Effect of Educational Sessions on Knowledge, Attitude and Self -Care Practices among Pregnant Women with Gestational Diabetes

El-Shaimaa El-Ansary and Shaimaa Fouad
Woman's Health and Midwifery Nursing - Faculty of Nursing - Mansoura University.

Abstract

Background: Gestational Diabetes is associated with severe maternal, fetal and neonatal complications. Health education about regular exercises, dietary adjustment and proper taking of medication is important part in the care of women with gestational diabetes. Nurses have a significant role in educating women how to prevent and reduce gestational diabetes adverse effects on pregnancy outcomes. **Aim:** This study aimed to assess the effect of educational sessions on knowledge, attitude and self -care practices among pregnant women with gestational diabetes. **Methods:** A quasi experimental pretest/posttest research design was used at the antenatal outpatient clinics of Mansoura University Hospitals, Egypt. A purposive sample of 97 gestational diabetic women was studied, who aged 18 – 35 years, gestational age 24 – 27 weeks, have single live fetus. Data was collected for pregnant women knowledge about gestational diabetes using gestational diabetes knowledge questionnaire, pregnant women attitudes regarding gestational diabetes using diabetic attitude scale and pregnant women self-care practices using diabetic self-care practices questionnaire. **Results:** Post intervention, pregnant women had good knowledge score (77.3%), improved total positive attitudes score (91.8%) and improved total good self-care practices score (90.7%) regarding gestational diabetes. There were statistically significant differences ($p<0.001$). **Conclusion:** The current study hypotheses were accepted where pregnant women's knowledge, attitude and self-care practices regarding gestational diabetes were improved after implementation of the educational sessions. There were statistically significant differences between those variables before and after the intervention. **Recommendations:** The current study recommended that, simple clarified educational programs should be continuously implemented to increase women's knowledge and improve their attitude about gestational diabetes as well as promote their self-care practices and lifestyle. Also, training courses and workshops about gestational diabetes care and management for health care providers at antenatal units should be conducted on regular intervals.

Key Words: Knowledge, Attitude, Self -care practices, Gestational diabetes, Pregnant women.

Introduction

Gestational Diabetes (GD) is a global disorder and one of the most common complications during pregnancy. Pregnant women with diabetes can be categorized as follows: women who have been diagnosed with diabetes before pregnancy and women with GD whose disease occurs and is diagnosed for the first-time during pregnancy **(Khiyali, Manoochri, Jeihooni, Heydarabadi & Mobasheri, 2017).**

The prevalence of GD increases with age from 8% to 26% in women aged 45 years or more. There were nearly about 204 million women worldwide had GD and is expected to increase to 308 million by 2045 **(International Diabetes Federation, 2015)**.The rate of GD in Egypt is 2-14% of all pregnancies **(Khalil,**

Fathy & Mahmoud, 2017). There are many risk factors for GD including increased body weight, multipara, advanced maternal age, personal and family history of GD, infertility treatment, recurrent UTI, macrosomic baby, unexplained neonatal death, prematurity and preeclampsia **(Ming, Ding, Zhang, Long, Li, Sun1 et al, 2018).**For screening and diagnosis of GD, a single-stage of Oral Glucose Tolerance Test (two-hour OGTT with 75 g glucose) was recommended by WHO and the International Association of Diabetes and Pregnancy Study groups in 2013. Clinical diagnosis of it is very important for timely management to avoid complications **(Zandinava, Sehhatti, Mohammad et al, 2017; World Health Organization, 2015; Krejci & Anderlova, 2014).**

Gestational diabetes leads to maternal, fetal and neonatal complications as preeclampsia, polyhydramnios, preterm labor, shoulder dystocia, infection, cesarean section, fetal demise, fetal malformation, macrosomia, hypoglycemia, hyperbilirubinemia, respiratory distress syndrome and perinatal mortality. Furthermore, in later life, other complications may develop and affect both women and their infants as obesity, type 2 diabetes mellitus, heart diseases and neuropsychological problems **(Liu, Xie & Guo, 2017; Xu, He, Dainelli, Yu, Detzel, Zolezzi et al, 2017; Farrag&Metwely, 2016).**

Pregnant women's knowledge, attitude and self-care practices toward GD mainly affect pregnancy outcomes. Poor knowledge about the disease results in inadequate understanding of health provider's instructions, restricted adherence to management protocols and ultimately unfavorable perinatal outcomes so knowledge is an essential element of health concepts shaping **(Al Habashneh, 2010).**

