

# Prediction of Self-efficacy and Self-care Behaviors among Diabetic Women Based on their Attitude towards Gestational Diabetes

Masoumeh Kordi (MSc)<sup>1</sup>, Mahsima Banaei Heravan (MSc)<sup>2,3\*</sup>

<sup>1</sup> Assistant Professor, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>2</sup> Lecturer, Department of Midwifery, Faculty of Nursing and Midwifery, Pregnancy Health Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

<sup>3</sup> Msc in Midwifery, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p> <hr/> <p><i>Article History:</i> Received: 15-Jan-2020 Accepted: 01-Jun-2020</p> <hr/> <p><i>Key words:</i> Gestational Diabetes Self-efficacy Self-care Attitude Pregnancy</p>	<p><b>Background and Aims:</b> Gestational diabetes mellitus (GDM) is the most commonly observed metabolic disorder in pregnancy. Self-care and self-efficacy are recognized as contributing factors to the control of this disease. Nonetheless, these factors might be affected by such issues as one's knowledge and attitude. The present study aimed to assess how attitude towards GDM could predict diabetic women's self-care and self-efficacy during pregnancy.</p> <p><b>Materials and Methods:</b> This predictive correlational study was conducted on 400 women with GDM referring to health centers and maternity clinics in Mashhad, Iran. Data were collected using a demographic and midwifery questionnaire, a diabetes attitude scale, a self-efficacy questionnaire, and a self-care questionnaire retrieved from the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. The data were analyzed in SPSS software (version22) using Spearman and Pearson correlation coefficients, as well as multiple linear regression and general linear regression models.</p> <p><b>Results:</b> A direct linear relationship was observed between the attitude and self-efficacy (<math>P&lt;0/0001</math>; <math>r=0/23</math>). However, no significant relationship was found between attitude and self-care (<math>P=0.365</math>; <math>r=0.45</math>). Based on the results of the general linear regression model, attitude could predict self-efficacy (<math>P&lt;0.0001</math>; <math>F=27.798</math>; <math>\beta=0.334</math>). There was also a significant direct relationship between self-efficacy and self-care.</p> <p><b>Conclusion:</b> It can be concluded that midwives could tailor interventions to improve the attitude of women towards GDM to enhance their sense of self-efficacy in order to execute diabetes self-care activities to manage their disease, effectively.</p>

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## Introduction

Gestational Diabetes mellitus (GDM) is characterized as the initiation or recognition of carbohydrate intolerance during pregnancy (1). This disease mainly develops as the result of insulin resistance, similar to that found in type 2 diabetes (2). In this way, some critical risk factors for GDM include age, high body mass index (BMI), and history of diabetes in first-degree relatives (3). It is worthwhile to mention that symptoms of GDM are overeating, binge drinking,

hyperuricemia, hypertension, and hypoglycemic episodes (4). It should be noted that GDM is the most commonly observed metabolic disorder in pregnancy (1) affecting 14-18% of all pregnant women (5). In this regard, 1.3-8.9% of pregnant women in Iran are at the risk of this disease (6). As a result, the increasing prevalence of GDM has highlighted the critical need for the treatment and control of this disorder (7). The early treatments for GDM include dietary therapy,

\* Corresponding author: Mahsima Banaei Heravan, Lecturer, Department of Midwifery, Faculty of Nursing and Midwifery, Pregnancy Health Research Center, Zahedan University of Medical Sciences, Zahedan, Iran. Tel: 00989127298776; Email: banaeihtm@yahoo.com

blood glucose monitoring, and moderate-intensity exercise. Meanwhile, insulin or oral tablets are prescribed when blood glucose levels cannot be controlled by diet (8). The GDM is accompanied by an increased risk of some maternal and fetal complications, including macrosomia, cesarean section, premature birth, pre-eclampsia, and polyhydramnios (9). It is noteworthy that the prevention of such complications strongly depends on patients' engagement in daily self-care. Moreover, self-care is recognized as an effective factor in controlling diabetes; accordingly, patients are held responsible for more than 95% of diabetes care (10, 11).

