatal outcomes; however, physical activity parameters such as type, severity, and length of pregnancy may vary. Doing these, exercises can have beneficial effects on the health of the mother and fetus (9). Among these effects, cases such as reducing the prevalence of HTN, eclampsia, and preeclampsia can be mentioned. Exercising prevents deep vein thrombosis by speeding up blood flow in the lower extremities and preventing them from stopping. Physical readiness allows pregnant women to perform types of their daily family, job and entertainment activities. Therefore, the risk of physical diseases due to low mobility is also reduced (11). Exercise reduces the severity of pain, even during the process of delivery and improves heart and lung function. The high percentage of cesarean sections may have cultural, economic, occupational or physical reasons (12).

Studies have shown that primiparous women who have performed aerobic exercises at least 3 sessions a week and each week, 30 minutes during pregnancy have lower overweight, have a shorter pregnancy period, and a lighter newborn baby. A common misconception related to pregnancy period is that physical activity and exercise during pregnancy period are problematic and rest is the best solution (13). Contrary

to this wrong belief, it should be noted that if the principles related to scientific exercise prescription were observed, it would be very valuable during pregnancy period. The goal of physical activity during pregnancy period is to maintain or increase physical readiness (not to increase athletic abilities) (13).

The shortage of physical activity is considered as a great risk factor for cardiovascular diseases, obesity-related diseases and mortality. Certain periods in women's life, such as pregnancy period, will naturally lead to a greater reduction of physical activity. Many researchers have concluded that exercising during pregnancy period is associated with "the quality of life improvement, depression reduction, and self-confidence, increase, and weight control during pregnancy" (14).

What is certain is that nowadays in health education, effective interventions are performed based on theory and model. It has been specified that theory-based physical activity interventions are preferable to non-theory-based interventions. Theories and models are considered as a basis for interventions and through them the effects of intervention can be measured and behaviors can be predicted. Theory is a set of interrelated concepts, definitions, and propositions that provide a systematic view of events or situations by specifying relationships between variables in order to explain and predict events and situations. Theories help us to express explicit assumptions and hypotheses related to intervention strategies and objectives (15).

Healthy mothers are advised to perform moderate-intensity physical activity for at least 150 minutes per week during pregnancy period. The prevalence of obesity during childhood and infancy periods has increased dramatically over the past three decades, and mortality rate has increased in the post-delivery period due to obesity (7).

Unfortunately, despite the many benefits of exercise in physical and mental health, many people do not have enough physical activity (3). Active participation in physical activity during pregnancy period not only maintains the general health of the pregnant person, but also reduces the risk of chronic diseases such as gestational diabetes and preeclampsia. However, the relationship between physical activity during pregnancy period and the risk of PTB is still unclear, because there are also other effective factors that affect premature delivery (3). LMS distance learning systems is considered as a tool for continuous education, and these trainings can include teachers and students of any age, geographical location, social and political status and position and with any type of training. E learning is a new method of distance learning, and is based on the internet network. With this description, people who have limited time such as employees and managers, experts, engineers and staff or due to geographical problems do not have access to good professors like residents of small or remote sites can make the maximum use of E-learning opportunities. Researches show that virtual academic education is a successful and efficient system, if the educational content is properly compiled and properly evaluated (16). Considering the low costs of this type of education, the foundation policy of using it has been proposed in Iranian university education. Also, considering that no study with a qualitative approach has been conducted so far in Iran about the underlying factors of physical activity in pregnant women, so the findings of this research can be the basis and foundation for physical activity development programs in pregnant women in the future

of the country. The results of this investigation can lead to making the necessary decisions and planning for the implementation of more comprehensive educational methods based on the conditions and facilities of the educational environment.

Research Method

The method of this research is applied in terms of purpose. The present research was conducted by mixed (quantitative and qualitative) method in terms of data collection method. This study is a research clinical trial (RCT) study. Due to the nature of the research, in this research, a quasi-experimental research design (pre-test, post-test) with a control group was used. The research population included all pregnant women aged 18 to 40 years with a gestational age of 12–38 weeks referring to health centers in District 5 of Tehran Municipality, from 22 districts of the city that had eliminated their physical activity during pregnancy. Simple random sampling was performed among those invited to participate in the study in the healthcare center. Thus, after sending invitations to pregnant women who were in their first pregnancy and conducting telephone follow-ups by an expert and the health center official, 23 people were selected among the mothers who referred to the healthcare center.

