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Comparison of health-promoting lifestyle and irrational health beliefs in healthy pregnant women and gestational diabetes mellitus

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Abstract:

BACKGROUND: Gestational diabetes mellitus (GDM) is a common complication of pregnancy. The goal of this study was to compare health-promoting lifestyles and irrational health beliefs in pregnant women with GDM and healthy pregnant women.

MATERIALS AND METHODS: The present study was a descriptive causal-comparative study in which 100 eligible GDM women and 100 eligible healthy women were selected through available sampling in three referral hospitals in Tehran In 2020. In this study, the Health Promoting Lifestyle Profile (HPLP) and the Irrational Health Beliefs Scale (IHBS) were used. Data were analyzed using independent *t*-test and logistic regression by SPSS 16 software.

RESULTS: Findings showed that there is a significant relationship between the variables of IHBS and HPLP. For every one unit increase in an IHBS score, the chance of having diabetes increases by 2.8%. In the case of HPLP, women who exercised well were 7.5% less likely to develop diabetes, and those who took good responsibility were 7.8% less likely to develop diabetes. Furthermore, in independent *t*-test, the HPLP variable showed a significant difference between the two groups with diabetes and healthy individuals ($P < 0.001$). Furthermore, in comparing the subscales of this variable, physical activity ($P < 0.0001$), self-fulfillment ($P < 0.004$), responsibility ($P < 0.003$), and stress control ($P < 0.001$), a significant difference was observed. The results of IHBS research showed a significant difference between the two groups of gestational diabetes and healthy individuals ($P < 0.004$).

CONCLUSION: The results of the present study show the need to identify and focus on irrational health beliefs and health-promoting lifestyles. Modification of these psychological structures can be useful in the prevention and management of this chronic disease.

Keywords:

Gestational diabetes mellitus, health-promoting lifestyle, irrational health beliefs

Introduction

Gestational diabetes mellitus (GDM) is a common complication of pregnancy that begins with glucose intolerance or metabolic disorders during pregnancy.^[1] In 2019, more than 20 million live births worldwide were associated with some form of hyperglycemia, 84% of which was due to

GDM.^[2] In Iran, the prevalence of this disease is between 1.3% and 18.6%.^[3] Complications of this disease include macrosomia, birth injuries, stillbirth, neonatal hypoglycemia, and preeclampsia.^[4] GDM has increased over the past two decades.^[5] The increase in GDM worldwide is probably due to inappropriate lifestyle changes and unhealthy health behaviors.^[6] If GDM is not treated in time, it can significantly increase the risk of mother

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and baby getting type 2 diabetes and obesity.^[7] Self-care is an important and vital aspect of GDM management that lifestyle modification is one of its components.^[8] Improving lifestyles such as adopting a healthy eating pattern and having proper physical activity are important ways to prevent diabetes.^[9] Unhealthy lifestyle is one of the causes of chronic diseases and premature death.^[10] Lifestyle is a concept that is often used to describe people's choices according to their consumption pattern, in the field of health, these choices include diet, smoking, alcohol, and other health-related habits.^[11] Adopting a health-promoting lifestyle is a safe way to maintain and promote maternal and infant health.^[12] This strategy includes performing appropriate health behaviors in various aspects of life that lead to improved physical and mental health^[13] and prevention of chronic diseases.^[14] While several studies have examined the relationship between a healthy lifestyle and a reduced risk of disease, there are few studies that have evaluated a health-promoting lifestyle and its components.^[15] In a study, Gilbert *et al.* showed that mental and social health was associated with adequate nutrition and physical activity in women with GDM,^[16] but that other aspects of a healthy lifestyle were not considered simultaneously in this study.

