



RESEARCH ARTICLE

EFFECTIVENESS OF INSTRUCTIONAL SCHEME FOR PREGNANT WOMEN REGARDING  
GASTONATIONAL DIABETES ON THEIR KNOWLEDGE,  
ATTITUDE AND CLINICAL IMPLICATIONS

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ABSTRACT

**Introduction:** Gestational Diabetes Mellitus (GDM) has well recognised adverse health implications for the mother and her newborn that are both short and long term. Obesity is a significant risk factor for developing GDM and the prevalence of obesity is increasing globally.

**Aim:** to evaluate the effectiveness of applying instructional scheme for pregnant women on their knowledge, attitude and clinical implications.

**Subject and Methods:** quasi-expermental research design with convenience random sampling was used which calculated 60 pregnant women in the first trimester using three tools.

**Results:** The results indicates a statistically significance differences in post and follow-up implementation of instructional scheme phase comparing to pre instructional scheme phase in total knowledge, attitude, and clinical implications.

**Conclusion & Recommendations:** there are a remarkable increase and improvement of the pregnant women 's level of knowledge and acquiring the ultimate positive and noticeable improvement in the attitude and their clinical implications ,and there are obvious needs for instructional scheme offered on simple media to pregnant women to prevent occurrence of gestational diabetes mellitus. Within this context, there is a great demand for strategies and programs that take into consideration all the social, financial, and psychological contexts.

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INTRODUCTION

Gestational Diabetes Mellitus (GDM) ; it is described as "the glucose tolerance disorder in different degree that firstly appear or recognized during pregnancy". Gestational Diabetes Mellitus is observed nearly 3-7% of all the pregnancies. In the United States of America 7% of all the pregnancies, annually more cases than 200,000 are complicated by gestational diabetes. In Australia it is estimated that GDM rate is between 5.2% and 8.8%. In addition to, More than 8 million women in the United States have gestational diabetes mellitus (GDM); it is observed in 7% of all pregnancies. (Sen & Sirin, 2014 and Evert & Hei, 2015) Gestational Diabetes Mellitus (GDM) has well recognised adverse health implications for the mother and her newborn that are both short and long term. Obesity is a significant risk factor for developing GDM and the prevalence of obesity is increasing globally. (Nagle *et al.*, 2013)

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According to the American Diabetes Association (ADA) the Diagnosis and Classification of Diabetes Mellitus lists GDM or delivery of a baby weighing > 9 lb as a risk factor for developing diabetes later in life. Women who have had a pregnancy complicated by GDM are 40–60% more likely to develop diabetes within 15–20 years. Other risk factors for developing diabetes include a family history of type 2 diabetes, the degree of abnormality of the glucose tolerance test, the degree of obesity, and certain ethnicities (Evert and Hei, 2015). The prevalence of GDM in a population is reflective of the prevalence of type 2 diabetes within that population. In low-risk populations, such as those found in Sweden, the prevalence in population-based studies is lower than 2% even when universal testing is offered, whereas studies in high-risk populations, such as the Native American Cree, Northern Californian Hispanics, and Northern Californian Asians, reported prevalence rates ranging from 4.9% to 12.8%. Prevalence rates for GDM obtained from hospital-based studies similarly reflect the risk of type 2 diabetes in a population with a single hospital-based study in Australia reporting prevalences ranging from 3.0% in Anglo-Celtic

women to 17.0% in Indian women. Finally, of the eight studies published that report on trends in the prevalence of GDM, six report an increase in the prevalence of GDM across most racial/ethnic groups studied. In summary, diabetes during pregnancy is a common and increasing complication of pregnancy. (Hunt and Schuller, 2007) A common approach to screening for glucose intolerance in pregnant women is the use of a 50g glucose challenge test (GCT) in the late second trimester, followed by a diagnostic oral glucose tolerance test (OGTT) when the GCT is positive (1-hour post-challenge blood glucose  $\geq 7.8$  mmol/L). As women with a negative GCT do not undergo the diagnostic OGTT, it is possible that they could have undiagnosed gestational diabetes (GDM) or gestational impaired glucose tolerance (GIGT). Thus, we sought to characterize predictors of a false negative GCT and its clinical implications. (Goldberg *et al.*, 2013)

