

Health beliefs and stages of changes to improve behaviors among obese and overweight women undergoing preconception care

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ABSTRACT

Background: Beginning and continuing pregnancy with obesity and being overweight has some known side effects for the mother and the fetus. Preventing these complications requires medical interventions before pregnancy. Because designing health improvement interventions requires understanding of the related factors of the behavior, the aim of this study was to determine the relation between health beliefs of women regarding the risks of obesity for pregnancy and stages of behavioral changes in women under preconception care.

Materials and Methods: This study was a cross-sectional study that was conducted on 120 obese and overweight women under preconception care. Health belief structures including perceived sensitivity/intensity, perceived benefits, perceived barriers, and perceived self-efficacy were measured using a questionnaire, and its relation with stages of nutrition and physical activity behavior changes was evaluated according to a transtheoretical model.

Results: Results showed a significant correlation between the stage of nutrition behavioral change and perceived sensitivity/intensity, perceived benefits, and self-efficacy ($P < 0.05$). In addition, the stage of physical activity behavioral change showed a negative and significant correlation with perceived barriers and a positive and low-to-moderate significant correlation with other health belief structures ($P < 0.05$). Furthermore, the relation of perceived sensitivity/intensity with perceived benefits and self-efficacy was positive and significant, and that with perceived barriers was negative and significant ($P < 0.01$).

Conclusions: Results showed that a health belief model could be a predictor of weight adjustment behaviors including nutrition and physical activity behaviors. Therefore, educational interventions based on a health belief model could be effective for improvement of these behaviors in obese and overweight women under preconception care.

Key words: Health belief model, nutrition, obesity, overweight, physical activity, transtheoretical model

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INTRODUCTION

Obesity and being overweight have known effects on the cardiovascular system and metabolic conditions, and its everyday increasing prevalence has made it a public health problem. Obesity and being overweight are important risk factors of systemic disorders.^[1,2] In addition, a relation between obesity and some kinds of cancer has been reported.^[3] While it is

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estimated that complications of obesity is the main cause of mortality, its prevalence has an increasing rate, especially among women. It was reported that, in 2005, 57% of women were obese and overweight,^[4] which is estimated to reach 74% by 2015.^[5] Increasing prevalence of obesity especially among women is much more widespread than just public health. Undesirable effects of obesity and being overweight on the childbearing capabilities of women,^[6,7] as well as its effects on the health of the mother and the fetus have been confirmed by many studies. Complications such as preeclampsia and gestational diabetes, which are more prevalent among obese women,^[8,9] are important factors in mortality of mothers and infants.

Other complications of obesity and being overweight such as preterm delivery,^[10] increased rate of caesarian section,^[11] and failure in breastfeeding are factors that would increase the morbidity of mothers and infants. Therefore, starting pregnancy with an appropriate weight for women is one of the important goals of women's health. However, success of health improvement programs requires recognition of individual's intellectual infrastructure. In this case, health system programs could be successful. In explaining many health-related behaviors, health belief models had enough capability,^[12,13] and in some cases, using it had positive results on pregnancy-related behaviors.^[14,15] A review article showed that the level of perceived threat of obesity is associated with an increased motivation for weight loss;^[16] however, the teachings of traditional societies that recommend obesity as the perfect condition for getting pregnant could affect individual's health belief. Therefore, understanding the dominant thoughts of obese women who intend to get pregnant is of special importance. Therefore, the aim of this study was to evaluate the health belief of obese women who intended to get pregnant and were under preconception care. In addition, this research studied the relation between health belief structures of this group and weight loss related behaviors based on the stage of change theory.

