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Website: www.jehp.net
DOI: 10.4103/jehp.jehp_62_18

# Physical activity for healthy pregnancy among Iranian women: Perception of facilities versus perceived barriers

Zahra Toghyani, Ashraf Kazemi<sup>1</sup>, Nafisehsadat Nekuei<sup>2</sup>

## Abstract:

**BACKGROUND:** Regular physical activity during preconception period has beneficial effects on the health of women during conception and the identification of factors associated with it is an effective factor for improving the behavior. Therefore, the aim of this study is to evaluate the relationship between the physical activity and health belief model (HBM) constructs (perceived susceptibility/severity, barriers, and self-efficacy) as intrapersonal factors among women undergoing preconception care.

**METHODS:** In this cross-sectional study, 110 women who were undergoing preconception care were carried out. Moreover, health belief constructs and attitude toward physical activity were assessed through the use of researcher-made questionnaire. In addition, the duration of physical activity with moderate/vigorous intensity was evaluated utilizing a long form of the International Physical Activity Questionnaire.

**RESULTS:** The results showed that although there was a relationship between the all health belief constructs and attitude toward physical activity and the duration of leisure physical activities carried out during ( $P < 0.05$ ), but using the linear regression test showed that only perceived barriers, independent from other variables, had a significant inverse correlation with this type of activities ( $\beta = -0.27$ ,  $P = 0.02$ ).

**CONCLUSION:** The findings of this study showed that among the constructs of the HBM, perceived barriers are the most important predictor of physical activity in women during the preconception period and emphasize the need to design possible means to promote physical activity to remove barriers to effective physical activity.

## Keywords:

Attitude, health belief, perceived barriers, physical activity, preconception

Departments of Midwifery and <sup>1</sup>Reproductive Health, School of Nursing and Midwifery, Isfahan University of Medical Sciences, <sup>2</sup>Nursing and Midwifery Care Research Center, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

## Address for correspondence:

Dr. Ashraf Kazemi,  
Department of Reproductive Health, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.  
E-mail: kazemi@nm.mui.ac.ir

Received: 07-03-2018

Accepted: 26-08-2018

## Introduction

Achieving a healthy pregnancy is influenced by the maternal health and her health-related behaviors during the preconception period.<sup>[1]</sup> The benefits of regular physical activity receive wider dimensions in women of reproductive age, especially before pregnancy. Inappropriate metabolic conditions of women in the preconception period, following inactivity, include abnormal metabolic conditions for lipids,<sup>[2]</sup> low cardiovascular capacity,<sup>[3]</sup>

which have adverse effects on the maternal and fetus health during pregnancy such as gestational, preeclampsia, and perinatal complications.<sup>[4-6]</sup> That's why it is recommend that all healthy women should be encouraged to engage in regular, moderate-intensity physical activity during preconception period.<sup>[7]</sup> Nevertheless, despite the known effects of physical activity on the health of women and encouraging women to carry out regular physical activity, the high prevalence of inactivity is a global public health problem, particularly among women.<sup>[8,9]</sup>

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**How to cite this article:** Toghyani Z, Kazemi A, Nekuei N. Physical activity for healthy pregnancy among Iranian women: Perception of facilities versus perceived barriers. J Edu Health Promot 2019;8:3.

Based on this, preconception care provides an opportunity to promote and improve physical and metabolic status before pregnancy.<sup>[10]</sup> Therefore, the physical activity is promoted by implementing appropriate interventions, as a result of which not only the physical health of the pregnant women is ensured but also motivations of active life are strengthened in them and fields needed to continue such behavior is provided during the later stages of life. Nevertheless, it is necessary to know behavior-related factors.<sup>[11]</sup>

Among the different theories and models, the health belief model (HBM) is a psychological model, which explains health behaviors and examines the relationship between beliefs and behavior. According to HBM, health concerns can be predictive of preventive health behaviors,<sup>[12]</sup> in such a way that a person will carry out the related health behavior, if he/she senses danger in a situation, takes its complications seriously, believes that in the face of that situation, a particular type of behavior leads to a valuable outcome with an acceptable cost and believes in his/her effectiveness in overcoming barriers.<sup>[12,13]</sup> Since attitudes and beliefs are closest factors to behavior and are more flexible than other factors,<sup>[14]</sup> the relationship between the physical activity, health belief constructs, and attitude toward physical activity, as intrapersonal factors, in women undergoing preconception care is evaluated in this study.

## Methods

The present research was a cross-sectional study, which was performed on 110 women between the ages of 15 and 45 years. These women were undergoing preconception care in Isfahan, Iran. Data were collected between September and November 2015. Inclusion criteria were having at least secondary education, absence of recognized mental-psychological disorders (such as depression and bipolar disorder), and absence of motor system diseases. Clustering sampling method was utilized and ten health centers were randomly selected and 110 women, who were referred to receive preconception care, were selected.