Furthermore, Diabetes during pregnancy is associated with significant risk of complications to the mother, fetus and newborn. We reviewed the potential impact of early detection and control of diabetes mellitus during pregnancy on stillbirths for possible inclusion in the Lives Saved Tool (LiST). Diabetes, especially pre-gestational diabetes with its attendant vascular complications, is a significant risk factor for stillbirth and perinatal death. (Syed *et al.*, 2011) Finally, It is a matter of public health importance that clinicians have evidence based strategies to inform practice and currently there is insufficient evidence regarding the impact of dietary and lifestyle interventions on improving maternal and newborn outcomes. (Nagle *et al.*, 2013)

### **Aim**

The aim of the present study is to evaluate the effectiveness of applying instructional scheme for pregnant women on their knowledge, attitude and clinical implications through:

1. Assess pregnant women's knowledge, regarding gestational Diabetes
2. Assess pregnant women's attitude , regarding gestational Diabetes
3. Assess pregnant women's health status , regarding gestational Diabetes
4. Develop an instructional scheme for pregnant women in order to prevent gestational Diabetes
5. Implementation of an instructional scheme for pregnant women.
6. Evaluate the effect of implementing an instructional scheme on the pregnant knowledge, attitude, and clinical implications.

### **Research Hypotheses**

- The post-implementation of instructional scheme knowledge's scores for pregnant women will be highly compared to pre instructional scheme implementation scores.
- The post-implementation of an instructional scheme attitude scores for pregnant women will be highly compared to pre instructional scheme implementation scores.

- The occurrence of gestational diabetes among pregnant women who will expose to the designed instructional scheme about liver transplantation care will reduce.
- Pregnant women who will expose to the designed instructional scheme about gestational diabetes prevention will show better clinical implications.

### **Conceptual framework**

Bandura's Social-Cognitive Theory and Pender's Health Promotion Model (HPM) remains one of the most widely recognized conceptual frameworks for understanding health management and guided the present study's design. The social cognitive approach works on the demand side by helping people to stay healthy through good self management of health habits. If people lack awareness of how their lifestyle habits affect their health, they have little reason to put themselves through the misery of changing the bad habits they enjoy. They are lectured more than they want to hear about their unhealthy practices. Applications of theories of health behavior have tended to assume adequate knowledge of health risks. It is usually high. Knowledge creates the precondition for change. But additional self-influences are needed to overcome the impediments to adopting new lifestyle habits and maintaining them. (Sen and Sirin, 2014)

### **Significance of the study**

The observed increase in yearly cumulative incidence of GDM was independent of changes in age and ethnicity of the study population. A true increase in GDM incidence might reflect or contribute to the increases in the prevalence of diabetes and obesity. Coordinated efforts are needed to alter this trend and to prevent chronic diabetes in GDM patients and their offspring (Assiamira *et al.*, 2004). Additionally, Prevention of diabetes among African American women is critical because of the high rates of diabetes-related mortality and morbidity in this population (Qalawa and Elsidig, 2013). The public health challenge posed by diabetes is very considerable. Only by substantially increasing public awareness of diabetes and its complications, and through primary prevention measures, early detection and evidence-based management of the disease, will the growing epidemic and its financial costs be minimized (WHO, 2006). Thus, Education plays a major role in the management of diabetes. Persons with diabetes mellitus need to perform several self-care actions, such as eating food on a meal plan, self-testing of blood glucose as prescribed by the physician, and getting the amount of exercise needed to manage diabetes (Gagliardino & Graciela, 2001).

### **MATERIALS AND METHODS**

A quasiexperimental research study research design will be utilized in this study; the study will be portrayed under the four main designs as follows:

- 1- Technical Design.
- 2-Operational Design.
- 3-Administrative design.
- 4- Statistical Design.

## Research design

A quasi-experimental research design was used to conduct the present study.

### (1) Technical Design

The technical designs for this study included research setting, subjects, tools and methods of data collection.