Data collection tools were semi-structured interviews and a questionnaire.

1. A questionnaire designed based on the results of needs assessment and the dimensions of the PEN-3 model,

This is a researcher-made questionnaire and has three factors with 42 items. In the present study, the validity of the questionnaire was confirmed using content validity and the internal reliability of this questionnaire was investigated through a confirmatory study among 250 pregnant mothers of the similar group, and the reliability of the questionnaire was confirmed with Cronbach's alpha coefficient of 0.85.

2- Physical activity assessment questionnaire after educational intervention in pregnant women (PPAQ),

The questionnaire has consisted of two parts, the first part was information related to personal characteristics and in the second part, 32 questions about physical activity, which were divided into four groups of questions that included activities at home (16 questions), travel (3 questions), workplace activity (5 questions) and entertainment and sports (8 questions) and activity intensity was calculated based on MET, which has been a unit for estimating metabolic expenditure in physical activity. Body mass index was calculated by dividing weight (in kg) by the square, height (in square meters). Its reliability was also determined by conducting a preliminary study on 20 research eligible pregnant women with the Cronbach's alpha of 0.85.

Validity and Reliability of the Tool:

Face Validity Investigation: The prepared questionnaires were distributed among at least 15 pregnant women referring to health care centers, and then the face validity was determined based on the

importance of the questions and by calculating the impact score. Items with an impact score of higher than 1.5 were specified as appropriate for subsequent analyses.

Content Validity: To determine the content validity, the judgment of experts under the title of the panel of experts in the desired field of expertise was used. To investigate the content validity quantitatively, two coefficients of content validity ratio and content validity index were used.

Content Validity Ratio: At least 15 specialists and experts responded to each item in three ranges (item is necessary, item is useful but not necessary, the item is not necessary). The obtained numbers, which were larger than the Lawshe's table number, were considered as necessary items.

Content Validity Index: To ensure that items have best been designed to measure structures, three criteria: simplicity and fluency, relevance or specificity, clarity or transparency were examined in the Likert's 8-part spectrum, and each item by (at least 15 specialists), and the CVI score higher than 0.79 was specified as adequate.

Reliability Investigation: To determine the reliability of data collection tools, a modified questionnaire was distributed among 30 people in the study population and Cronbach's alpha value was calculated. An alpha value higher than 0.7 was specified as adequate.

Information Analysis Method:

In the first stage, qualitative data were coded immediately after each group discussion and individual interview, and these sessions were continued until data saturation. Using MAX-QDA software and based on deductive qualitative content analysis, we obtained the main themes and topics. Descriptive and inferential statistical methods were used to analyze the data.

Findings

Interpretive Coding

In the process of thematic analysis implemented in this research, interpretive codes were created by continuous comparison and several times of descriptive codes produced in the previous step. To produce interpretive codes, several descriptive codes were collected under the umbrella of one interpretive code and formed it. Interpretive codes and descriptive codes below them have been presented in Table (1). In this table, the interpretive codes have been specified in gray and the descriptive codes below they have been specified in white. Of course, it should be mentioned that interpretive codes are not produced after all descriptive codes, but are produced and reproduced as parallel and in a continuous comparison overlapping process.

Confirmatory Factor Analysis of the Questionnaire

In this section, using structural measurement models, the accuracy of measuring structures by relevant indicators was examined.

Considering that all significant numbers of model parameters except the question of (doing daily principled exercise will not harm the mother and fetus) is higher than 1.96; therefore, the validity of the measurement structures of the relevant variables is confirmed at a significant level.

In the research model, the Root Mean Square Error of Approximation (RMSEA) is equal to 0.038 and less than 0.1 and confirms the significance and fit of the model.

Table 2 shows that the confirmatory factor analysis of the structures of the questionnaire of the impact of E-learning program to increase physical activity in pregnant women referring to health care centers in Tehran based on the PEN-3 cultural model, has a suitable fit and the structures of the questionnaire measures the relevant variables well.

