

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

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p>Background and Aims: 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>Materials and Methods: 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 liner regression and general linear regression models.</p> <p>Results: A direct linear relationship was observed between the attitude and self-efficacy ($P < 0.0001$; $r = 0.23$). However, no significant relationship was found between attitude and self-care ($P = 0.365$; $r = 0.45$). Based on the results of the general linear regression model, attitude could predict self-efficacy ($P < 0.0001$; $F = 27.798$; $\beta = 0.334$). There was also a significant direct relationship between self-efficacy and self-care.</p> <p>Conclusion: 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>
<p><i>Article History:</i> Received: 15-Jan-2020 Accepted: 01-Jun-2020</p>	
<p><i>Key words:</i> Gestational Diabetes Self-efficacy Self-care Attitude Pregnancy</p>	

► Please cite this paper as:

Kordi M, Banaei Heravan M. Prediction of Self-efficacy and Self- Care Behaviors among Diabetic Women based on their Attitude towards Gestational Diabetes Journal of Midwifery and Reproductive Health. 2020; 8(4): 2486-2493. DOI: 10.22038/jmrh.2020.45863.1558

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, 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

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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^2 , 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:

Self-efficacy score = $57.6 + (0.196 \times \text{score of attitude})$ (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 ($P < 0.0001$; $\beta = 0.318$)

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 ($P = 0.014$; $\beta = 0.020$), along with the history of GDM ($P = 0.032$; $\beta = 0.234$) 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 ($P < 0.0001$; $R = 0.31$; $df = 1$; $F = 43.5$; $\beta = 0.02$). 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 = $3.07 + (0.02 \times \text{self-efficacy score})$ (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
Demographic variables				
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
Midwifery variables				
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 GMD, 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 GMD towards this disease in an effort to achieve a high level of self-efficacy.

Acknowledgments

This study was extracted from an MSc dissertation in Midwifery approved by the Research Council of Mashhad University of Medical Sciences (931760), Mashhad, Iran. The authors' deepest appreciation goes to the Research Deputy of Mashhad University of Medical Sciences for the financial support, the officials of the health centers and clinics, as

well as the women who participated in this research project.

Conflicts of interest

Authors declared no conflicts of interest.

References

1. Cunningham F, Leveno KJ, Bloom S, Hauth J, Rouse D, Spong C. Volume three of Williams Obstetrics. 24th ed. New York: Mc Graw Hill; 2014. P. 322-3.
2. Akhoundan M, Mirmiran P, Rashidkhani B, Asghari G. Relationship between gestational diabetes and dietary patterns. *Iranian Journal of Diabet and Lypid*. 2012; 11(3): 309-20. [Persian]
3. Leng J, Shao P, Zhang C, Tian H, Zhang F, Zhang S, et al. Prevalence of gestational diabetes mellitus and its risk factors in Chinese pregnant women: a prospective population-based study in Tianjin, China. *PLoS One*. 2015; 10(3): e0121029.
4. Balali Meybodi F, Mahmoudi M, Hasani M. Knowledge, attitude and practice of pregnant women referred to health care centers of Kerman University of Medical Sciences in regard to gestational diabetes. *Journal of Qualitative Research in Health Sciences*. 2011;11(1 and 2):17-24. [Persian]
5. Mohammad Beigi A, Tabatabaei H, Mohammad Salehi N. Modeling the determinants of diabetes in pregnancy in Shiraz. *Journal of Research Feyz*. 2009; 13(1): 37-42. [Persian]
6. Hedayati H, Khazaei T, Mogharab M, Sharifzadeh G. The Prevalence Of Gestational Diabetes And Overt Diabetes In Pregnant Women In The City Of Birjand. *Modern Care. Journal of Birjand University of Medical Sciences*. 2012; 4(8): 238-44. [Persian]
7. Rouhe H, Salmela-Aro K, Halmesmaki E, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. *International Journal of Obstetrics & Gynaecology*. 2009; 116(1): 67-73.
8. Hartling L, Dryden D, Guthrie A, Muise M, Vandermeer B, Donovan L. Benefits and harms of treating gestational diabetes mellitus: a systemic review and meta-analysis for the us preventive services task force and the national institutes of health office of medical applications of research. *Annals of internal medicine*. 2013; 159(2): 123-9.