The pregnant women's attitude towards gestational diabetes could directly affect their perception of the need for special training, the way they live with diabetes, the way they magnitude the short term and long term complications and their attitude affect their autonomy in the treatment and their style or channels when communicating with the medical care team and finally their evaluation about the disease seriousness. Therefore, taking individuals' opinions and beliefs into consideration is very important for developing the strategies of managing diabetes **(Saboula, Ahmed & Rashad, 2018; Khiyali, Manoochri, Jeihooni, Heydarabadi, Mobasheri, 2017).**

Gestational diabetes self-care practices embrace many activities as self-monitoring of blood sugar level, controlling weight and checking one's feet **(Saboula, Ahmed & Rashad, 2018)**. It has been significantly proven in several studies that, teaching women with diabetes or other chronic diseases about self-care practices have multiple benefits. Generally, self-care is influenced by attitudes, personal beliefs and community culture in which one lives **(Zandinava, Sehhatti, Mohammad et al, 2017).**

Counseling before and during pregnancy along with effective management are crucial for good perinatal outcomes. The maternity nurse's key role during antenatal, perinatal & postnatal periods is preventing and reducing complications as much as possible by teaching them about exercise, diet regimen and treatment during their pregnancy period **(Liu, Xie and Guo, 2017**; **Mohammed, Eswi, Fahmy & Shehata, 2016).** In addition, they should empower high risk women by raising their awareness, giving advice and support to decrease the risks of adverse perinatal

outcomes **(Nezhad, Maghbooli, Vassigh & Larijani, 2016; National Institute for Health and Care Excellence, 2015).**

The seriousness of GD and the dramatically increasing incidence of this disease make it one of the most urgent health challenges of this century. It is thus important to raise public awareness of this disease and to ameliorate the harmful effects of GD once diagnosed. In addition, there is a limited evidence of successful intervention studies for women with GD and seemingly, no consistent approach to treat this disease so raising women awareness, personal beliefs and the value of GD self-management is discussed in the study **(Mary C. Carolan-Olah, 2016).**

Significance of the study

According to International Diabetes Federation (IDF) Report (2015), 20.9 million (16.2%) live births had hyperglycemia and an estimated 85.1% of them were due to GD, 7.4% were as a result of other types of diabetes first diagnosed in pregnancy and 7.5% due to diabetes diagnosed before pregnancy **(International Diabetes Federation, 2015)**. The global prevalence of GD varies widely from one to twenty eight percent depending on general characteristics, examination, and diagnostic tests **(Jiwani, Marseille, Lohse, Damm, Hod& Kahn, 2012).**Additionally, the majority (87.6%) of GD are in developing countries where there is a limitation in access to maternity care **(Ogurtsova, Rocha, Huang, Linnenkamp, Guariguata, Cho et al, 2017).** Gestational diabetes is a global health problem due to its high prevalence and its major effects on maternal and infant's health **(Konong, Hoogenberg, Luters & Bruce, 2016).**

In Egypt, there is inadequacy of data on the quality of health care services offered to gestational diabetic women, lack of national guidelines for the screening and management of GD, lack of knowledge about GD effect, management as well as nursing care measures to reduce complications and to educate the pregnant women self-care measures **(Abdel Fadeel & Afefy, 2017).** Also, there is an imperative need for the development of health resources to teach, motivate and empower women to self-manage and control their GD so this study was designed to assess the effect of educational sessions on knowledge, attitude and self -care practices among pregnant women with gestational diabetes.

Aim of the study:

This study aimed to assess the effect of educational sessions on knowledge, attitude and self -care practices among pregnant women with gestational diabetes.

Hypotheses of the study

To achieve the aim of the current research three hypotheses were examined.

Hypothesis I: Pregnant women who receive educational sessions about gestational diabetes have higher total knowledge score post than pre-intervention.

Hypothesis II: Pregnant women who receive educational sessions about gestational diabetes exhibit positive attitude post than pre-intervention.

Hypothesis III: Pregnant women who receive educational sessions about gestational diabetes have improved self-care practices post than pre-intervention.

Subjects and Method:

Research design

A quasi-experimental (pretest / posttest) design was utilized in this study. The effect of the independent variable (i.e., educational sessions) on the dependent variable (i.e., knowledge, attitude and self -care practices regarding gestational diabetes) was assessed in this study.

Research setting

This study was conducted at the antenatal outpatient clinics of Mansoura University Hospitals, Egypt which consist of six rooms for sonar, antenatal examination, gynecological examination, vesicular mole, lab and nursing staff. Also, a reception area, waiting area for women and lecture's hall with adequate number of seats and data show where the researchers interviewed the recruited women to conduct this study. The antenatal clinics provide diagnostic and therapeutic services for the pregnant women from Saturday to Wednesday, from 9 a.m. to 2 p.m.