Table 1
Interpretive Codes and Descriptive Codes Below Them

Interpretive Codes	Descriptive Codes below Interpretive Codes
Enabling Factors	
Time Management	
Access	
Physical Factors	
Economic Factors	
Appropriate Facilities	
Training Factors	
Informing	
The Informing Role of Media about Pregnancy Exercise	
Hospitals and Physicians Informing about Pregnancy Exercise	
Education Informing about Pregnancy Exercise	
Support from Those around	
The Role of Friends in Pregnancy Exercise	
The Role of Family in Pregnancy Exercise	

Table 2
Results of Factor Analysis of Questionnaire Structures

	Item	Factor Load	T-Value
Assessing Training Factors	If my spouse attend at physical activity training classes during pregnancy, I can more easily convince her to participate in pregnancy exercise classes.	0.48	7.53
	If my family and my spouse attend at physical activity training classes during pregnancy, I can convince them to participate in exercise classes.	0.57	9.06
	My friends and acquaintances encourage me to exercise during pregnancy.	0.64	10.46
	If after a pregnancy exercise class, there is a group discussion to exchange information with pregnant women, I am more eager to participate in a pregnancy exercise class.	0.58	9.36
	If after the pregnancy exercise class, there is a skilled and knowledgeable person to answer midwifery questions, I am more eager to participate in pregnancy exercise classes.	0.44	6.74
	If my doctor recommends, I perform exercise during pregnancy.	0.47	7.32
Assessing Enabling Factors	If there is a proper place for doing exercise, I can exercise more easily during pregnancy.	0.42	6.47
	If exercise classes are held free, I can use these classes more easily.	0.63	10.19
	If the exercise space is close to my living place, I can participate pregnancy classes better and more easily.	0.69	11.46
	If training CD is presented in the centers, I can exercise better at home.	0.61	9.84
	If there are enough facilities such as buffet, toilet, and so on in pregnancy exercise classes, I always try to participate in pregnancy exercise classes.	0.61	9.77
	If pregnancy exercise classes are held at various times during the day, I can participate in exercise classes more easily.	0.74	12.55

Table 3
Pre-Test and Post-Test Results of Variables in Experimental and Control Groups

Variable	Experimental		Control	
	Mean	Standard Deviation	Mean	Standard Deviation
Perceptual Factors	46.61	12.74	46.77	14.13
Enabling Factors	18.76	1.50	18.73	1.90
Training Factors	16.89	1.44	16.93	1.89
Post-Test				
Enabling Factors	27.47	1.74	21.09	1.75
Training Factors	25.66	2.70	18.30	2.94

Table 4
Presuppositions Results of the Analysis of Covariance for Research Variables

Variables	Kolmogorov Smirnov		Significance Level	
Enabling Factors	0.121		0.000	
Training Factors	0.098		0.000	
Increasing Physical Activity	0.117		0.000	
Variances Homogeneity	Levin's Statistics	Df1	Df2	Significance Level
Enabling Factors	0.315	1	198	0.576
Training Factors	1.404	1	198	0.238
Regression Slope Homogeneity	df	F	Significance Level (Sig)	
Enabling Factors	1	2.282	0.132	
Training Factors	1	1.668	0.198	

Table 5
Results of the One-Way Analysis of Covariance for Couples' Intimacy

Variable	Total Squares	Degree of Freedom	Mean Squares	F-Number	Significance Level	Effect Size
Enabling Factors	2031.161	1	2031.161	684.132	0.000	0.776

Table 6
Results of the One-Way Analysis of Covariance for Couples' Intimacy

Variable	Total Squares	Degree of Freedom	Mean Squares	F-Number	Significance Level	Effect Size
Training Factors	2719.433	1	2719.433	357.584	0.000	0.645

Description of Research Variables

The results of descriptive statistics about pretest and posttest of the variables of "perceptual factors", "enabling factors", "attitude" and "perceptual factors" in the experimental and control groups have been presented in Table (3).

Analytical Findings

Presuppositions of the Analysis of Covariance

According to the contents specified in Table (4), considering that the significance level for the variables of "perceptual factors", "enabling factors", "training factors" is higher than 0.05, it can be concluded that the relevant variables have a normal distribution.