9. Doostifar K, Parsanahad M, Baharzadeh K, Khadem F, Ahmadi Angali K, Araban M. Risk Factors for Gestational Diabetes in Pregnant Women: A case-control study. *PAYESH*. 2020;18(6): 559-67. [Persian]
10. Dipietro J, Costigan K, Sipsma H. Continuity in self-report measures of maternal anxiety, stress, and depressive symptoms from pregnancy through two years postpartum. *Journal of Psychosomatic Obstetrics & Gynecology*. 2008;29(2):115-24.
11. Norouzi A, Tahmasebi R, Rekabpour S. Effective social support resources in self-management of diabetic patients in Bushehr(2011-12). *Iranian South Medical Journal*. 2013; 16(3): 250-9. [Persian]
12. Hosseinzadeh M. The effect of multiple teaching methods to preventive behavior of postpartum type 2 diabetes in gestational diabetic women attendance to Mashhad health centers [dissertation] , Iran University; 2015. [Persian]
13. Memarian R. Orem's self-care nursing model. In: Beigzadeh, Safar. Editors. *Application of concepts and theories of nursing* Tehran Heydari; 1999. P. 93-111. [Persian].
14. Safford M, Russell L, Churlsh D, Roman S, Pogach L. How much time do patients with diabetes spend on self - care. *Journal of the American Board of Family Practice*. 2005; 18(4): 262-70.
15. Heisler M, Bouknight R, Hayward R, Smith D, Kerr E. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *Journal of general internal medicine*. 2002; 17(4): 243-52.
16. Javadi M, Maghsoudi Z, Rastegarmoghadam R, Shahedi M, Kazeminasab M, Mezerji M. The relationship between self- care and emotional distress in patients with type 2 diabetes referred to the Yazd diabetes research center in 2018. *Nursing and midwifery journal*. 2020; 17(11): 871-7. [Persian]
17. Bahrami N, Pajohideh Z, Mohammadi Shosi Koshte S, Maraghi E. Attitude and practice towards self-care in women referred to health centers in Dezful. *Journal of Social Determinants of Health Research Center of Shahid Beheshti University of Medical Sciences*. 2015; 1(2): 130-36. [Persian]
18. Mohebi S, Azadbakht L, Feyzi A, Sharifi Rad G, Hozouri M, Sherbafchi M. The relationship between self-efficacy dietary intake of macronutrients in women with metabolic syndrome; a study path analysis. *Iranian Journal of Diabetes and Metabolism*. 2012; 12(1): 56-67. [Persian]
19. Bastani F, Zarrabi R. Self-efficacy in women with gestational diabetes. *HAYAT*. 2010; 16(3): 56-65. [Persian]
20. Anderson R, Funnell M, Fitzgerald J, Marrero D. The diabetes empowerment scale: A measure of psychosocial self-efficacy. *Diabetes Care*. 2000; 23(6): 739-43.
21. Ghadamgahi F, Zighaimat F, Ebadi A, Houshmand A. Knowledge, attitude and self-efficacy of nursing staffs in hospital infections control. *Iranian Journal of Military Medicine*. 2011; 13(3): 167-72. [Persian]
22. Silva J, Kaholokula J, Ratner R. Ethnic differences in perinatal outcome of gestational diabetes mellitus. *Diabetes Care*. 2006;29(9):2058-63.
23. Javadi A, Javadi M, Sarvghadi F. Knowledge, attitude and practice of diabetic patients referred to Qazvin Bu Ali Sina diabetes center. *Journal of Birjand University of Medical Sciences*. 2004; 11(3): 46-51. [Persian]
24. Ghasem zadeh S, Dadmanesh M, Safari A, Ebrahimi S. The Study on the knowledge, attitude and function of gestated mother's about gestational diabetes that referred to army khanvadeh hospital from 2005 to 2006. *Annals of Military and Health Sciences Research*. 2007; 5(3): 1325-30. [Persian]
25. Welch G, Beeney LJ, Dunn SM, Smith RBW. The development of the diabetes integration scale: a psychometric study of the ATT39. *Multivariate Experimental Clinical Research*. 1996; 11(2): 75-88.
26. Stanford Patient Education Research Center. self-management@stanford.edu. Available from: <http://patienteducation.stanford.edu/>. Accessed March 4, 2008.
27. Mashburn D. Self efficacy, self reliance, adherence to self care, and glycemic control among cherokee with type 2 diabetes [dissertation] , Minnesota University;2012.