Sampling

Anon-probability purposive sample of 97 gestational diabetic women was recruited from the previously mentioned setting to share in this study according to the following inclusion criteria: (1) age of 18 – 35 years, (2) gestational diabetes diagnosed clinically by resident obstetrician at gestational age 24 – 27 weeks and (3) having single live fetus while excluded from this study, women suffering from any other diseases (e.g. diabetes, asthma, epilepsy, hypertension, thyroid dysfunction, anemia, respiratory, and cardiac diseases and psychological complications).

Sample size calculation

This quasi-experimental research aimed to assess the effect of educational sessions on knowledge, attitude and self -care practices among pregnant women with gestational diabetes. Based on data from previous study by **Saboula, Ahmed & Rashad (2018)** assessed the effect of nursing intervention on knowledge, attitude and self-care activities among gestational diabetic women, considering level of significance of 5%, study power of 80%, and by using the following formula: $n = [2(Z \alpha/2 + Z \beta)\ 2 \times p\ (1-p)]/ (p1 - p2)\ 2$, Type of test = two-sided where n = sample size required, p = pooled proportion of event, p1-p2 = difference in proportion of event, Z α/2: This depends on level of significance, for 5% this is 1.96, Z β: This depends on power, for 80% this is 0.84, $n= [2(1.96 + 0.84)\ 2 \times 0.55\ (1-0.55)]/ (0.2)\ 2 =97$. Based on the previously mentioned formula, 97 pregnant women were recruited.

Recruitment of the sample

This study included 97 pregnant women with GD. They were allocated into 10 groups. Nine groups each included 10 women and the tenth groupincluded7 women. During the study period, 9 women dropped because they haven't time to attend the upcoming sessions and all were replaced with the next potential women. The flowchart of the studied sample is presented in Figure 1.

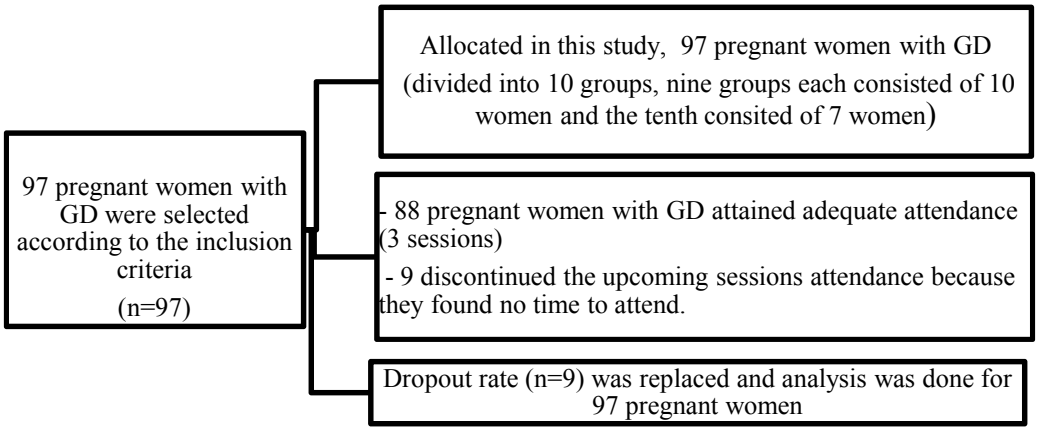

Figure 1 Flowchart of the study sample

Tools of data collection

Four tools were used to collect the data about pregnant women knowledge, attitude and self-care practices regarding gestational diabetes: a structured self-administered questionnaire, gestational diabetes knowledge questionnaire, diabetic attitude scale and diabetic self-care practices questionnaire

Tool 1. A structured self-administered questionnaire:

It was developed by the researchers to collect the pregnant women's general characteristics and consisted of two parts; part one is about the demographic characteristics such as age, level of education, occupation, residence and telephone number while part two is about the obstetric history such as gravidity, parity, gestational age at enrollment and personal history of gestational diabetes.

Tool 2. Gestational Diabetes Knowledge Questionnaire:

It was developed by the researchers after an extensive reviewing of the related literatures **(Eigenmann, Skinner and Colagiuri, 2011; Mazloomy, Mirzaei, Afkhami, Baghiani and Fallahzadeh, 2010)** to assess pregnant women's knowledge about gestational diabetes. It included 6 questions about definition of gestational diabetes, risk factors, symptoms, complications and management & proper nutrition. **The scoring system** was calculated as: (1) for "correct" answer and (0) for "incorrect" answer. The total score ranges from 0 – 12, higher score indicates good knowledge. It was categorized for each woman into "good, fair and poor knowledge" as follows: **poor**<50 %, **fair** from 50% to75% and **good**>75 %.