In this study, duration of moderate/vigorous physical activity was evaluated in the area of occupational, homework, transport, and leisure activities using the long form of the International Physical Activity Questionnaire of the World Health Organization.<sup>[15]</sup> Activities with metabolic equivalent of task over 4 are regarded as moderate/vigorous activities. In addition, a self-report questionnaire was utilized to assess HBM constructs, including perceived susceptibility and severity in three-dimensions of inactivity threat to the mother's, pregnancy and fetal health, perceived benefits, perceived barriers, self-efficacy, and cue to action as well

as attitude toward physical activity in four dimensions: emotional, behavioral, cognitive, and belief. The questionnaires used in 5-point Likert scale (1–5) were developed using valid literature review<sup>[16]</sup> and interviews with two specialists in the field of health promotion and a reproductive health specialist. In addition, the content and face validity of the questionnaires were confirmed by applying the opinions of experts on the first draft. The reliability of the instruments was evaluated using a pilot study on 20 people eligible to participate in the research and repeating it a week later. In assessing internal consistencies, Cronbach's alpha was 0.92 for attitude toward physical activity. In addition, Cronbach's alpha was 0.82, 0.75, 0.85, 0.72, and 0.86, respectively, for HBM constructs, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. Furthermore, reliability index in terms of repeatability was 0.95 and above 0.78 for attitude toward physical activity and for all constructs of HBM, respectively.

In addition, levels of knowledge about the beneficial effects of regular physical exercise, as an intervening variable, was assessed in the period before pregnancy using 8 multiple-choice questions. Body mass index of all women was measured by measuring height and weight.

Data were analyzed through the use of SPSS version 19, *t*-test, Pearson and Spearman correlation coefficient, and multivariate linear regression analysis by adjusting the results for age, level of education, spouse's education level, employment status, body mass index, and knowledge scores. Acceptable error rate was 0.05 in tests for statistical significance.

## Ethical considerations

The study was approved by the Ethics Committee of Isfahan University of Medical Sciences (IR.mui.rec.1394471). Furthermore, informed consent was received from all the participants.

## Results

The evaluation results of underlying factors of 110 women within 15–45 years of age and mean and standard deviation of HBM constructs, attitude toward physical activity, and duration of moderate-/vigorous-intensity physical activity in various fields are shown in Table 1. In addition, the results of evaluation that triggers physical activity are presented in Table 2.

Duration of moderate/vigorous physical activity in the area of leisure time and the total physical activity were poorly [Table 1] and directly correlated with body mass index ( $r = 0.21, P < 0.05$  and  $r = 0.26, P < 0.01$ ). In addition,

the duration of physical activity in the area of domestic and occupational tasks was negatively correlated with spouse's education level ( $r = -0.25, P < 0.01$ ). Furthermore, the average duration of physical activity in the transport field among employed women was more than unemployed women (3.70 vs. 1.62,  $t = 2.66, P = 0.01$ ). Other underlying factors had no significant correlation with duration of physical activity.

**Table 1: The results of underlying characteristics analysis**

Variables	Mean (SD) or n (%)
Knowledge (8 item), mean (SD)	6.14 (1.45)
Body mass index (kg/m <sup>2</sup> ), mean (SD)	24.79 (4.35)
Age (years), mean (SD)	29.95 (3.98)
Women education level, n (%)	
High school	5 (4.5)
Diploma	48 (43.6)
Advanced diploma and licentiate	54 (46.1)
Master degree and higher	3 (2.7)
Spouse's education level, n (%)	6 (5.5)
Secondary school and lower	11 (10.0)
High school	58 (52.7)
Diploma	30 (27.3)
Advanced diploma and licentiate	5 (4.5)
Master degree and higher	6 (5.5)
Employment status, n (%)	
Homemaker	90 (81.8)
Employed	20 (18.2)
Physical activity	
Leisure time physical activity	1.50 (2.46)
Transport physical activity (walking)	2.08 (2.35)
Tasks physical activity (domestic and occupational)	3.18 (2.70)
Total moderate/vigorous physical activity	6.76 (5.10)
Perceived susceptibility (total scale), (7 item)	28.09 (4.18)
Maternal (4 item)	16.79 (2.45)
Pregnancy (2 item)	7.78 (1.60)
Fetal (1 item)	3.52 (1.00)
Perceived severity (total scale), (5 item)	19.54 (3.22)
Maternal (2 item)	7.84 (1.53)
Pregnancy (2 item)	7.69 (1.43)
Fetal (1 item)	4.01 (0.82)
Perceived benefits (5 item)	20.95 (2.85)
Perceived barriers (7 item)	16.99 (4.47)
Self-efficacy (10 item)	34.91 (7.40)
Attitude toward physical activity (16 item)	66.93 (7.88)