### A- Study Setting

This study was carried out in port said city in out patients antenatal clinics at ministry of health hospitals, Elgawhara hospital , family medicine center.

### Target population

Convenience samplings were selected from all pregnant women in the selected setting as mentioned above it included 60 pregnant women in the first trimester.

Exclusion criteria:

- Third trimester
- Women have gestational Diabetes, endocrine disorders.
- women with past history of gestational Diabetes mellitus

### C-Tools for Data Collection

Data was collected by using one tool contains 4 main parts developed by the researchers based on recent related literature review and modified tool from Mathew, 2006 and Barnett, 2006 to assess the women's knowledge and attitude and clinical implications toward gestational diabetes as follows:

#### Part I- Sociodemographic data:

It was Contains information related to demographic characteristics of the studied women as their age, educational class level, occupation and residence, past and family history.

#### Part II: woman's knowledge regarding Gestational Diabetes Questionnaire

It includes 23 questions to assess the woman's general knowledge related to Diabetes Mellitus, 8 questions regarding definition of gestational diabetes, risk factors, clinical manifestations, investigations, prevention by diet, exercise, follow-up and complications of gestational diabetes Mellitus.

#### Part III: woman attitude sheet

It includes 4 items to assess woman's attitude regarding gestational diabetes, it includes hygienic care, dietary habits, activities and follow-up appointments.

#### Part IV: clinical implications assessment sheet

It includes 5 investigations to assess the women health status as RBCs, WBCs, PLT, Blood Glucose and Others

## Intervention Program

The researcher will design the instructional scheme based on review of literatures as (Arabia, 2012 and Evert & Hei, 2015) guides and the findings of the baseline assessment of knowledge. It will be validated through the expert's opinions. The aim of this instructional scheme will be to improve women's knowledge and attitude about gestational diabetes. The scheme contents and the choice of teaching methods will be based on women's age, level of education and needs whether individually or in groups. An instructional booklet will be prepared by the researcher to present information for patients in a simple way using simple language and illustrative pictures. It will be distributed to all pregnant women in proper time.

### Methods of Data collection

#### Ethical considerations

#### Ethical Consideration

1. An approval was taken from hospital director and head nurses after brief and comprehensive explanation of the study, its aims and benefits of applying it for nurses and women.
2. A brief explanation of the purpose and importance of the study was given to the pregnant women and assured that the obtained information will be confidential and used only the purpose of the study. Confidentiality of the information was assured by the researcher.

### (2)-Operational Design

The operational design includes preparatory phase, content validity, reliability, pilot study and fieldwork.

#### A-Preparatory Phase

It includes reviewing of literature, different studies and theoretical knowledge of various aspects of the gestational diabetes using books, articles, internet, periodicals and magazines.

#### B- Content Validity

Validated tools were used from Published sources as mentioned before in tools of data collection.

#### C-Content Reliability

Was carried out through using Cronbach alpha test = 0.086

#### Pilot Study

Pilot study was carried out after the development of the tools on 10% of the pregnant women to test applicability of the tools then necessary modification were done according to the results of the results of pilot study and expertise opinions. The purpose of pilot study was:

- 1- To test the applicability of the study tools.
- 2- To estimate any need for addition in the tool.

Otherwise, these women were then excluded from the sample of research work to assure the stability of answers

### 3) Field work

This study was carried out between April, 2015 to November, 2015, a period of 7 months to collect from Saturday until Wednesday; work's selection was done in accordance with the predetermined sample selection criteria. Women who met the selection criteria were asked to participate in the study. Each woman was informed about the purpose of the study. The data were collected throughout three phases of assessment. The first phase (Pre-test phase) was done prior to conducting the instructional scheme. The second phase (implementation phase) which includes the application of instructional scheme after divided the sample into groups which group includes (10-14) pregnant women through eight sessions for 8 weeks as one session per week which lasted from 30-45 minutes. The media which used includes: illustrative pictures, real player, video tape and handouts which constructed in a suitable manner for educated and illiterate workers and given for every woman as a gift. The third phase (post-test phase) was done immediately post implementing instructional scheme

### (4) Statistical Design

Collected data was managed, entered then tabulated and analyzed according to the type of each data to realize the study aims.