Tool 3.Diabetic Attitude Scale:

This scale was adopted from **(Anderson, Fitzgerald, Funnell et al, 1998)** to assess attitudes of pregnant women regarding gestational diabetes. It consists of 33 items in six subscales: training to cope with the disease, compliance, severity of disease, blood glucose control, impact of diabetes on life, patient autonomy and team care. **The scoring system** was calculated as: (1) for "agree" and (0) for "disagree". The questionnaire was

evaluated giving a score of 0 – 33. The total score was dichotomized as either **negative attitude** < 50% or **positive attitude** > 50%.

Tool 4. Diabetic Self-Care Practices Questionnaire:

It was a self-report questionnaire adopted from **(Toobert, Hampson and Glasgow, 2000).** It consists of 14 items, which could be utilized to address specific self-care practices questions about: following specific designed diet regimen, self-measurement of blood glucose level, health related practices to avoid GD complications, practice safe regular exercise/ physical activity, taking medication regularly and foot care. **The scoring system** was calculated as: (0) for "no", and (1) for "yes". The questionnaire was evaluated giving a score of 0 – 14. The total score of each woman was categorized into "good and bad practices" as follows: **bad**< 50% and **good** >50%.

Validity and Reliability:

In this study, the questionnaires were translated into Arabic language according to the original ones before introducing it to the pregnant women. The content validity of the developed tool was reviewed by a panel of 3 experts in the maternity nursing specialty before using it to ensure that the questions were consistently conveyed and carried the anticipated meaning they were prepared for. No modifications were suggested. The diabetic attitude scale and diabetic self-care practices questionnaire were validated in previous studies. Cronbach alpha coefficients for internal consistency of the gestational diabetes knowledge questionnaire was 0.871. It was 0.852 for the diabetic attitude scale, while 0.822 for the diabetic self-care practices questionnaire, hence the questionnaires were found to be highly reliable.

Pilot Study

A pilot study was carried out on 10% (10 pregnant women) of the total study sample to test the objectivity and applicability of the study tools and the feasibility of research process as well as to estimate the time needed to answer them. Women in the pilot study were excluded from the study.

Ethical Considerations:

The present study was approved by Research Ethics Committee of Mansoura University, Faculty of Nursing. Written consents were obtained from all women involved in the study after clarification of the aim and approach. The women reassured about the confidentiality of their data and safety of the intervention. In addition, the right to withdraw from the study was permitted.

Field Work:

This study was carried out in the period from January to June2019. This work was conducted through four phases (preparatory, assessment, implementation and outcome evaluation). The researchers attended the previously mentioned setting five days per week, (Saturday, Sunday, Monday, Tuesday and Wednesday), from 9 a.m. to 12 p.m. until the calculated sample size of women was obtained

- **Preparatory phase**

Contents of the educational sessions about gestational diabetes were designed, methods of teaching were determined and the educational media (videos, attractive pictures and an Arabic booklet) were prepared. The booklet covered all contents of the sessions.

- **Assessment phase:**

1. The researchers interviewed the pregnant women, introduced themselves to them,

clarified the study purpose and took their consent to participate in the study. Data regarding women's general characteristics was collected by using a structured self - administered questionnaire.

2. Before the 1st session, women's knowledge, attitude and self-care practices regarding gestational diabetes were assessed by using gestational diabetes knowledge questionnaire, diabetic attitude scale and diabetic self-care practices questionnaire respectively as a pretest. The questionnaires were distributed among women and collected after filling.

- **Implementation phase:**

In the beginning, the pregnant women were oriented with the educational sessions' contents. Three educational sessions of theoretical and practical information about gestational diabetes were provided to them in ten groups of 9–10 women, one session every two weeks for six weeks at the lecture's hall at the antenatal outpatient clinics of Mansoura University Hospitals in the form of lectures and group discussion with duration of 50 - 60 minutes for each session. In the 1st session, definition of gestational diabetes, causes, risk factors, symptoms, complications& its prevention and management were discussed. The 2nd session concerned with discussion of some women's beliefs towards gestational diabetes nature & seriousness, effect on woman's life, woman training to cope & comply with diabetes, importance of blood glucose control, woman autonomy& right to self-care, need of health care team for training to provide gestational diabetes care and importance of support from family & friends and correction of incorrect personal beliefs. It also involved discussion of healthy dietary habits and nutritional behaviors which include effect of diet adjustment on controlling blood glucose, number of meals and foods that could increase and decrease blood glucose level, while the 3rd session was about teaching the mother self-care activities that women should follow to cope with gestational diabetes as safe physical exercises (recommended duration & type of exercise, adequate rest during exercise and danger signs during exercise),training on self-monitoring of blood glucose, gestational diabetes treatment (medication type & side effects and proper storage of medications), the necessity of foot care and follow up schedule. Prepared videos and attractive pictures were presented. At the end of each session, the important points were reviewed. The educational sessions were repeated to each group of women. Each woman was provided with an educational booklet at the end of the 1st session as a guide and was informed about the time of the next session. During data collection, the researchers communicated and followed the women by the phone.