SD=Standard deviation

Correlation coefficients between the main variables and duration of the physical activity in various fields are presented in Table 3. The results revealed that there is a direct and poor correlation between the duration of the physical activity in the leisure time and the level of perceived susceptibility, perceived severity, self-efficacy, and attitude toward physical activity. Furthermore, the duration of the physical activity in the leisure time was inversely correlated with the level of understanding of perceived barriers and attitude toward physical activity. Media messages, family encouragement, and complications of inactivity in family members have a significant positive correlation with leisure activities through the various effective channels of physical activity.

Nevertheless, adjusting the results for age, level of education, spouse's education level, employment status, body mass index, and the knowledge, using the multivariate linear regression showed that the level of understanding from perceived barriers was the only independent factor associated with the duration of leisure time, physical activity, and duration of the total physical activity [Table 4].

Moreover, the results of multivariate linear regression analysis showed that perceived barriers were inversely related to the level of perceived susceptibility to complications caused by inactivity for the fetus ( $\beta = -0.24, P < 0.05$ ) and self-efficacy ( $\beta = -0.50, P < 0.001$ ). There was no significant correlation among other HBM constructs and perceived barriers.

## Discussion

The purpose of this study was to evaluate the relationship between physical activity and health beliefs and attitude toward physical activity in women undergoing preconception care. The results demonstrated that although perceived susceptibility/severity and self-efficacy were correlated with the leisure time physical activity, this association was independent of underlying factors and the level of perceived barriers. Therefore, the duration of leisure time physical activity was negatively correlated to the perceived barriers and duration of leisure time physical activity was decreased

**Table 2: Kinds of cues to action for starting regular physical activity in participants**

Cues to action items	Very low (%)	Low (%)	Medium (%)	High (%)	Very high (%)
Health-care advises	1.8	4.5	35.5	35.5	22.7
Receive educational pamphlets and videos	2.7	19.1	23.6	31.8	22.7
Promotional messages in the mass media	1.8	10.9	37.3	29.1	20.9
Family advises	4.5	8.2	28.2	31.8	27.3
Friends advises	3.6	15.5	26.4	31.8	22.7
women referred to health centers advises	10.0	24.5	33.6	20.9	10.9
Observation complications of inactivity in self or in family member	5.5	10	11.8	31.8	40.9

**Table 3: Correlation between the physical activity behaviors (hours/week), the attitude toward physical activity, and health belief model constructs**

	Moderate/vigorous physical activity ( <i>r</i> )			
	Leisure time	Transport (walking)	Tasks	Total
Attitude toward physical activity	0.28**	0.13	0.18	0.29**
Perceived susceptibility (total scale)	0.26**	-0.03	0.00	0.12
Maternal	0.21*	-0.01	0.00	0.09
Pregnancy	0.21*	-0.03	-0.01	0.08
Fetal	0.25**	0.05	0.01	0.15
Perceived severity (total scale)	0.21*	-0.01	-0.03	0.08
Maternal	0.25**	-0.01	-0.05	0.09
Pregnancy	0.15	-0.03	-0.01	0.05
Fetal	0.09	0.04	0.0	0.06
Perceived benefits	0.17	0.02	0.01	0.10
Perceived barriers	-0.31***	-0.05	-0.15	-0.25**
Self-efficacy	0.30**	0.11	0.14	0.27**
Cue to action				
Health-care advises	0.08	-0.01	0.16	0.12
Receive educational pamphlets and videos	0.12	0.04	0.17	0.17
Promotional messages in the mass media	0.20*	0.02	0.08	0.15
Family advises	0.26**	-0.03	0.02	0.12
Friends advises	0.19	0.12	0.00	0.15
Women referred to health centers advises	0.10	-0.04	-0.05	0.01
Observation complications of inactivity in self or in family member	0.20*	0.02	0.10	0.16

\**P*<0.05, \*\**P*<0.01, \*\*\**P*<0.001**Table 4: The results of linear regression analysis**