MATERIALS AND METHODS

This study was a cross-sectional research conducted on 120 obese and overweight women receiving preconception care in four health centers of Isfahan from 2014 to 2015. This study was approved by the ethics committee of Isfahan University of Medical Sciences. Number of samples was determined using Cochran's sample size formula with a confidence interval of 95% and 0.01 error. Inclusion criterion was age of 18–40 years. Data gathering tool was a 30-item questionnaire with a Likert scale (1–5) that was completed as self-reports and measured health belief structures including sensitivity and intensity of perceived threat,

perceived benefits, perceived barriers, and self-efficacy. This questionnaire was prepared based on the pattern of questionnaires for measuring health belief structures from previous literature.^[17] Furthermore, a pilot study conducted among 15 individuals with the inclusion criterion and repeated within a week reliability of all structures regarding their repeatability was approved by an index of more than 0.76. Cronbach's α for all structures was more than 0.73, which approved the internal reliability of the questionnaire. Examples of questionnaire's questions: For sensitivity, "if I would not lose weight I would have a more risky pregnancy than others;" intensity of perceived threat, "if I'd start my pregnancy with my current weight I would be worried about the health of the fetus;" perceived benefits, "I believe that losing weight before pregnancy would help my health during pregnancy;" perceived barriers, "losing weight programs are costly and expensive;" and perceived efficacy, "I could program my life so I would be able to execute weight loss programs." Evaluation of stage of change for nutrition and physical activity behaviors was conducted separately using a 5-item questionnaire including maintenance, action, preparation, contemplation, and pre-contemplation. Body mass index (BMI) was calculated by measuring height and weight and dividing weight (in kg) by square of height (in m). Centers for providing preconception care were selected by stratified randomization. Participants were selected from all the women who were referred to these centers for preconception care and had a BMI of more than 25. The criterion for being overweight was having a BMI of 25 to 30 kg/m², and for being obese the criterion was a BMI of more than 30. Written consent form was obtained from all the participants. From 120 questionnaires, 119 were completely filled and returned. Data was analyzed using the Statistical Package for the Social Sciences version 19 (Chicago, IL, USA) and Pearson correlation coefficient. The significant level for *P* value was set at 0.05.

Ethical considerations

This study was approved by the ethics committee of Isfahan University of Medical Sciences. Also, all subjects signed an informed written consent.

RESULTS

In this study from 119 participating women 93 (78.15%) were overweight and 26 (21.85%) were obese. Demographic characteristics and stage of change of nutrition and physical activity behaviors are shown in Table 1. Results showed that most of the participants for nutrition behaviors were in the contemplation phase and for physical activity behaviors were in the preparation phase. Table 2 presents the results of participants' health belief evaluation, the mean of sensitivity and intensity of perceived threat (pregnancy health, mother's

Table 1: Subjects profile

Variables	Mean (SD) or Number (%)	
Age	30.35 (4.20)	
Parity	1.18 (0.82)	
Body mass index	28.74 (3.14)	
Education (%)		
Less than high school	15 (13.60)	
High school and diploma	54 (45.40)	
University degree	50 (42.00)	
Working situation (%)		
Employed	14 (11.20)	
Unemployed	105 (88.20)	
Economic status		
Low level	1 (0.80)	
Moderate level	88 (73.90)	
High level	30 (25.20)	
Stage of change for nutrition (%)		
Pre-contemplation	14 (11.80)	
Contemplation	30 (25.30)	
Preparation	32 (25.20)	
Action	32 (25.20)	
Maintenance	11 (9.20)	
Stage of change for physical activity (%)		
Pre-contemplation	12 (10.10)	
Contemplation	32 (26.90)	
Preparation	36 (30.20)	
Action	27 (22.70)	
Maintenance	12 (10.10)	

SD: Standard deviation

Table 2: Constructs of health belief model

	Mean (SD)	
	Based on pure scale	Based on 100 scale
Perceived susceptibility (9 item)	26.69 (5.18)	59.31 (11.51)
Related to pregnancy complications (6 item)	15.88 (3.12)	52.94 (10.41)
Related to maternal health (2 item)	7.76 (1.86)	61.01 (18.01)
Related to fetal health (1 item)	3.05 (.90)	61.01 (18.01)
Perceived severity (6 item)	18.8 (4.29)	62.75 (14.31)
Related to pregnancy complications (2 item)	6.39 (1.47)	63.87 (14.74)
Related to maternal health (2 item)	3.14 (.81)	31.43 (8.06)
Related to fetal health (2 item)	9.29 (2.39)	92.94 (3.93)
Perceived benefits (5 item)	17.31 (2.70)	69.24 (10.81)
Perceived barriers (6 item)	9.50 (5.64)	31.68 (18.81)
Perceived self-efficacy (5 item)	15.96 (3.38)	63.83 (13.53)

SD: Standard deviation

physical health, and fetus's health dimensions), perceived benefits, perceived barriers, and self-efficacy structures.