Another factor influencing health behaviors is people's beliefs. Irrational health beliefs play an important role in poor self-care and poor treatment decisions.^[17] Focusing on irrational health beliefs shows that a person's health behaviors and decisions are influenced by his or her irrational information and assessments about his or her health or distorted information.^[18] Researchers have shown that a person's beliefs about health and disease have been effective predictors of drug intake.^[19,20] Numerous studies have examined the relationship between individuals' cognitive domains, especially irrational beliefs and emotional disturbances such as anxiety, depression, and physiological stimuli such as hypertension.^[21] In defining irrational health beliefs, researchers have pointed to a kind of optimistic bias in people's judgments about the likelihood of their health being compromised, meaning that people tend to believe they are less at risk than those around them. Therefore, they engage in fewer health-oriented behaviors, and because they believe that they will never get sick under any circumstances, they are more at risk and more prone to physical illness.^[22] Fathabadi *et al.* was mentioned irrational health beliefs have the predictive power of diabetes.^[23,24] But these studies have limitedly examined other diseases as well as pregnancy period. Given the presence of Iran in the process of developing national health programs that focus on obesity, diabetes, cardiovascular disease, and cancer, so to design and formulate health programs, a correct understanding of a healthy lifestyle is essential.^[25]

Considering the importance as well as the prevalence of GDM, it is necessary to identify the factors involved in their incidence. It seems that psychological structures such as health-promoting lifestyles and irrational health beliefs can be effective in preventing and controlling these diseases. Therefore, a study was conducted to investigate health-promoting lifestyles and irrational health beliefs and also to compare it in women with gestational diabetes and healthy women.

Materials and Methods

The method of the present study was descriptive causal-comparative. The statistical population of the study included all pregnant women with gestational diabetes and healthy women referred to three referral hospitals (Taleghani Hospital, Mahdiye Hospital, and Arash Hospital) in Tehran in 2020. The number of samples was 100 women with gestational diabetes and 100 healthy pregnant women who were selected by the available sampling method and according to the inclusion and exclusion criteria. Inclusion criteria were being Iranian, literacy, gestational age 24–38 weeks, and diabetes diagnosed by a doctor in the group with GDM. Exclusion criteria were a history of known chronic medical or mental illness, except in the case of gestational diabetes, a history of specific and chronic medical or psychological illness in a healthy pregnant group.

For this study, an ethics code was obtained from the Medical Sciences Department of Shahid Beheshti University. All participants were informed about the ethical issues of the research. This awareness includes the purpose of the research, the confidentiality of the participants' information, and that they have the right to be excluded from the study at any time in their sole discretion. After obtaining informed consent, the questionnaires were completed by the participants.

Research tools

Demographic and midwifery profile form

This form contains questions related to demographic and midwifery characteristics, which include age, age of spouse, occupation, occupation of spouse, level of education, level of education of spouse, economic status, and number of deliveries.

Health-Promoting Lifestyle Profile

This scale was first developed by Walker *et al.* in 1987. This questionnaire has 52 questions and its purpose is to measure nutritional health-promoting behaviors (8 questions), physical activity (9 questions), health responsibility (9 questions), stress management (9 questions), interpersonal relationships (9 questions), and self-actualization (9 questions). People should choose their answers on a Likert scale (never, sometimes, often,

and always), respectively from 1 to 4. In their study, Walker *et al.* calculated the Cronbach's alpha coefficient for the overall score of this questionnaire as 0.94 and for its 6 subscales between 0.88 and 0.90. In Iran, Cronbach's alpha coefficient for the whole tool was 0.82, and for subscales from 0.64 to 0.91.^[25]

Health Irrational Beliefs Scale

This scale was developed in 1999 by Christensen *et al.* Irrational beliefs about health is a 20-item self-report scale. At this scale, after describing the beliefs, an assessment of the situation is made, and participants must answer in a 5-point Likert scale (1. I will never have such an idea; 2. I will almost have such an idea; 3. In between I will have an idea; 4. I will have such an idea most of the time; and 5. I will always have such an idea) to choose to determine how much their assessment of their situation is similar to the requirements and conditions of the situation they imagine. The person's desired response is summed up in each of the items and the average number obtained indicates the amount of irrational beliefs about the person's health status. The higher a person's score, the more irrational thoughts they indicate. The minimum score that can be obtained from this scale is 20 and the maximum score is 100. In Iran, the apparent, content, and convergent validity of the scale were of good quality. In addition, Cronbach's alpha value was 0.86 and retest reliability was 0.64.^[26]