- **Outcome evaluation:**

The effect of the gestational diabetes educational sessions was evaluated after the implementation phase using the same pre-intervention tools:

1. Women's knowledge regarding gestational diabetes was assessed twice (immediately and two weeks after the 1st session).
2. Women's attitudes were assessed two weeks after the 2nd session.
3. Women's self-care practices were assessed four weeks after the 3rdsession.

Statistical Design:

Statistical Package for Social Sciences (SPSS) version 21 was used for statistical analysis of the obtained data. Data presented using descriptive measures in the form of

number, percentage, mean and standard deviation. Chi-square test used for the differences between variables pre and post intervention. Pearson correlation test used to the association between variables. The Cronbach's alpha was used to assess the reliability of the second, third and fourth tool.

Results

Table (1) shows the general characteristics of the pregnant women. It is clear from this table that, more than three-fifths (62.9%) of the pregnant women aged > 30 years with mean ± SD 27.6 ±5.9 and more than half (56.7%) of them had middle education. A higher percentage (82.5%) weren't working and more than half (55.7%) were from rural origin.

Table (2) presents the obstetric history of the pregnant women. It clarifies that, more than three quarters (76.3%) of the pregnant women were multigravida and more than two thirds (71.1%) were multipara. The average gestational age of the current pregnancy was 31.9 ±3.5 with 41.2% of the women were between 24 weeks and 25 weeks and 58.8% of them were between more than 25 weeks to 27 weeks. Among pregnant women, 18.6% had personal history of gestational diabetes.

Figure (2) compares the total knowledge score of the pregnant women regarding gestational diabetes pre, immediately and two weeks post intervention. It illustrates that, nearly two thirds (64.9%) of the pregnant women had poor knowledge regarding gestational diabetes before intervention whereas the majority of them (80.4%) and more than three quarters (77.3%) had good knowledge immediately and two weeks post intervention respectively. There was highly statistically significant increase ($p<0.001$) in total knowledge score immediately and two weeks post intervention compared to pre intervention among pregnant women.

Figure (3) describes the total attitude score of the pregnant women regarding gestational diabetes pre and two weeks post intervention. It shows that, nearly three quarters (74.2%) of the pregnant women had negative attitude toward gestational diabetes pre intervention and decreased to become 8.2% two weeks post intervention. Reversely, most of them (91.8%) had positive attitude toward gestational diabetes two weeks post intervention. There was highly statistically significant difference ($p<0.001$).

Figure (4) illustrates the total self-care practices score of the pregnant women regarding gestational diabetes pre and four weeks post intervention. It clarifies that, most of pregnant women (94.8%) had bad self-care practices toward gestational diabetes pre intervention and decreased to become 9.3% four weeks post intervention. Reversely, 5.2% of the pregnant women had good self-care practices toward gestational diabetes pre intervention in comparison to 90.7% four weeks post intervention. There was highly statistically significant difference ($p<0.001$).

Figure (5) clarifies the correlation between total knowledge and total attitude scores regarding gestational diabetes among the pregnant women post intervention. A significant positive correlation was observed between total knowledge and total attitude scores regarding gestational diabetes among the pregnant women post intervention ($r=0.545$, $p<0.001$).

Figure (6) illustrates the correlation between total attitude and total self-care practices scores regarding gestational diabetes among the pregnant women post intervention. It shows that, there is a positive correlation between total attitude and total self-care practices scores regarding gestational diabetes among the pregnant women post intervention ($r=0.430$, $p<0.001$).

Table 1. General characteristics of the pregnant women.

Items	NO. (97)	%
Age (years)		
<20	11	11.3
20 – 30	25	25.8
>30	61	62.9
Mean ±SD	27.6 ±5.9	
Educational level		
Read/write	13	13.4
Middle education	55	56.7
High education	29	29.9
Job		
Working	17	17.5
Not-working	80	82.5
Residence		
Rural	54	55.7
Urban	43	44.3

Table 2. Obstetric history of the pregnant women.