### Scoring system

The scoring systems for part II of woman's knowledge was ranged from 1-2 score which zero score for both I 'don't know and No answers and 1 for yes answer. Also scores were done after correct all sheets with model answers which write answer is namely as (satisfactory knowledge Level) and wrong answers namely as (Unsatisfactory knowledge Level) then arranged as total scores of knowledge. Part III to assess woman's attitude regarding gestational diabetes. It was include 6 items of dietary habits, exercises, hygienic care and follow-up ranged from 0 to 1 scores as zero for No answer and one for yes answer then arranged as total scores of attitude. Part IV to assess health status includes 4 items ranged from 1 to 3 scores as high, moderate and Low level.

### Statistical analysis

#### Data analysis

Data was collected and entered into a database file. Statistical analysis was performed using the SPSS 19 computer software statistical package. Data was described by summary tables and figures, Chi-2 was used to test the association between two qualitative variables and Paired t-test were used to compared between two or more proportion. Statistical significance was considered at P-value <0.05 and highly significance at P-value <0.00.

#### Limitation of the study

The researcher was made a great effort to found appropriate and available time for women and ensure that no contradiction with women's schedule for appointment /follow-up schedule.

## RESULTS

**Table (1):** shows that about (35 %) of study sample were in age group 26-30 years. Also, all of study sample (100%) are married, in addition to, (73.3%) from urban region, (63.3%) had secondary level of education and house wife which (55%) faced mild physical tension work.

**Table 1. Distribution of studied sample according to demographic data (n = 60)**

	No.	%
Age		
18 – 25	19	31.7
26 – 30	21	35.0
31 – 35	6	10.0
36 – 40	11	18.3
41 – 45	3	5.0
Min. – Max.		23.0 – 41.0
Mean ± SD.		28.8500 ± 5.47359
Marital status		
Married	60	100.0
Divorced	0	0.0
Widow	0	0.0
Residence		
Urban	44	73.3
Rural	16	26.7
Educational level		
Illiterate	5	8.3
Read and write	0	0.0
Secondary school	38	63.3
High education	17	28.3
Occupation		
Employee	5	8.3
Special	6	10.0
Symbols	0	0.0
House wife	38	63.3
not work	11	18.3
Type of work		
Hard physical	27	45.0
Mild physical	33	55.0

**Table 2. Distribution of studied sample according to their medical and family history (n = 60)**

	No.	%
suffer from chronic disease		
No	48	80.0
Yes	12	20.0
Chronic disease (n = 12)		
Liver	4	33.3
Gastrointestinal	3	25.0
Hypertension	3	25.0
Heart disease	1	8.3
Vascular	1	8.3
Family history of diabetes		
No	34	56.7
Yes	26	43.3
Diabetes knowledge		
Friends	0	0.0
T. v	16	26.7
Magazine and journal	14	23.3
Study	30	50.0
Doctor	0	0.0
Internet	0	0.0

**Table (2):** shows that (100%) of study sample had medical history of chronic disease, and (25%) of them have Gastrointestinal disorders and hypertension and (43.3%) had family history of diabetes Mellitus. On the other hand, (50%) of them reported that they acquired their information's regarding gestational diabetes from their study and schools.