Method of data collection and analysis

This study was approved by the Ethics Committee of Research Deputy of Shahid Beheshti University of Medical Sciences, Tehran, Iran (IR.SBMU.RETECH.REC.1399.456). After preparing the questionnaires, the necessary arrangements were made for sampling in selected hospitals. All participants met individually and received explanations about the purpose of the research, the confidentiality of the information, and the voluntary participation in the study. Questionnaires were provided to those who wished to participate in the study and were eligible to enter the study. After collecting information, the data were analyzed by SPSS (Statistical Package for the Social Sciences) version 16, SPSS Inc Chicago, Illinois, USA, statistical software. For statistical analysis, in addition to desc statistics, independent *t*-test as well as logistic regression was used.

Results

In this study, 200 pregnant women (100 healthy women and 100 women with diabetes) were studied. The mean age of the samples was 29.98 years (6.03), 60% of the samples had a diploma or lower.

Examination of the data in Table 1 shows that there is a significant difference in the comparison of

health-promoting lifestyles between the two groups of diabetics and healthy individuals ($P < 0.001$). Furthermore, a significant difference was observed in comparing the subscales of health-promoting lifestyle, physical activity ($P < 0.0001$), self-fulfillment ($P < 0.004$), health responsibility ($P < 0.003$), and stress control ($P < 0.001$). The results of research on irrational health beliefs showed a significant difference between the two groups of diabetics and healthy individuals ($P < 0.004$).

Table 2 shows that irrational belief in health has a significant negative correlation with health-promoting lifestyle and all its subsets.

Based on the results of Table 3 and regarding the coding for regression analysis (diabetic = 1, healthy individuals = 0), some health-promoting lifestyle variables (physical activity and health responsibility), as well as irrational health belief, predicted the incidence of GDM in women. Assuming that other model variables are constant for one unit of increasing an irrational health belief score, the chance of having diabetes increases by 2.8%. Pregnant women who had good physical activity had 7.5% less diabetes and also the results showed that pregnant women who had good responsibility had 7.8% less diabetes.

Discussion

The aim of this study was to compare health-promoting lifestyles and irrational health beliefs in pregnant women with GDM and healthy pregnant women. The results showed that there was a significant difference in the total score of health-promoting lifestyle between the two groups with GDM and healthy pregnant women. Significant differences were observed between the two groups among the subscales of health-promoting lifestyle, physical activity, self-fulfillment, health responsibility, and stress control. But the two groups did not differ significantly in the nutritional subscale. Badon *et al.* also reported a low mean lifestyle score associated with GDM.^[15] Another study also found that people with GDM had lower healthy lifestyle scores than healthy people.^[27] The results of Zhang *et al.* showed that promoting a healthy lifestyle may prevent gestational diabetes.^[28]

The present study showed that the group with GDM had a lower score in the physical activity subscale, which was statistically significant. This finding is consistent with previous studies.^[15,28] Studies on the effects of physical activity on pregnant women are very limited. A number of studies have linked physical activity before and during pregnancy to a reduced risk of gestational diabetes.^[28] However, in a randomized controlled intervention study, no association was found

Table 1: Mean, standard deviation, and independent t-test results for comparing groups in dimensions of health-promoting lifestyle

Variable	Mean (SD)		P
	Diabetic (n=100)	Healthy (n=100)	
Health-promoting lifestyle	137.51 (20.388)	146.58 (18.181)	0.001
Health responsibility	27.32 (4.681)	27.75 (4.407)	0.51
Physical activity	13.68 (5.057)	16.58 (5.856)	0.0001
Nutrition	25.88 (4.486)	25.86 (3.983)	0.983
Spiritual growth	26.445 (5.2)	28.58 (5.221)	0.004
Interpersonal relationships	25.50 (4.774)	27.46 (4.358)	0.003
Stress management	18.57 (4.125)	20.58 (4.15)	0.001
Irrational health beliefs	37.39 (13.463)	32.33 (10.618)	0.004

SD=Standard deviation

Table 2: Correlation of irrational health belief with health-promoting lifestyle and all its subsets in the studied samples