Self-care is a range of activities performed by individuals to ensure, maintain, and promote their health. It may be implemented independently of others (12); moreover, it is achieved based on some factors, such as knowledge, motivation, and performance (13). It should be underlined that diabetes self-care not only contributes to patients' health but also reduces medical costs (14, 15). The self-care aims to control normal blood glucose levels and decrease a myriad of complications (12). In a study conducted by Heissler et al. (2002) in the United States, it was found that the execution of self-care programs could reduce the complications of diabetes by more than 50% (15).

On the other hand, some psychological factors have been recognized as the main barriers to performing desirable self-care behaviors in diabetic patients (16). In other words, since self-care is greatly affected by individuals' self-efficacy, it is necessary to adopt some behaviors that are influenced by one's knowledge and attitudes (17). Self-efficacy is derived from the theory of social cognition which refers to an individual's beliefs and judgments about his/her ability to perform tasks and responsibilities (18). Apart from the way of thinking, behavior, and adherence to treatment regimens, people with higher levels of self-efficacy can perform tasks more successfully (19).

Anderson (2000) indicated that diabetic patients with higher self-efficacy had a positive attitude towards this disease (20). On the contrary, Ghadamgahi et al. (2011) found no significant relationship between attitude and self-

efficacy (21). On the other hand, in their study conducted in the United States, Silva et al. (2006) reported that patients' beliefs and attitudes could affect self-care in gestational diabetes (22). Nevertheless, Javadi et al. (2004) observed no significant relationship between the attitude and practice of diabetic patients (23).

On a final note, despite the high prevalence of gestational diabetes, there is a paucity of data regarding the attitude of patients in our country. Moreover, the knowledge, attitude, and self-efficacy which proceed behavior may vary (21). Therefore, the assessment of patients' attitude towards this issue can be of great help in its management (24). In addition, there are some contradictory results about the relationship of attitude with self-efficacy and self-care among women with GDM. In light of the aforementioned issues, the present study aimed to assess how attitude towards GDM could predict diabetic women's self-care and self-efficacy during pregnancy.

## Materials and Methods

This predictive correlational study was conducted in Mashhad health centers and maternity clinics of public hospitals affiliated to Mashhad University of Medical Sciences (Umm ul-Banin, Imam Reza (AS) and Ghaem in 2015 (AS). The research project was approved by the Local Research Ethics committee of Mashhad University of Medical Sciences, Mashhad, Iran (137. 1394IR. MUMS. REC). Moreover, written consent was obtained from all subjects.

For the purpose of the study, a preliminary study was conducted on 30 women with GDM eligible for research using the comparison formula for correlation ( $Z_1=95\%$  confidence interval mean of 1.96,  $Z_2=80\%$  test power mean of 0.84, and  $r=0.31$ ). The sample size was initially determined at 398 cases; however, regarding 5% sample attrition, it was eventually estimated at 418 patients.

All subjects completed a demographic and midwifery questionnaire, a diabetes attitude scale (25), a self-efficacy questionnaire (26), and a self-care questionnaire retrieved from the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire, based on the inclusion and exclusion criteria. An interview was carried out in the event of incomplete questionnaires

and missing data. In order to follow up on self-care, two more copies of the self-care questionnaire were provided to the subjects to be completed within the next 2 weeks at the end of each week. Moreover, they were also informed about the date of the second visit. Furthermore, they were reminded of the **upcoming** visit via phone call one day in advance.

Welch et al. (1996) developed the 19-item self-report diabetes attitude scale (25) with a total score range of 19-95 which are rated on a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. All items, except for three items of 11, 15, and 18, are then scored in reverse.

The self-Efficacy questionnaire was designed by Stanford University Research Center for diabetic patients (26). This 8-item questionnaire with a total score range of 8-80 are rated on a 10-point Likert Scale ranging from 1=not at all confident to 10=totally confident (27).