Items	NO. (97)	%
Gravida		
Primigravida	23	23.7
Multigravida	74	76.3
Parity		
Nullipara	23	23.7
Primipara	5	2.6
Multipara	69	71.1
Gestational age (weeks)		
24 – 25	40	41.2
>25 – 27	57	58.8
Mean ±SD	31.9 ±3.5	
Personal history of gestational diabetes	18	18.6

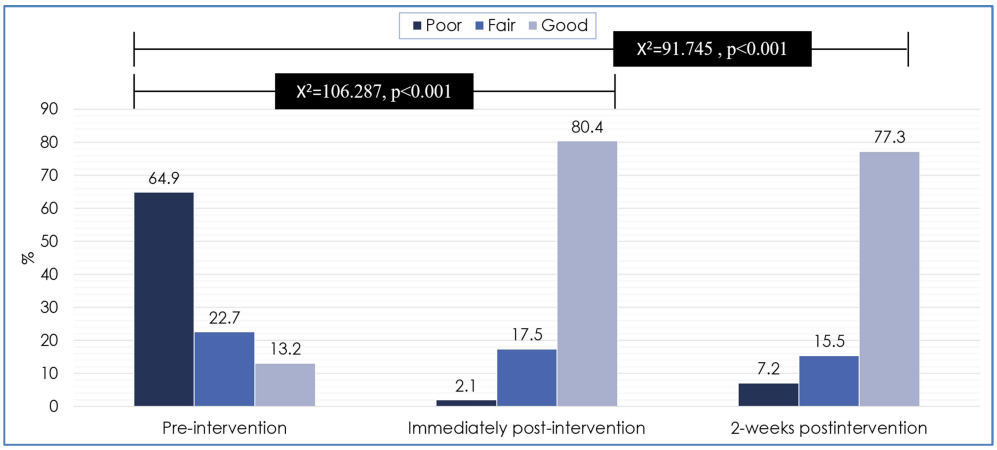

Figure 2. The total knowledge score of the pregnant women regarding gestational diabetes pre, immediately and two weeks post intervention.

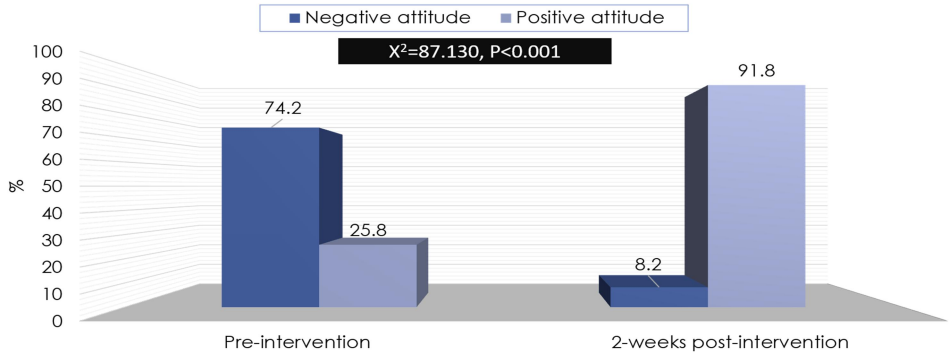

Figure 3. The total attitude score of the pregnant women regarding gestational diabetes pre and two weeks post intervention

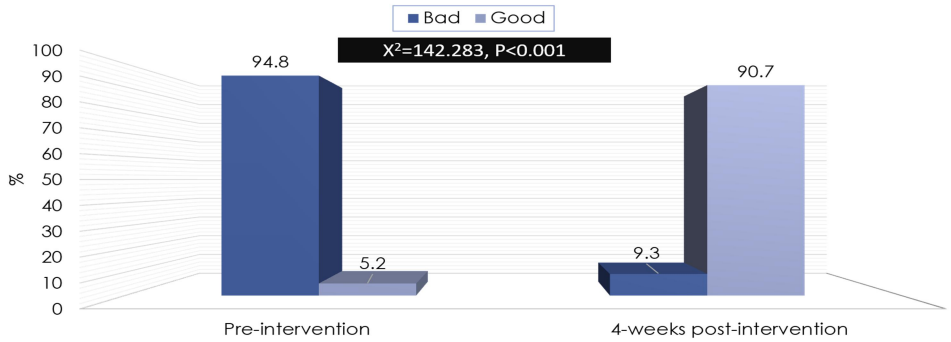

Figure 4. The total self-care practices score of the pregnant women regarding gestational diabetes pre and four weeks post intervention.