**Table 3. Comparison between pre and post according to knowledge (n = 60)**

Mean % score	Pre	Post	t	p
1-General information of D.M				
Min. – Max	0.0 - 28.57	28.57-71.43	17.848*	<0.001*
Mean ± SD	9.05±9.83	51.90±17.64		
2-knowledge of diet that prevent D.M				
Min. – Max	0.0 – 25.0	25.0 – 100.0	13.255*	<0.001*
Mean ± SD	2.50±7.56	51.67±27.95		
3-knowledge of exercises				
Min. – Max	0.0 – 75.0	25.0 – 100.0	14.527*	<0.001*
Mean ± SD	14.58 ± 18.0	72.92±28.48		
4-urine and blood analysis for suger				
Min. – Max	0.0 – 25.0	0.0 – 100.0	55.628*	<0.001*
Mean ± SD	0.42 ± 3.23	97.92±13.25		
5- General knowledge of gestational D.M				
Min. – Max	25.0 – 75.0	0.0 – 75.0	3.683*	0.001*
Mean ± SD	60.0 ± 20.17	48.75 ± 24.54		
6-knowledge of gestational D.M risk factors				
Min. – Max	14.29- 71.43	28.57-100.0	6.868*	<0.001*
Mean ± SD	40.0 ± 23.05	66.90±24.74		
7-clinical manifestations of gestational D.M				
Min. – Max	20.0 – 60.0	40.0 – 60.0	6.438*	<0.001*
Mean ± SD	42.0 ± 14.82	55.50±8.32		
8-complications of gestational D.M				
Min. – Max	0.0 – 100.0	0.0 – 100.0	3.385*	0.001*
Mean ± SD	20.0 ± 40.34	51.67±50.39		
9-Hygienic care				
Min. – Max	0.0 – 100.0	0.0 – 100.0	2.399*	0.020*
Mean ± SD	5.0 ± 21.98	18.33 ± 39.02		
10- Follow-up				
Min. – Max	0.0 – 50.0	50.0 – 100.0	10.171*	<0.001*
Mean ± SD	15.0 ± 23.11	52.50 ± 14.34		
Total knowledge				
Min. – Max	17.78-42.22	46.67-68.89	33.255*	<0.001*
Mean ± SD	25.81±6.61	59.85±7.03		

t: Paired t-test

\*: Statistically significant at  $p \leq 0.05$ **Table 4. Comparison between pre and post instructional scheme according to total score of attitude in preventing gestational diabetes Mellitus**

	No. items	Scores	Pre	Post	t	p
Percent score of attitude						
Min. – Max	14	0 - 14	50.0 - 57.14	42.86-57.14	6.626*	<0.001*
Mean ± SD			52.74±3.50	56.55±2.72		1*
Total score of attitude						
Min. – Max			7.0 – 8.0	6.0 – 8.0		
Mean ± SD			7.38±0.49	7.92±0.38		

t: Paired t-test\*: Statistically significant at  $p \leq 0.05$ **Table 5. Distribution of studied sample according to their clinical implications (n = 60)**

Laboratory studies	Normal		High		Low	
	No.	%	No.	%	No.	%
1 – Complete blood count						
RBCs	60	100.0	0	0.0	0	0.0
WBCs	60	100.0	0	0.0	0	0.0
Platelets	60	100.0	0	0.0	0	0.0
Blood glucose	45	75.0	6	10.0	9	15.0
Others	1	1.7	0	0.0	0	0.0

**Table 6. Distribution of studied sample according to what do you think the factors that hinder acquiring the knowledge and screening for gestational diabetes Mellitus (n = 60)**

	No.	%
What do you think the factors that hinder acquiring the knowledge of gestational diabetes Mellitus		
Lack of time	19	31.7
Lack of awareness programs	16	26.7
Fear of discovery the diseases	20	33.3
Physical problems	5	8.3

**Table (3):** Clarifying that there was a statistically significance difference were founded in post implementing instructional

scheme phase in comparing with pre-instructional scheme implementation phase regarding knowledge and total scores of knowledge of gestational diabetes mellitus  $p = (0.001)$

**Table (4):** shows that there was a statistically significance difference were founded in post implementing instructional scheme phase in comparing with pre-instructional scheme implementation phase regarding their total scores of attitude in preventing gestational diabetes mellitus  $p = (0.001)$

**Table (5):** shows that all (100%) of study sample had normal level of red blood counts, Wight blood count, and platelet count while (10%) of them had high blood glucose level.

**Table (6):** shows that (33.3%) of studied sample think that the fear of discovered a disease is the factors that hinder acquiring the knowledge of gestational diabetes Mellitus.