Correlation matrix using Pearson and Spearman correlation coefficient between demographic data, health belief structures, and BMI showed that BMI had a weakly significant and positive correlation with perceived sensitivity and perceived intensity. In addition, there was a positive correlation between perceived sensitivity and intensity with perceived benefits and self-efficacy, and a significant and negative correlation between the same two structures and level of perceived barriers. Moreover, the results of Spearman correlation showed that the stage of change of nutrition behaviors had a weak and significant correlation with all the health belief structures, except for perceived barriers. In addition, the stage of change of physical activity had a negative and significant correlation with perceived barriers and a positive and weak to moderate correlation with other health belief structures [Table 3]. Table 4 presents the results of evaluation of correlation between health belief structures and BMI and physical activity and nutrition stage of change regardless of demographic characteristics including age, number of deliveries, economic status, and educational level. These results showed that the observed correlation between health belief structures with BMI and stage of change behaviors were independent from the demographic characteristics.

DISCUSSION

This study was conducted on overweight and obese women, who intended to get pregnant and were under preconception care. Their health belief structures about the complications of being overweight and obese during pregnancy were evaluated. Results of the study showed that overweight and obese women had a relatively higher level of sensitivity/intensity of perceived threat regarding obesity during pregnancy. Results showed that women with inappropriate weight conditions before pregnancy assume themselves to be prone to the complications of obesity and believe these complications to be serious. Another result showed that, along with higher levels of sensitivity/intensity of perceived threat in participating women, level of perceived benefits was relatively high and of perceived barriers was relatively low. Therefore, according to health belief model theories,^[17] it could be expected that the studied women have started efforts to moderate their weight. In this regard, the results of the study showed that more than 85% of the participants were at the contemplation or higher stage of change in nutrition and physical activity behaviors for moderation of their weights. In addition, the observed direct and significant correlation between perceived sensitivity/intensity, perceived benefits, and perceived self-efficacy

Table 3: The matrix association of variables (Pearson and spearman)

	Health belief model constructs					Stage of change	
	P. susceptibility	P. severity	P. benefits	P. barriers	P. self-confidence	Nutrition	Physical activity
Age	0.15	0.11	0.18*	-12	0.02	0.12	0.20
Parity	0.06	0.08	0.12	0.13	0.10	-0.06	0.06
Education	0.11	0.05	0.03	0.03	-0.07	0.07	-0.04
Economic	-0.08	0.08	0.04	0.09	0.03	-0.05	-0.06
BMI	0.19*	0.25**	0.14	0.03	0.08	0.12	-0.02
P. susceptibility	-	0.77****	0.53****	-0.34****	0.38****	0.21*	0.20*
P. severity	-	-	0.53****	-0.23**	0.42****	0.22*	0.19*
P. benefits	-	-	-	-0.26**	0.62****	0.28**	0.37****
P. barriers	-	-	-	-	-0.26**	-0.14	-0.28**
P. self-confidence	-	-	-	-	-	0.28**	0.27**

*P<0.05, **P<0.01, ***P<0.001, ****P<0.0001, P: Perceived

Table 4: The relations between stage of change and health belief model constructs (Partial correlation)

	Body mass index	Stage of change	
		Nutrition	Physical activity
Perceived susceptibility	0.21*	0.22*	0.19*
Related to pregnancy complications	0.21*	0.25**	0.25**
Related to maternal health	0.09	0.08	0.03
Related to fetal health	0.30***	0.21*	0.18
Perceived severity	0.27**	0.18*	0.15
Related to pregnancy complications	0.25**	0.22*	0.17
Related to maternal health	0.31**	0.08	0.04
Related to fetal health	0.25**	0.17	0.17
Perceived benefits	0.17	0.26**	0.01
Perceived barriers	0.02	-0.11	-0.07
Perceived self-confidence	0.08	0.32**	0.13