The researcher-made self-care questionnaire is developed based on Toobert and Glasgow Summary of Diabetes Self-Care Activities (SDSCA) (28) which contains 14 items in 6 sections as follows: diet (6 items), physical activity (2 items), blood sugar monitoring (3 items), insulin injections (1 item), proper oral drugs (1 item), and smoking (1 item). Moreover, it measures self-care behaviors in the last 7 days on an 8-point Likert scale ranging from 0 to 7. It was allocated a score of either 0 or 1 for the smoking questions, and a score of 0-7 for the other questions (29, 30). Thereafter, all subjects answered the questionnaire based on their type of treatments (e.g. diet, physical activity, blood sugar monitoring, metformin use, insulin injection, or none). Therefore, it can be concluded that the number of answered questions was different to equalize the total score of the questionnaire. The score of the total questionnaire obtained by each subject was divided by the number of the answered questions. The final self-care score range was set at 0.57-6. It is noteworthy that since the self-care questionnaire was completed three times, the average score of the three questionnaires was regarded as one's self-care score.

The validity of the research unit selection form, demographic form, attitudes about

diabetes, self-efficacy, and self-care was determined using the content validity method. Along these lines, both the attitude and self-efficacy questionnaire were translated into Persian. The self-care questionnaire was prepared from reliable sources, available instruments, and the application of changes based on the study population. These instruments were presented to 80 faculty members of the Nursing and Midwifery Department of Mashhad Medical Sciences who were knowledgeable in this field. Moreover, after reviewing and investigating the necessary suggestions and corrections, the final instrument was applied as well. Welch (1996) confirmed the reliability of the attitude scale rendering the Cronbach's alpha coefficient of 0.84 (25). In addition, Lorig (2008) verified the reliability of the self-efficacy questionnaire using the test-retest method ( $r=0.80$ ) (31). The reliability of SDSCA was reported as 0.73 by Jalaludin et al. (2012) using Cronbach's alpha method (32). Furthermore, the reliability of its Persian version confirmed by Didarlou et al. (2011) was equal to 0.74 using the Cronbach's alpha method (33).

In the current research, the questionnaires were administered to 30 women with GDA who met the inclusion criteria. It should be mentioned that the reliability of the diabetes attitude scale, self-efficacy, and self-care questionnaires were confirmed by Cronbach's alpha coefficient of 0.70, 0.82, and 0.70, respectively. The inclusion criteria were as follows: 1) gestational diabetes diagnosed by a physician, 2) singleton pregnancy, 2) Iranian nationality, 3) residing in Mashhad, 4) a minimum of fifth grade elementary education. On the other hand, the exclusion criteria entailed: 1) a history of physical diseases or other obstetric problems, 2) drug addiction, and 3) speech and hearing disorder preventing them from communicating with the researcher. Subsequently, the gathered data were analyzed in SPSS software (version 22) using the Pearson and Spearman correlation coefficients, as well as general and multiple linear regression models. It worth noting that 95% confidence interval and  $P < 0.05$  were statistically significant in all tests.

**Results**

The mean age and BMI of the subjects were reported as 31.34±5.6 years and 27.59±4.8 kg/m<sup>2</sup>, respectively. 85 (21.2%) patients had a history of GDM, while 331 (82.8%) participants had requested pregnancy. In addition, 159 (39.8%) patients had a high school education,

224 (56%) subjects had an average socioeconomic status, and 363 (90.8%) patients were housewives.

The mean and standard deviation of attitude, self-efficacy, and self-care were obtained at 66.67±10.4, 45.87±13.6, and 3.99±0.8, respectively.

**Table 1.** Linear regression test results for the relationship of attitude with self-efficacy and self-care

	Variable	β	df	R	F	Test result
Attitude	Self-efficacy	0.196	1	0.256	27.798	P < 0.0001
	Self-care	0.556	1	0.047	0.864	0.353

According to Spearman test results, there was a significant direct linear relationship between attitude and self-efficacy (P < 0.0001, r=0.23).