Variable	HPL	HR	PA	Nutrition	SG	IR	SM	IHB
HPL								
Pearson correlation	1							
Significant (two-tailed)								
HR								
Pearson correlation	0.646**	1						
Significant (two-tailed)	0.000							
PA								
Pearson correlation	0.632**	0.270**	1					
Significant (two-tailed)	0.000	0.000						
Nutrition								
Pearson correlation	0.558**	0.396**	0.225**	1				
Significant (two-tailed)	0.000	0.000	0.001					
SG								
Pearson correlation	0.711**	0.339**	0.353**	-0.233**	1			
Significant (two-tailed)	0.000	0.000	0.000	0.001				
IR								
Pearson correlation	0.761**	0.519**	0.337**	-0.319**	0.575**	1		
Significant (two-tailed)	0.000	0.000	0.000	0.000	0.000			
SM								
Pearson correlation	0.843**	0.435**	0.546**	-0.388**	0.583**	0.635**	1	
Significant (two-tailed)	0.000	0.000	0.000	0.000	0.000	0.000		
IHB								
Pearson correlation	-0.310**	-0.139*	-0.269**	-0.186**	-0.231**	-0.178*	-0.236**	1
Significant (two-tailed)	0.000	0.050	0.000	0.008	0.001	0.012	0.001	

*Correlation is significant at the 0.05 level (two-tailed), **Correlation is significant at the 0.01 level (two-tailed). HPL=Health-promoting lifestyle, HR=Health responsibility, PA=Physical activity, SG=Spiritual growth, IR=Interpersonal relationship, SM=Stress management, IHB=Irrational health belief

Table 3: Relationship between health-promoting lifestyle variables and irrational health beliefs with gestational diabetes mellitus in the studied samples

Variable	B	SE	P	OR	CI
PA	-0.075	0.030	0.012	0.928	0.875-0.984
Nutrition	0.063	0.038	0.096	1.066	0.989-1.148
IR	-0.078	0.036	0.033	0.925	0.861-0.994
IHB	0.028	0.14	0.038	1.029	1.002-1.056

PA=Physical activity, IR=Interpersonal relationship, IHB=Irrational health belief, SE=Standard error, OR=Odds ratio, CI=Confidence interval

between a healthy lifestyle including nutrition and physical activity during pregnancy and a reduced risk of gestational diabetes.^[29] Prepregnancy lifestyle seems to be more strongly associated with the risk of gestational

diabetes.^[15] The results of Bahadoran and Mohamadirizi study showed that the rate of physical activity is low among pregnant women and factors such as age, number of children, and household income level are among the factors involved in lack of physical activity.^[30] Physical activity, such as exercise, reduces insulin resistance by altering the adipokine profile. Adipose tissue, as an endocrine organ, secretes proteins such as adiponectin, leptin, resistin, and dysfatin, all of which are involved in the pathogenesis of insulin resistance. Adiponectin is responsible for increasing energy intake and fat catabolism and increasing insulin sensitivity. Studies have shown that lowering adiponectin levels increases the risk of gestational diabetes and has also been found

to correlate negatively with blood glucose levels. Studies have shown that exercise increases the serum level of this protein. On the other hand, studies have shown that inflammatory conditions beyond the ability of pregnant women, such as those found in obesity, can lead to GDM. In inflammatory conditions, inflammatory molecules such as tumor necrosis factor-alpha and interleukin-6 increase insulin resistance. Studies have shown that exercise also reduces the plasma levels of these substances.^[31] Physical activity improves blood glucose levels and prevents or delays type 2 diabetes.^[32,33]