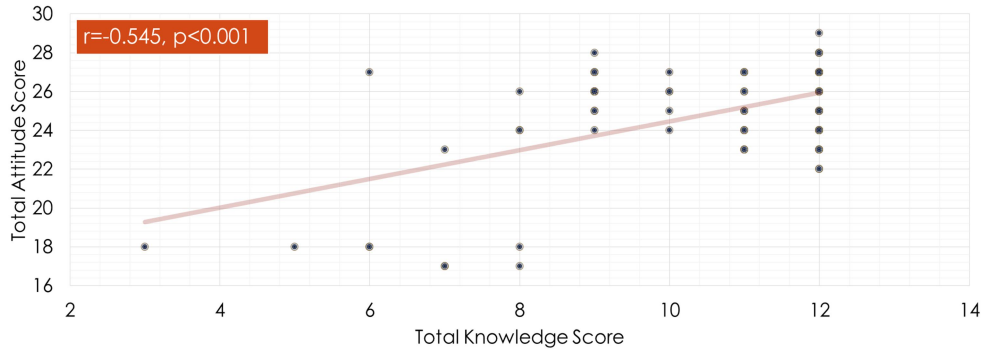

Figure 5. Correlation between total knowledge and total attitude scores regarding gestational diabetes among the pregnant women post intervention.

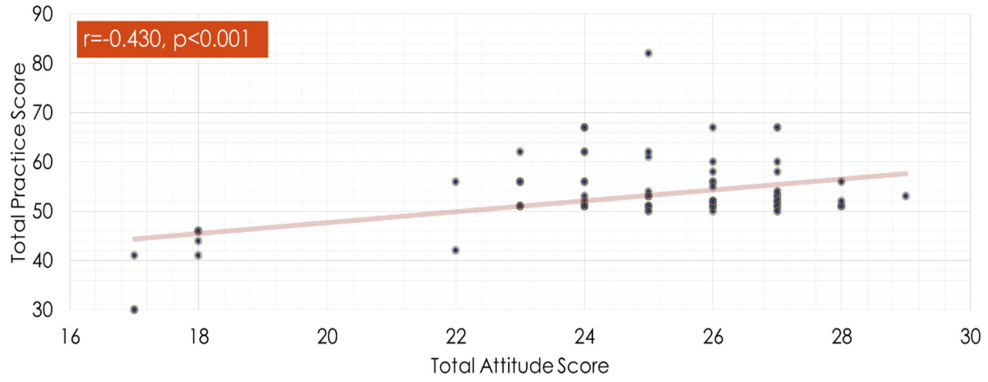

Figure 6. Correlation between total attitude and total self-care practices scores regarding gestational diabetes among the pregnant women post intervention.

Discussion

The present study aimed to assess the effect of educational sessions on knowledge, attitude and self-care practices among pregnant women with gestational diabetes. This aim was achieved through the present study findings which revealed significant differences in pregnant women's knowledge, attitude and self-care practices before and after the intervention. Therefore, the hypothesis "pregnant women who receive educational sessions about gestational diabetes have higher total knowledge score, positive attitude and improved self-care practices post intervention than pre-intervention" was reinforced.

Lack of women's knowledge about gestational diabetes causes inadequate understanding of the medical information, which in turn leads to limited adherence to dietary and lifestyle changes and exposes both woman and fetus to more serious complications. The present study findings revealed that, there was a highly statistically significant difference regarding pregnant women total knowledge about gestational diabetes pre and post intervention ($p < 0.001$) whereas knowledge had been markedly increased post intervention. Pre intervention, only less than one-sixth of the pregnant women had good knowledge score compared with more than three quarters two weeks post intervention. This significant improvement is very valuable, because acquisition of accurate knowledge is considered the basis for and linked to positive attitude and better self-care practice but the women need follow up for some time to change their behaviors and make correct decisions.

This result was in line with **Saboula, Ahmed & Rashad (2018)** who assessed the impact of nursing intervention on knowledge, attitude and self-care activities among gestational diabetic women in Shebin Elkom, Egypt. They concluded a significant increase in the total knowledge score of gestational diabetic women post-intervention. Similar finding was reported in a quasi-experimental study by **Mohamed &Ahmed (2019)** to assess the effect of educational program on maternal & fetal outcomes for 50 pregnant women with gestational diabetes at Assiut city,

Upper Egypt. They reported a statistical significant difference between knowledge score pre and post the educational program.

Moreover, this finding was congruent with the study of **Said & Aly (2019)** that was conducted in Benha, Egypt on 70 gestational diabetic women to investigate the effect of educational package regarding lifestyle and clarified that there was a highly statistically significant difference regarding knowledge before and four weeks after the educational intervention. Also, Australian and Egyptian studies **(El Toony, Khalifa and Ghazaly, 2018; Sayakhot, Carolan-Olah&Steele, 2016)** analyzed the effectiveness of the educational intervention on knowledge of healthy diet and lifestyle among gestational diabetic women. Such studies concluded a significant increase in women's knowledge post-intervention.