## DISCUSSION

An increasing prevalence of gestational diabetes has become a very challenging task in prenatal care worldwide. International Association of Diabetes and Pregnancy Study Groups (IADPSG) has recently issued recommendations on the diagnosis and classification of hyperglycaemia in pregnancy. These recommendations, the first to provide harmonised, evidence-based criteria for the diagnosis and classification of diabetes in pregnancy, are currently being discussed and accepted worldwide by the relevant authorities. (Lovrenčić, *et al.*, 2013) Based on the present study about that more than one quarter of study sample were in age group 26-30 years. Also, all of study sample are married, in addition to, near two-third of them from urban region, more than half of them had secondary level of education and house wife which half of them faced mild physical tension work, all of study sample had medical history of chronic disease, and one quarter of them have Gastrointestinal disorders and hypertension and near half of them had family history of diabetes Mellitus. On the other hand, half of them reported that they acquired their information's regarding gestational diabetes from their study and schools. In addition to, above half of study sample acquired their information's from their study. These goes in the same line with Qalawa and Elsiddig, 2013 who reported from Abdel – Megied *et al.*, 2011 that Health information competencies are applied to transform health-related information into knowledge that is consistent with the most current medical practice. The new generation of health information consumers has, for the most part, easy access to information; yet it may not be able to take full advantage of this convenient access. Furthermore, Poor nutritional habits, such as inadequate consumption of macronutrients, represent a very important component in the etiology of chronic diseases. Despite the high level of the education of university students, they still have poor nutritional habits, more so than the general population.

Current study revealed that there was a statistically significance difference were founded in post implementing instructional scheme phase in comparing with pre-instructional scheme implementation phase regarding knowledge and total scores of knowledge of gestational diabetes mellitus. This finding goes in the same way with Holanda *et al.*, 2012 who concluded in their study that pregnant women showed superficial knowledge about the gestational diabetes and reported difficulties in the dietotherapy follow-up and practice

of physical activity, which can influence the promotion of self-care, treatment and control of the disease. Also, Eileen *et al*, 2002 stated that further research is needed to evaluate pregnant women's nutritional knowledge and actual dietary practices, to develop effective strategies designed to promote adequate nutritional intake in pregnant women, and to help women remain within the Institute of Medicine (IOM) weight gain recommendations. Consistent individualized nutritional assessment and counseling during pregnancy could provide a foundation for continued healthy eating habits during the postpartum period and possibly throughout the woman's life.

In addition to creating awareness, regular follow-up, including testing for pre-diabetes and diabetes, should be promoted on an ongoing basis after a pregnancy that is complicated by GDM. If overweight, women with a history of GDM should be counseled to reduce their risk for diabetes through lifestyle changes and medications if necessary. Children of women with a history of GDM should also be encouraged to establish and maintain healthy lifestyles to avoid excess weight gain and reduce their risk for type 2 diabetes. (Evert and Hei, 2015) Today, health consumers are actively seeking information and using it to make health decisions. The ease of accessing information may influence their perceptions of their ability to make informed health decisions. So, Individuals with less education and exposure to information-related activities are expected to have even lower health information competencies. Also, Health educators must continue to partner with a variety of groups that play an important role in promoting health information literacy, such as librarians and educators. (Qalawa and Elsiddig, 2013) The 2002 National Institute for Health and Clinical Excellence (NICE) Health Technology Assessment concluded that there was insufficient evidence to advocate universal screening in pregnancy while noting that there were clearly women in whom maternal hyperglycaemia caused adverse fetal outcomes including Macrosomia, shoulder dystocia and stillbirth. (Scott *et al.*, 2002) While evidence supports a positive association with increasing plasma glucose on a 75 g or 100 g oral glucose tolerance test and macrosomia and primary cesarean section, clear thresholds for increased risk were not found. The 50 g oral glucose challenge test has high NPV but variable PPV. Treatment of GDM results in less preeclampsia and macrosomia. Current evidence does not show that treatment of GDM has an effect on neonatal hypoglycemia or future poor metabolic outcomes. There is little evidence of short-term harm from treating GDM other than an increased demand for services. Research is needed on the long-term metabolic outcome for offspring as a result of GDM and its treatment, and the "real world" effects of GDM treatment on use of care. (Hartling *et al.*, 2012)