In the nutritional subscale, people with GDM scored higher than healthy pregnant women, although this difference was not significant. In a review study, it was stated that most of the studies on nutrition and its relationship with gestational diabetes are retrospective or cross-sectional, but these studies could not draw definitive conclusions about the role of nutrition during pregnancy in gestational diabetes.^[28] The reason for the higher score of people with gestational diabetes in the present study can be stated that the disease has caused people to increase their efforts to feel healthy and therefore began to eat healthy food. People's perception of their illness is considered an important psychological structure that can motivate a person with diabetes to engage in self-care activities. According to the model of common sense and self-regulation,^[34] people who face threats to their health, such as those diagnosed with the disease, tend to form emotional and cognitive manifestations that respond to the choice of coping methods and behaviors. It determines the health of this problem as well as the evaluation of the therapeutic effects. In this study, healthy pregnant women scored higher on the subscale of interpersonal relationships than women with GDM, which was statistically significant. A number of studies have shown that social mental health, such as social support, is associated with adherence to a healthy lifestyle. These studies also showed that psychosocial health is effective with positive changes in nutrition and physical activity.^[16] In this study, women with gestational diabetes scored lower on the health responsibility subscale than healthy pregnant women. Adherence to a healthy lifestyle seems to be associated with a reduced risk of GDM.^[27] The results of an intervention study also showed that counseling leads to improved health-promoting lifestyles in mothers with gestational diabetes in the intervention group.^[35] In relation to the stress control subscale in the present study, women with gestational diabetes scored lower, which was a statistically significant difference. In one study, Omidvar *et al.* reported that stress and anxiety were strongly negatively correlated with healthy eating, physical activity, interpersonal relationships, and stress management.^[36] Pourisharif *et al.* also stated that psychological stress may increase

the risk of the metabolic syndrome because it increases the activity of the sympathetic nervous system and leads to increased levels of cortisol and catecholamines in the blood.^[37] Increased cortisol levels may block insulin function and lead to diabetes.^[38] Zaheri *et al.* showed that psychotherapy interventions can reduce stress in pregnant women with gestational diabetes and thus improve their pregnancy outcomes.^[39]

The results of the present study showed that the mean score of irrational health beliefs in women with gestational diabetes is higher than healthy individuals, which showed a statistically significant difference. Regression analysis also shows that for every unit increase in an irrational health belief score, the chance of having gestational diabetes increases by 2.8%. The results of the present study also showed that irrational health beliefs had a significant negative correlation with health-promoting lifestyle and all its subsets. Irrational beliefs about health beliefs are irrational attitudes and thoughts that have no scientific or practical basis and lead to negative consequences. When these beliefs are raised specifically in the field of health, they are called irrational health beliefs.^[40] Irrational beliefs play a role in poor self-care and poor health decisions.^[18] Many of these irrational beliefs are rooted in traditional and cultural beliefs and have been accepted as a fact in the custom of societies.^[41] Mann *et al.* stated that studying the nature and impact of irrational health beliefs represents an important opportunity to target barriers to the prevention and successful management of diabetes in Hispanic society. This study showed that even people with long-term diabetes had irrational beliefs about their disease. One-third of these patients expect to recover completely, even though it is a chronic condition. These patients also thought that diabetes had few symptoms and consequences if the disease might lead to diabetic retinopathy, nephropathy, and heart disease.^[42] Diabetics with irrational health beliefs think they need medical treatment when their blood sugar is very high. This in itself leads to poor adherence of these people to medical treatments.^[41] Christensen *et al.* concluded that high levels of irrational health beliefs in diabetics are associated with poor adherence to medical treatment.^[43] Hunt *et al.* also reported that irrational health beliefs in diabetics preclude self-care.^[44] The results of the above studies are in line with the results of this study. But a review of the literature reveals a lack of adequate studies on the relationship between irrational health beliefs and health behaviors and diabetes, especially in pregnant women. The strength of the study was that data were collected from three referral hospitals in Tehran and the health-promoting lifestyle variable, which examines all aspects of lifestyle in pregnancy, was assessed. Furthermore, the variable of irrational health beliefs, which was previously evaluated in a limited way, was

studied in this study. One of the limitations of this study is that the present study was performed crosssectionally in the pandemic condition of COVID-19 (coronavirus) disease, which limits the causal explanation of the findings. In addition, the studied variables were measured using self-report questionnaires.

Conclusion

According to the findings of the present study, it seems that the variables of irrational health beliefs and health-promoting lifestyle play a role in predicting GDM. Given that chronic diseases are one of the most important problems in human societies today, in order to prevent their occurrence and long-term complications, it is necessary to identify the factors involved in the occurrence of these diseases and also to correct them.

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Conflicts of interest

There are no conflicts of interest.

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