Moreover, the general linear regression model revealed that the attitude is the predictor of self-efficacy (P < 0.0001). There was a 6.5% variance in self-efficacy. The linear equation of the self-efficacy prediction based on attitude was obtained as follows:

$$\text{Self-efficacy score} = 57.6 + (0.196 \times \text{score of attitude}) \quad (1)$$

Nevertheless, regarding the spearman test results, the attitude had no direct linear relationship with the self-care (P=0.365; r=0.45).

Eventually, attitude and self-care were defined as independent and dependent variables, respectively, in the general linear regression model; accordingly, attitude was not considered the predictor variable for self-care [Table 1].

In this regard, the simultaneous effect of confounding variables on the relationship between attitude and self-efficacy was investigated using the multiple regression test. The occupation was then excluded from this

model in which only the attitude was significantly related to self-efficacy (P < 0.0001; β= 0.318)

In this matter, the simultaneous effect of confounding variables on the relationship between attitude and self-care was assessed using the multiple regression test. The occupation was again excluded from this model, in which only age (P=0.014; β= 0.020), along with the history of GDM (P=0.032; β=0.234) was significantly associated with self-care [Table 2].

Furthermore, concerning the Pearson test result (P < 0.0001; r=0.31), there was a significant direct linear relationship between self-care and self-efficacy. Moreover, regarding the general linear regression model, the self-efficacy can be regarded as a predictor variable for self-care (P < 0.0001; R=0.31; df=1; F=43.5; β=0.02). It should be indicated that this variable can predict a 9.6% variance in self-care. Meanwhile, the linear equation of self-care prediction based on self-efficacy was achieved as follows: Score of Self-care=3.07+ (0.02×self-efficacy score) (2)

**Table 2.** Relationship of demographic and pregnancy-related variables with self-efficacy and self-care in women with gestational diabetes

Variable	Self-efficacy β	p	Self-care β	p
<b>Demographic variables</b>				
Attitude	0.318	<0.0001	0.005	0.254
Age	0.021	0.866	0.020	0.014
education	-0.106	0.878	-0.027	0.553
Socio-economic class	1.371	0.169	-0.021	0.753
Occupation (student)	1.427	0.756	-0.205	0.543
Occupation (housewife)	-1.840	0.490	0.149	0.394
BMI	-0.240	0.091	-0.008	0.373
<b>Midwifery variables</b>				
Type of pregnancy	2.123	0.245	0.047	0.693
History of gestational diabetes	1.860	0.264	0.234	0.032

## Discussion

As evidenced by the obtained results, attitude had a significant direct linear relationship with self-efficacy in women with GDM. Moreover, attitude was specified as a predictor of self-efficacy. Moreover, the subjects obtained a moderate score in attitude and low scores in self-efficacy variables. In this regard, Zografos highlighted the critical significance of attitude and added that mere knowledge was not sufficient to vary the behaviors. Therefore, apart from the provision of information, it is substantial to change attitudes to bring about behavior change (34). Moreover, regarding that self-efficacy is recognized as a major psychosocial variable concerning the interventions associated with self-care behaviors (19), these low scores of self-efficacy are alarming. Here, it should be mentioned that low self-efficacy in women suffering from GDM would result in non-compliance with the recommended diets for blood glucose control and, as a result, the possibility of increased adverse pregnancy and birth outcomes (35). In this regard, Goodarzi et al. (2012) investigated the correlation of self-efficacy with knowledge, attitude, and practice in 200 patients suffering from diabetes in Karaj. Using the knowledge, attitude, and practice questionnaire (KAP), as well as the self-efficacy questionnaire (SE), attitude was positively and significantly correlated with self-efficacy ( $P < 0.05$ ;  $r = 0.16$ ) pointing to the positive effect of attitude on self-efficacy (36). Along the same lines, Rajabi et al. (2016) explored the effect of the family-centered empowerment model on knowledge, attitude, and self-efficacy in 172 mothers with 6-12-year-old children suffering from asthma. The result of the mentioned study confirmed a direct and significant relationship between attitude change and self-efficacy ( $P < 0.001$ ;  $r = 0.33$ ) (37). In the same context, Ghadamgahi et al. (2011) assessed the knowledge, attitude, and self-efficacy of 135 nursing staff in terms of nosocomial infection control in Mashhad. The results of the referred did not indicate a significant relationship between attitude and self-efficacy (21). Here, it is worthwhile to mention that the discrepancy between the current research and the study performed by Ghadamgahi (21) can be attributed to different research populations and