Several epidemiological studies have suggested a robust link between physical activity and reduced risk of GDM; however, researchers have been unable to suggest a cost-effective, easily accessible, evidence-based program with guidelines for frequency, intensity, duration, and type of activity to prevent the incidence of GDM in sedentary, at-risk populations. True effectiveness of specific structured exercise programs remains untapped in GDM prevention and treatment, and many well-controlled exercise studies are warranted. (Mottola, 2008) Regarding pregnant women attitude towards gestional diabetes

prevention, the present study results shows that there was a statistically significance difference were founded in post implementing instructional scheme phase in comparing with pre-instructional scheme implementation phase regarding their total scores of attitude in preventing gestational diabetes mellitus. This finding goes in the same way with Norris *et al.*, 2002 who mentioned that Self-management education improves GHb levels at immediate follow-up, and increased contact time increases the effect. The benefit declines 1–3 months after the intervention ceases, however, suggesting that learned behaviors change over time. Further research is needed to develop interventions effective in maintaining long-term glycemic control. More recently, The last study of screening practices for gestational diabetes (GDM) in the UK concluded that a lack of consensus about screening was due to a lack of clinical guidelines. We aimed to determine current practices in Scotland since new guidelines recommended that diagnosis should be made at a lower level of hyperglycaemia. Despite provision of clinical guidelines, there are still inconsistencies in screening and management of GDM in Scotland. If a similar increase in the prevalence of GDM is experienced across Scotland, there will be major implications for health care provision and resource allocation. (Stirrat *et al.*, 2015)

In Brazil, Holanda *et al.*, 2012 reported that Studies in Brazilian national literature on attitude and knowledge of pregnant women with diabetes mellitus are scarce. Knowledge is a continuous process, since the person in chronic health condition needs to understand the changes that occur in its body to face them in the daily live and achieve quality of life. However, it is recognized that knowledge about the disease is essential in preventing complications in the performance of self-care and maintenance of metabolic control. Additionally, Lifestyle advice including dietary modification is the primary intervention in all women diagnosed with gestational diabetes. However, 7–20% of women will fail to achieve adequate glycaemic control with diet and exercise alone: oral hypoglycaemic agents or insulin will be required to control their gestational diabetes (Landon *et al.*, 2009)

The evidence for exercise during pregnancy for GDM prevention is incomplete. No trial reported on the primary outcomes for the review of large-for-gestational age and perinatal mortality. Many reported secondary outcomes, including pregnancy hyperglycaemia not meeting GDM diagnostic criteria, maternal weight change during pregnancy, maternal BMI at late pregnancy, small-for-gestational age, ponderal index, were limited to single trials with small sample sizes (Barakat 2011; Hopkins 2010). No trial reported any longer-term outcomes for the women and their children. It is important to note that all of the five included trials were conducted in high-income countries (two were in Australia, one each from in New Zealand, Norway and Spain), hence it is limited for other settings. (Han *et al.*, 2012) Most studies were of high or medium quality. Compared with women with a normal BMI, the unadjusted pooled odds ratio (OR) of an underweight woman developing GDM was 0.75 (95% confidence interval [CI] 0.69 to 0.82). The OR for overweight, moderately obese and morbidly obese women were 1.97 (95% CI 1.77 to 2.19), 3.01 (95% CI 2.34 to 3.87) and 5.55 (95% CI 4.27 to 7.21) respectively. For every 1 kg m<sup>2</sup> increase in

BMI, the prevalence of GDM increased by 0.92% (95% CI 0.73 to 1.10). The risk of GDM is positively associated with prepregnancy BMI. This information is important when counselling women planning a pregnancy. (Torloni *et al.*, 2009) There are clearly some women whose glucose levels rise sufficiently in pregnancy to cause harm to their babies. However, there are also many women with lower levels of glucose intolerance whose babies are not at risk, but who may suffer anxiety and inconvenience as a result of being classed as abnormal. On balance, the present evidence suggests that we should not have universal screening, but a highly selective policy, based on age and overweight. (Scott *et al.*, 2002)

Concerning clinical implications after applying instructional scheme for pregnant women, the present study shows that all of study sample had normal level of red blood counts, Wight blood count, and platelet count while all of them had high blood glucose level. These findings supported with Lovreni, *et al.*, 2013 who mentioned that Early diagnosis and appropriate management of both GDM and pre-existing diabetes in pregnancy are of the utmost importance in avoiding adverse pregnancy outcomes for both mother and her baby. Although adverse perinatal outcomes associated with the degree of hyperglycaemia in overt diabetes are well known, until recently diagnostic criteria for GDM either referred to the mother-related outcomes, i.e. to the identification of women with a high risk of developing diabetes in pregnancy, or were identical to diagnostic criteria for non-pregnant individuals.