Testing the Hypotheses

Hypothesis 1

Intervention based on E-learning has a significant effect of enabling factors to increase physical activity in pregnant women in the experimental group.

According to Table (5), pregnant women in the enabling factors variable (F = 684.132, P < 0.05), have received a significant impact from the intervention based on E-learning. As a result, the hypothesis zero is rejected and the research hypothesis is accepted. In other words, the intervention based on E-learning is effective on the enabling factor ratio of pregnant women.

Hypothesis 2

Intervention based on E-learning has a significant effect on training factors to increase physical activity in pregnant women in the experimental group.

According to Table (6), pregnant women in the training factors variable (F = 357.584, P < 0.05), have received a significant impact from the intervention based on E-learning. As a result, the hypothesis zero is rejected and the research hypothesis is accepted. In other words, the intervention based on E-learning is effective on the training factor ratio of pregnant women.

Conclusion

In the present study, the effect of positive, intermediate and negative enabling and training factors affecting physical activity in pregnant women was discussed and investigated. The results indicate that:

1: Intervention based on E-learning has a significant effect of enabling factors to increase physical activity in pregnant women in the experimental group.

Based on the research results, it can be said that there is a statistically significant difference between the experimental and control groups in the scores obtained from the enabling factors in the pre-test and the experimental group. After the intervention training based on E-learning in various sessions for pregnant women, the tested enabling factors were effective and increased the enabling factors of pregnant women and the research hypothesis was confirmed. During the conducted studies in various countries of the world, various factors affect doing physical activity, especially during pregnancy. Adequate income and economic and social status, social support, factors related to neighbor and friends, cohesion and social capitals and racial factors in conjunction with each other change health behavior and physical activity. Therefore, having a support network can lead to the continuation of physical activity (17).

Cultural and social factors seem to be one of the factors and perhaps barriers affecting the ratio and model of physical activity of individuals (18). In the study of Tamimi and Norouzi, there was a significant relationship between family support and physical activity. The results of their study showed that having a social communication network has an effect on health behaviors, including physical activity and among these; family support was the most important predictor of physical activity (19).

2: Intervention based on E-learning has a significant effect on training factors to increase physical activity in pregnant women in the experimental group.

Based on the research results, it can be said that there is a statistically significant difference between the experimental and control groups in the scores obtained from training factors in the pretest and the experimental group. After training intervention based on E-learning in various sessions for pregnant women, the tested training factors were effective and increased the training factors of pregnant women and the research hypothesis was confirmed. The results of the research are consistent with the studies of Shojaeian et al. (2017). In explaining this finding, it can be said that the intervention based on E-learning affects the enabling or discourage factors of exercise activity. People who are important for pregnant women receive these factors. It is important for family members and friends to pay attention to the point that mothers need support during pregnancy period and after delivery. Emotional and psychological support of those around from pregnant women is very effective in preventing psychological and mental problems of the pregnancy period. Although the process of learning and internalizing participation in exercise activities is influenced by various factors. Among these factors, social networks of pregnant women (family and friends, and so on) with approval and encouragement, advice, guidance and by providing appropriate facilities and opportunities, can provide the context for pregnant women to participate in performing certain behaviors, such as participating in exercise activities.

Abbreviations

PPAQ: Pregnancy physical activity questionnaire; RCT: Research Clinical Trial; MET: Metabolic equivalent of task; CVI: Content validity index; CVR: Content validity reliability; RMSEA: Root Mean Square Error of Approximation; WHO: World Health Organization; IRB: institutional review board.

Declarations

Ethics approval and consent to participate

The Research Ethics Committee approved the research of this study. All pregnant women in this trial were informed about participating in the survey and gave written informed consent for the study.

Consent for publication

Not applicable.

Availability of data and materials

All data generated during the process of this research are included in this article.

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Competing interests

The authors declare that they have no competing.

Authors' contributions

LK comprehended the trial, completed the collection, categorized the data. SR presented supervise during data collection and collaborated to temporary and interpretation final data. SHN performed manage during the development of the study and data collection, participated in the analysis of the data. FSH prepared the draft, and edited the repetitive draft. All researchers read, concluded, and approved the final draft.

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