instruments, as well as cultural differences that can affect the results. A researcher-made questionnaire was applied in the study conducted by Ghadamgahi (21), while the self-efficacy for diabetes scale developed at Stanford University was utilized in the present study.

According to the obtained results, the attitude variable had no significant linear relationship with the self-care variable in women with GDM. Moreover, subjects had a moderate score of self-care. It should be noted that similar studies have not yet been conducted on the attitude of pregnant women towards GDM (24). In this way, Javadi et al. (2004) conducted a study on 212 diabetic patients in Qazvin and found no significant relationship between attitude and practice (23). On the other hand, Mirkarimi et al. (2014) investigated the knowledge, attitude, and practice of women referring to health centers in Gorgan. Using the standard general self-care questionnaire, among the factors determining self-care behaviors in 420 participants, attitude had a statistically significant relationship with self-care ( $P = 0.0001$ ) (38). In addition, Morvati Sharifabad et al. (2009) assessed the status of predisposing factors for self-care and their relationships with self-care behaviors in 181 patients suffering from rheumatoid arthritis. They indicated a positive and significant correlation between self-care behaviors and attitude ( $P < 0.01$ ) (39). It is noteworthy that the discrepancy between the current research and the studies performed by Mirkarimi (38) and Morovati Sharifabad (39) can be ascribed to different research populations and instruments. The standard general self-care questionnaire was applied in the study performed by Mirkarimi (38). Moreover, a researcher-made self-care questionnaire was employed in the study conducted by Morovati Sharifabad (39). On the contrary, a self-care questionnaire derived from SDSCA was used in the current study. In addition, age was regarded as one of the factors affecting self-care. In addition to the aforementioned differences, age was effective in self-care; therefore, the mean age difference between the current research and the aforementioned studies could be considered another reason for different results.

In the present study, self-efficacy had a significant direct linear relationship with self-

care in GDM women. In this connection, Shakibazadeh et al. (2010) indicated that self-efficacy had a significant positive relationship with self-care in 128 patients with type 2 diabetes (40). In fact, those patients benefiting from higher self-efficacy set higher goals for themselves, which leads to enhanced motivation and self-care (33, 36, 40). Nevertheless, Chlebowy et al. (2006) observed no significant correlations between self-efficacy and self-care behavior in patients suffering from type 2 diabetes (41). The disparity between the results of our study and those reported by Chlebowy et al. can be attributed to different populations and measuring instruments. A 29-item self-efficacy questionnaire was employed in a study conducted by Chlebowy (2006). In addition, the self-care score reported in the present study was noticeably lower than that obtained in the study conducted by Chlebowy (2006).

Every study has some limitations which should be addressed in the paper. In this regard, one of the notable limitations of the present study was the use of a self-care questionnaire in the form of self-report. On the other hand, the strength of the study lies in the fact that since women with GDM were followed up for two weeks for the self-care, the proposed questionnaire was completed three times (i.e. at the beginning of the study, as well as 1 week and 2 weeks later), and the average of the three questionnaires was regarded as the final score. In so doing, the participants were less likely to forget about self-care activities.

On a final note, it is suggested that large-scale studies be conducted in the future to explore the effect of attitude training on self-efficacy in women with GDM.

## Conclusion

Attitude was related to self-efficacy in women suffering from GDM, and it was critical to the prevention and control of this disease. Therefore, midwives should make necessary interventions to improve the attitude of women with GDM towards this disease in an effort to achieve a high level of self-efficacy.

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## Conflicts of interest

Authors declared no conflicts of interest.

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