*P<0.05, **P<0.01, ***P<0.001

with level of behavior change in obese and overweight women as well as its reverse correlation with perceived barriers indicated that health belief structures could be predictors of weight moderating behaviors in obese and overweight women under preconception care. Self-efficacy improvement interventions and nutrition behaviors modification in Iran among women under preconception care have been successful in improving efforts for modification of nutrition behaviors.^[18] A qualitative study also showed that one of the most important barriers of having a healthy lifestyle for obese individuals is lack of perceived threat.^[19] Other studies have also shown that women with other risky conditions that caused them to perceive higher threats than other women had more health related behaviors than other women. Charron-Prochownik *et al.* reported that the intensity of perceived threat in diabetic teenagers is an important factor in modification of

metabolic controlling behaviors to reduce pregnancy health damages. They also showed a positive relation between perceived benefits and lifestyle modification behaviors to improve pregnancy condition in women with type-1 diabetes and a reverse correlation between the level of perceived barriers and lifestyle modification behaviors.^[20]

In the present study, participants' health beliefs regarding the threats of being obese and overweight before pregnancy was not studied; however, the observed relation in other studies between perceived sensitivity and weight moderating behaviors in obese women^[16] showed that probably the women who participated in the present study did not have high levels of perceived sensitivity/intensity to try to moderate and keep an ideal weight for the sake of their health, and probably planning for pregnancy has become an important factor to increase the level of perceived threat.

Other results of this study that showed direct correlation between behaviors' stage of change and perceived sensitivity/threat about the effects of obesity on pregnancy health and health of fetus and the lack of correlation between perceived sensitivity/intensity and mother's physical health have confirmed this matter and individual's strong motivations for having a pregnancy with appropriate conditions and maintain the health of the fetus is also an explanation for this result. Pregnancy is an important part in a woman's life, and whenever they feel a factor could cause them to start an inappropriate pregnancy and would be worried about its complications, they would redirect their behaviors to resolve those problems.^[17]

According to the results, despite a correlation between perceived sensitivity/intensity and levels of nutritional behavior changes, there was no significant correlation between perceived sensitivity/intensity about the health of fetus and levels of physical activity behavior changes.

Studies have shown that mostly women prefer to restrict their intake calories than to perform physical activities for weight moderation,^[21] which could be an explanation for this result.

Direct correlation of sensitivity and intensity of perceived threat with each other and the direct correlation of these two structures with level of perceived benefits and self-efficacy and their reverse correlation with level of perceived barriers and adherence of weight moderation behaviors to this model showed that the health belief model is an appropriate model for explaining weight loss nutrition and physical activity behaviors among women who are planning to get pregnant and are under preconception care. In addition, these findings showed that using this model could be appropriate for improving weight loss behaviors in obese and overweight women during preconception period. Other results of this study indicated the presence of a direct and significant correlation between BMI and perceived sensitivity/intensity and lack of correlation between BMI and perceived benefits, barriers, and self-efficacy. In addition, the results showed no correlation between BMI and level of stage of changes. These findings conclude that BMI is not a predictor of weight loss behaviors in obese and overweight women.

Although the results of this study showed efficiency of health belief model for explaining weight loss related behaviors in women receiving preconception care, it is necessary to consider this study's limitations for generalizations of the results. One of the most important limitations of this study was that this was a cross-sectional study and could not determine the causal relation between variables. Moreover, being at higher phases of transition implies having more knowledge and consequently an increased sensitivity/intensity of perceived threat for future pregnancies.