28. Toobert D, Hampson S, Glasgow R. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care Journal*. 2000; 23(7): 943-50.
29. Andersson L, Sundstrom-Poromaa I, Wulff M, Astrom M, Bixo M. Depression and anxiety during pregnancy and six months postpartum: a follow-up study. *Acta obstetrica et gynecologica Scandinavica*. 2006; 85(8): 937-44.
30. Wattanakul B. Factor influencing diabetes self- management behaviors among patients with T2DM in rural thailsnd [dissertation] , America University; 2012.
31. Lorig K, Ritter P, Villa F, Piette J. Spanish diabetes self-management with and without automated telephone reinforcement: two randomized trials. *Diabetes Care Journal*. 2008; 31(3): 408-14.
32. Jalaludin M, Fuziah M, Hong J, Mohamad Adam B, Jamaayah H. Reliability and validity of the revised summary of diabetes self-care activities (SDSCA) for Malaysian children and adolescents. *The official journal of the Academy of Family Physicians of Malaysia*. 2012; 7(2-3): 10-20.
33. Didarloo A, Shojaeizadeh D, Eftekhar Ardabili H, Niknami S, HJizadeh E, Alizadeh M. Factors affecting the care behavior of diabetes in diabetic women attending clinics of Khoy based on developedrational action theory. *Journal of Public Health and Institute of Health Research*. 2011; 9(2): 79-92. [Persian]
34. Zografos K. The effects of an adolescent asthma education on knowledge, intention, behavior, self-efficacy, and self-consciousness. *Californian Journal of Health Promotion*. 2007; 8(1): 60-71.
35. Crowther C, Hiller F, Moss J, McPhee A, Jeffries W, Robinson F. For the Australian carbohydrate intolerance study in pregnant women (ACHOIS) trial group effect of treatment of gestational diabetes mellitus on pregnancy outcomes. *The New England journal of medicine*. 2005; 352(24): 2477-86.
36. Goudarzi M, Ebrahimzadeh I, Rabie A, Saeidipour B, Asghari Jafarabadi M. The relationship between knowledge, attitude and performance with self efficacy in patients with type 2 diabetes in Karaj. *Iranian Journal of Diabet and Lypid*. 2012; 11(3): 269-81. [Persian]
37. Rajabi R, Forozy M, Fuladvandi M, Eslami H, Asadabady A. The effect of family- centered empowerment model on the knowledge, attitudes and self-efficacy of mothers of children with asthma. *journal of Nursing Education*. 2016; 5(4): 41-9.[Persian]
38. Mirkarimi S, Aryaie M, Kamran A, Farid H. Knowledge, attitude and practice of women referred to health centers of Gorgan on the determining factors of self-care. *Jorjani Biomedicine Journal*. 2014; 2(2): 50-8.[Persian]
39. Morowati Sharifabad M, Nadrian H, Soleimani Salehabadi H, Mazloumi Mahmoudabad S, Asgarshahi M. Evaluation of self-care predisposing factors and their relationship with self-care behaviors in patients with rheumatoid arthritis. *HAYAT*. 2009; 15(3): 39-51.[Persian]
40. Shakibazadeh E, Rashidian A, Larijani B, Shojaeezadeh D, Forouzanfar M, Karimi Shahanjarini A. Perceived barriers and self-efficacy: impact on self-care behaviors in adults with type 2 diabetes. *Hayat*. 2010; 15(4): 69-78. [Persian].
41. Chlebowy D, Garvin B. Social support, self efficacy and outcome. Exeptions: impact on self care behaviors and glycemic control in Caucasian and African American adults with type 2 diabetes. *Journal of the Diabetes Educator*. 2006; 32(5): 777-86.