Furthermore, Recent changes in management and medical nutrition therapy for diabetes mellitus. Have produced a need to retrain many practicing dietitians. To meet this need, a multidisciplinary group experienced in medical nutrition therapy and educational methods used a formal needs-assessment process to design a new training program. Sugar is Not a Poison (SNAP): The Dietitian's New Role in Diabetes Management is a 2 1/2-day program that uses written text, didactic presentation, and exercises that simulate patient encounters to accomplish 12 learning objectives. Program evaluations show high levels of participant satisfaction. Mean ( $\pm$ standard deviation) scores on pre- and posttests of knowledge and problem solving were 69 $\pm$ 13% and 86 $\pm$ 9%, respectively (P<.001). The SNAP program needs assessment, training methods, and knowledge/ problem-solving test are relevant to all types of education programs in clinical dietetics. (Lorenz *et al.*, 2000)

Based on the evidence, it would seem that education delivered by a team of educators, with some degree of reinforcement of that education made at additional points of contact, may provide the best opportunity for improvements in patient outcomes. Educators need to have time and resources to fulfil the needs of any structured educational programme. There is also a need for education to have a clear programme at the outset. From the evidence reported it is unclear what resources would need to be directed at the educators themselves to ensure that they can deliver programmes successfully. Any future research should consider patient education within the context of overall diabetes care and as such follow guidelines for the development and evaluation of complex interventions. Good-quality, longer-term studies would be desirable, but

these would require careful consideration around the nature of any control group. Information is needed to clarify the sensitivity of diabetes education programmes to the performance of the diabetes educators, in order to ensure success and cost-effectiveness of education programmes (Loveman *et al.*, 2008). While, in 2003, the U.S. Preventive Services Task Force concluded that evidence was insufficient to advise for or against routinely screening all pregnant women for gestational diabetes mellitus. Regarding potential harms associated with gestational diabetes screening at 24 weeks' gestation or later and treatment, evidence suggests that during the first few weeks after screening, women with positive results on screening for gestational diabetes may report higher anxiety, more psychological distress, and poorer perceptions of their general health than women with negative results.

However, these differences do not persist into the late third trimester or postpartum period. There also appears to be no long-term differences between women with positive and those with negative screening results in the experience of screening or likelihood of requesting screening for gestational diabetes during future pregnancies. Limited evidence suggests that quality of life is not worse in women receiving gestational diabetes treatment than in women not receiving treatment. (Hillier *et al.*, 2008)

Based on the finding of the present study, more than one third of studied sample think that the fear of discovered a disease is the factors that hinder acquiring the knowledge and screening of gestational diabetes Mellitus. This finding goes contradicting with Nielsen *et al.*, 2014 who found that there are various challenges in GDM screening and diagnosis including difficulties in screening women during the recommended time period, applicability and relevance of the risk factors used in selective screening programmes, challenges in testing women in the fasting state and need for repeated testing, screening procedure being too time consuming, scarcity of test consumables and lack of equipment.

### Conclusion and Recommendation

From the foregoing discussion, it can be seen that the implementation of instructional scheme for pregnant women on prevention of gestational diabetes Mellitus showed a remarkable increase and improvement of the women's level of knowledge and acquiring the ultimate positive and noticeable improvement in their attitude and clinical implications and there are obvious needs for instructional scheme offered on simple media to pregnant women to prevent gestational Diabetes. Within this context, there is a great demand for strategies and programs that take into consideration the antenatal care to prevent gestational Diabetes Mellitus.

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