Concerning the pregnant women's attitudes toward gestational diabetes, the present study indicated that, nearly three quarters of the pregnant women had negative total attitude score toward gestational diabetes pre intervention, reversely most of them had positive total attitude score post intervention. As a result, enhancements of women's attitudes create a background for women to promote their practice and control the disease. This finding was consistent with **Gerayloo, Kakolaki, Safdari et al. (2015)** who reported that, the attitude of the study subjects toward gestational diabetes was improved after intervention. Also, in a study conducted by **Mohamed & Ahmed (2019)**, their results proved that the educational intervention was significantly effective on pregnant women's attitude regarding gestational diabetes.

As regards pregnant women's self-care practices toward gestational diabetes in this study, most of them had bad total self-care practices score before the intervention, but after the intervention the practice improved and most of them had good total self-care practices score. This change in women's practices might be due to proper education which increase their awareness and improve their healthy behaviors. The pregnant woman used her knowledge and skills as a source to independently take care of her health. In general, personal attitude, knowledge, resources and cultural background affect self-care practices and adherence to treatment plans. Previous studies reported improvement of women's behaviors and self-care practices after intervention **(Saboula, Ahmed and Rashad, 2018; Khiyali, Manoochri, Jeihooni, Heydarabadi, Mobasheri, 2017; Gerayloo, Kakolaki, Safdari et al, 2015)** which are similar to this study.

The present study revealed a significant positive correlation between total knowledge and total attitude scores regarding gestational diabetes among pregnant women post intervention. It is expected that improvement of women's knowledge is accompanied by an improvement in attitudes towards gestational diabetes. This means that the more their knowledge is, the positive their attitudes are. This finding was coincided with the results reported by **Said & Aly (2019) and Noronha, Karkada, Prabhu et al. (2018)** which concluded a positive correlation between

women's knowledge and attitude regarding gestational diabetes after the intervention.

Additionally, the present study found a positive correlation between pregnant women's total attitude and total self-care practices scores post intervention. This reflected that improvement in attitude resulted in improvement in practices. This might be due to the general effect of women's attitudes on the way in which they intended to self- manage gestational diabetes related self-care. Moreover, women with positive attitude towards gestational diabetes will adhere health lifestyles easily and vice versa, women who believed that gestational diabetes would not seriously affect their lives, were less likely to adhere to treatment plans. Consistent with this finding, **Zandinava, Sehhatti, Mohammad et al. (2017)** conducted a clinical trial in Iran to assess the effect of educational package on self-care behavior, quality of life and blood glucose measures among 46gestational diabetic women. They mentioned that educational program increased women's knowledge regarding gestational diabetes improve their attitudes and hence promote their self-care behaviors such as exercise, proper diet, etc.

Generally, the results of this study demonstrated effectiveness of the educational sessions on gestational diabetes knowledge, attitude and self-care practices of pregnant women by presenting suggestions of healthy diet, physical activity and weight control. This improvement might be due to good communication skills of the researchers and active participation of the women. Women participation motivates them to make changes in their life style with a view to increase their willing to learn how gestational diabetes is controlled. This highlights the need for consistent education of women to improve their life styles and to prevent the early onset of type 2 diabetes mellitus. A previous study of **Petkova, DimitrovandGeourgiev (2011)** in Bulgaria for education of gestational diabetes at the antenatal clinic, reported the significant role of education program for improvement of gestational diabetes outcomes. Also, in these studies **(Hailu, Moen andHjortdahl , 2019; Mohebbi, O'Reilly, Versace, Lim, Janus and Dunbar, 2019; Alayoub, Curran, Coffey et al, 2018;Liu , Xie and Guo , 2017),** the positive effect of the educational intervention was confirmed.

Implications for nursing

The findings of this study demonstrate that providing educational sessions is an effective approach to improve women's knowledge, attitude and self -care practices regarding gestational diabetes. Therefore, incorporating such sessions to the standard healthcare for women with gestational diabetes is necessary. Nurses role as an educator is more important to help women overcome knowledge gaps and treatment non adherence and also teach them the importance of preventing adverse outcomes of uncontrolled diabetes in order to achieve the best possible outcomes.

Conclusion

Based on the findings of the present study, the tested hypotheses were accepted where pregnant women's knowledge, attitude and

self-care practices about gestational diabetes were improved after implementation of the educational sessions. There were statistically significant differences between those variables before and after the intervention.

Recommendations

In the light of the current study findings, the following are recommended:

(1) Simple clarified educational programs should be continuously implemented to increase women's knowledge and improve their attitude about gestational diabetes as well as promote their self-care practices and lifestyle.

(2)Training courses and workshops about gestational diabetes care and management for health care providers at antenatal units should be conducted at regular intervals.

(3) Future studies are recommended to investigate the impact of gestational diabetes educational program on women quality of life.

Conflicts of interest disclosure

The authors declare that there is no conflict of interest.

Financial support

- No funding was received

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