CONCLUSIONS

The results of this study showed that the level of perceived threat in overweight women planning their pregnancies and receiving preconception care is relatively desirable and the health belief model could be an explanation for weight loss nutrition behaviors among them.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Inci M, Demirtas A, Sarli B, Akinsal E, Baydilli N. Association between body mass index, lipid profiles, and types of urinary stones. *Ren Fail* 2012;34:1140-3.
2. Sanada H, Yokokawa H, Yoneda M, Yatabe J, Sasaki Yatabe M, *et al*. High body mass index is an important risk factor for the development of type 2 diabetes. *Intern Med* 2012;51:1821-6.
3. Ma Y, Yang Y, Wang F, Zhang P, Shi C, Zou Y, *et al*. Obesity and risk of colorectal cancer: A systematic review of prospective studies. *PLoS One* 2013;8:e53916.
4. Janghorbani M, Amini M, Willett WC, Mehdi Gouya M, Delavari A, Alikhani S, *et al*. First nationwide survey of prevalence of overweight, underweight, and abdominal obesity in Iranian adults. *Obesity* 2007;15:2797-808.
5. World Health Organization: Chronic diseases are the major cause of death and disability worldwide. Available at: <http://www.who.int> [Last accessed on 2015 Nov 21].
6. Ramezanzadeh F, Kazemi A, Yavari P, Nasr-Esfahani MH, Nejat S, Rahimi-Foroshani A, *et al*. Impact of body mass index versus physical activity and calorie intake on assisted reproduction outcomes. *Eur J Obstet Gynecol Reprod Biol* 2012;163:52-6.
7. Best D, Bhattacharya S. Obesity and fertility. *Horm Mol Biol Clin Investig* 2015;24:5-10.
8. Metsala J, Stach-Lempinen B, Gissler M, Eriksson JG, Koivusalo S. Risk of Pregnancy Complications in relation to maternal prepregnancy body mass index: Population-based study from Finland 2006-10. *Paediatr Perinat Epidemiol* 2015;30:28-37.
9. Spradley FT, Palei AC, Granger JP. Increased risk for the development of preeclampsia in obese pregnancies: Weighing in on the mechanisms. *Am J Physiol Regul Integr Comp Physiol* 2015;309:R1326-43.
10. Shin D, Song WO. Prepregnancy body mass index is an independent risk factor for gestational hypertension, gestational diabetes, preterm labor, and small- and large-for-gestational-age infants. *J Matern Fetal Neonatal Med* 2015;28:1679-86.
11. Al-Kubaisy W, Al-Rubaey M, Al-Naggar RA, Karim B, Mohd Noor NA. Maternal obesity and its relation with the cesarean section: A hospital based cross sectional study in Iraq. *BMC Pregnancy Childbirth* 2014;17:14:235.
12. Frohwirth L, Moore AM, Maniaci R. Perceptions of susceptibility to pregnancy among U.S women obtaining abortions. *Soc Sci Med* 2013;99:18-26.
13. Ben Natan M, Kuttygaro R. Predictors of women's intentions to be screened for HIV during pregnancy. *J Assoc Nurses AIDS Care* 2015;26:673-9.
14. Ekhtiari YS, Majlessi F, Foroushani AR, Shakibazadeh E. Effect of a self-care educational program based on the health belief model on reducing low birth weight among pregnant Iranian women. *Int J Prev Med* 2014;5:76-82.
15. Khoramabadi M, Dolatian M, Hajian S, Zamanian M, Taheripanah R, Sheikhan Z, *et al*. A Effects of education based on health belief model on dietary behaviors of Iranian pregnant women. *Glob J Health Sci* 2015;25;8:230-9.
16. Daddario DK. A review of the use of the health belief model for weight management. *Medsurg Nurs* 2007;16:363-6.
17. Glanz K, Rimer B, Viswanath K. *Health Behavior and Health Education, Theory, Research, and Practice*. 4th Ed. San Francisco: Jossey-Bass, San Francisco; 2008.

18. Bastani F. The effect of education on nutrition behavioral intention and self-efficacy in women. *Health Scope* 2012;1:12-7.
19. Amiri P, Ghofranipour F, Ahmadi F, Hosseinpanah F, Montazeri A, Jalali-Farahani S, *et al.* Barriers to a healthy lifestyle among obese adolescents: A qualitative study from Iran. *Int J Public Health* 2011;56:181-8.
20. Charron-Prochownik D, Sereika SM, Becker D, Jacober S, Mansfield J, White NH, *et al.* Reproductive health beliefs and behaviors in teens with diabetes: Application of the Expanded Health Belief Model. *Pediatr Diabetes* 2001;2:30-9.
21. Serdula MK, Collins ME, Williamson DF, Anda RF, Pamuk E, Byers TE. Weight control practices of U.S. adolescents and adults. *Ann Intern Med* 1993;119 (7_Part_2):667-71.