	Moderate/vigorous physical activity							
	Leisure time		Transport (walking)		Tasks		Total	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
Age	0.06	0.51	0.02	0.81	-0.06	0.56	0.01	0.91
Education level	-0.16	0.15	-0.03	0.81	-0.04	0.76	-0.11	0.33
Spouse's education level	0.28	0.01	-0.01	0.95	-0.25	0.02	0.00	0.99
Employment status	0.00	0.99	0.38	<0.001	0.18	0.07	0.27	0.01
Body mass index	0.21	0.04	0.10	0.35	0.17	0.12	0.23	0.02
Knowledge	-0.05	0.60	0.08	0.46	-0.14	0.19	-0.06	0.54
Attitude toward physical activity	0.01	0.98	0.04	0.74	0.15	0.26	0.10	0.43
HBM constructs								
Perceived susceptibility	0.18	0.24	0.01	0.96	-0.01	0.97	0.09	0.57
Perceived severity	0.01	0.93	-0.17	0.31	-0.19	0.24	-0.17	0.27
Perceived benefits	-0.08	0.56	-0.04	0.76	0.06	0.67	-0.03	0.85
Perceived barriers	-0.27	0.02	-0.07	0.52	-0.15	0.19	-0.24	0.03
Self-efficacy	0.15	0.18	0.12	0.29	0.07	0.56	0.17	0.14

HBM=Health belief model

with an increase in the level of perceived barriers. This finding is in line with the results of other research carried out among different groups.<sup>[16,17]</sup> In addition, the results of meta-analysis carried out on the use of HBM in describing health behaviors, demonstrated that barriers perceived as the most powerful constructs of HBM, and had the greatest impact in predicting health behaviors and perceived susceptibility and severity are poor predictive ability for these behaviors.<sup>[17]</sup> This finding is in line with HBM theories, which explains that even when a person understands the threat of the complication and believes that a particular behavior

will effectively reduce this threat, and if the evaluation of perceived barriers to the behavior is more than its benefits, barriers can prevent the adoption of the above behavior.<sup>[13]</sup> In contrast to these results, Downs and Ulbrecht reported that in pregnant women and in women in the postpartum period, understanding barriers do not have a crucial effect on the duration of the physical activity, while in contrast to these results, the perceived benefits were a major factor contributing to physical activity.<sup>[18]</sup> The difference in the results of studies carried out on pregnant and nonpregnant women who were undergoing preconception care is probably due to the

fact that the pregnant women feel greater responsibility for maintaining their healthy pregnancy; therefore, they underestimate barriers while seeking to understand the benefits of a behavior.

Another finding indicates an inverse relationship between the perceived barriers and the perceived susceptibility toward fetal complications, which shows the importance of the fetal health in future mothers which can reduce perceived barriers to physical activity. These results demonstrate that one of the ways to promote the level of physical activity is to focus health promotion programs on the reduction of barriers to physical activity in women. Furthermore, given the imminence of pregnancy in women undergoing preconception care, these interventions should be started in the adolescence period. The findings also indicate that an increase in the perceived susceptibility may be associated with lower perceived barriers with a focus on the fetal health in women undergoing preconception care.

Results of several studies have reported conflicting results on the evaluation of the correlation between attitude and physical activity. Based on this, the results of several studies revealed that attitude to behavior are not a predictor of the levels of physical activity among Iranian women.<sup>[19]</sup> In addition, the previous study in Glasgow showed that although public attitude was positive toward physical activity, there was no significant relationship between attitude and physical activity.<sup>[20]</sup> Whereas, other studies reported that attitude is an important and predictive factor of physical activity in middle-aged women.<sup>[21,22]</sup> Nevertheless, the results of this study showed that although the duration of the moderate/vigorous physical activity was positively correlated with the attitude in women undergoing preconception care, this correlation was independent of factors underlying the perceived barriers. These results demonstrated that structural facilities and cultural reception for the physical activity is needed in order to promote physical activity in women, particularly physical activity in leisure time. In this regard, social norms may affect women's physical activity more than their attitude toward physical activity and health beliefs and therefore may follow by a greater perception of the barriers in women. It seems that the physical activity promotion programs are more effectively implemented among women, especially in societies where many cultural and structural barriers exist in the way of doing physical activity by women, because another finding of the research has revealed that family's recommendation and media messages among a variety of effective channels on physical activity have a decisive role during physical activity. While in some other countries, health-care providers were identified as important sources for information regarding physical activity.<sup>[23]</sup> In

addition, the results of the present study revealed that observation of side effects caused by physical inactivity by the person or family was significantly correlated with physical activity in leisure time. This research finding confirms the role of observational learning in increasing the duration of physical activities.

## Conclusion

The present study demonstrated that understanding barriers is the most important determinants of physical activity behaviors in young women undergoing preconception care. Furthermore, the relationship between the perceived barriers and the perceived susceptibility to complications caused by inactivity for the fetus shows that health promotion programs may be associated with increased physical activity in preconception care by focusing on the increased susceptibility in women toward the fetal health.

## Acknowledgment

The authors would like to thank the Isfahan University of Medical Sciences for funding the survey (Grant Number: 394471).

## Financial support and sponsorship

This study was financially supported by Isfahan University of Medical Sciences (GN: 394471).

## Conflicts of interest

There are no conflicts of interest.

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