Effect of educational program about Gestational Diabetes Mellitus on knowledge and reported practice among women at Assiut city

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Abstract

Gestational diabetes mellitus is a severe and neglected threat to maternal and child health. **Aim of the study** to assess Effect of educational program about Gestational Diabetes Mellitus on knowledge and reported practice among women at Assiut city. **Materials and Method:** design A quasi-experimental research (pre- post test) was conducted in antenatal care clinics. **Sample:** A convenient sample the total number was 365 women attended clinics **setting of study** the study was conducted at Ante- Natal Care clinics of Assiut city which serves the west sector and woman's Health Hospital, Assiut University **Tools.** two tools, structured interviewing questionnaire and follow- up sheet **Results**. The prevalence of GDM was found to be 3.4% among pregnant women's, there is a statistical significant difference between Pre-test and Post-test Knowledge level (p.v= 0.000) and there is a statistical significant difference between Practicing exercise and blood sugar analysis (p.v= 0.000) **Conclusion**. Knowledge of women's was improved after implementation program. **Recommendations** Antenatal health educational classes for all women to increase their awareness about the importance of early, proper screening and effective GDM management to improve their pregnancy outcomes.

Keywords: Educational program, GDM, Knowledge & Practice

Introduction

Gestational diabetes mellitus is a growing public health problem. GDM prevalence in the United States increased from 4.6 percent in 2006 to 8.2 percent in 2016 women who were nonwhite, older, overweight, and/or of lower socioeconomic position had the highest prevalence of GDM. These disease trends predict that in the next years, health care practitioners will notice an increase in the proportion of young women at high risk of T2D diagnosis. **(La Manna & Quelly, 2020).**

Health literacy includes knowledge, and studies have shown that a lack of knowledge about an illness leads to a poor interpretation of medical information. This leads to a lack of compliance with management strategies and, as a result, adverse pregnancy outcomes. **(Alnaim, 2020).**

Globally, GDM affects an estimated 15% of the pregnant women, 87.6% of the hyperglycemia were in low and middle-income countries. It is one of the challenging health problems of sub-Saharan African countries A review indicated that the occurrence of GDM in sub-Saharan Africa was 14% and Middle East and North Africa ranged from 8.4% to 24.5% though the study used different screening and diagnostic criteria Research findings showed that the prevalence of GDM varied to a certain extent among regions in Africa For example, East and West Africa reported 6 and 14%, respectively **(Muche et al., 2019).**

Egypt's diabetes rate has risen considerably, exceeding international levels. Egypt is among the top 10 nations in the world in terms of diabetes patients, according to the International Diabetes Federation (IDF). Diabetes mellitus during pregnancy Gestational diabetes is a frequent pregnancy condition characterized by the development of spontaneous hyperglycemia during pregnancy. According to the most recent IDF figures, GDM affects over 14% of all pregnancies worldwide, resulting in roughly 18 million births per year **(Knowler et al., 2018).**

Early detection of gestational diabetes mellitus is critical for improving prognosis and reducing the risk of health problems in the mother and fetus, and attentive health management for pregnant women is essential to maintain adequate blood glucose levels. Blood glucose levels in GDM can only be controlled through dietary and lifestyle changes. As a result, for optimal blood glucose management in pregnant women, patients must have a thorough understanding of the disease and practice self-care. As a result, health education and training are vital **(Dhyani et al., 2018) .**

Educational strategies on Gestational diabetes mellitus need to be encouraged and implemented, especially for young fertile women. The Fifth International Workshop-Conference on GDM has suggested that families receive early counseling. In order to avoid excessive fetal and material weight increase, Educational programs have been recommended that emphasize reduced fat and energy intake, regular physical activity, and regular clinic visits **(Bhalge et al., 2019).**

As a response, educating patients on Gestational diabetes mellitus risks and proper self-care methods such as self-blood glucose monitoring, diet, exercise, and insulin treatment is an important aspect of Gestational diabetes mellitus nurse management. As health education plays an important role in increasing women's awareness and knowledge about GDM that will be translated to improve their self-care measures and increase their commitment with the care regimen, which ultimately will contribute to complications reduction **(El-Nagar et al., 2019).**

Significance of the study

According to estimates by the International Diabetes Federation, the prevalence of Gestational diabetes mellitus (GDM) ranges from 2% to over 30% worldwide **(Reitzle et al., 2021).** In recent years, the prevalence rate of GDM has increased globally, with its incidence varying from 1.4% to 18.5% in different countries The rate of gestational diabetes among pregnant women in Egypt affects between 2-14% of all pregnancies **(El-Nagar et al., 2019).**The primary treatment strategy is generally lifestyle advice combining diet and exercise. Self-monitoring of blood glucose levels helps to achieve normal glycaemia. Physical activity increases the expression of several elements in the insulin signal ling pathway, and it has other general effects facilitating glucose management **(Huvinen 2018).**

Aims of the Study were to:

Assess Effect of educational program about Gestational Diabetes Mellitus on knowledge and reported practice among women at Assiut city..

Research Hypothesis

The educational program will improve women's knowledge and practice about GDM and their maternal and fetal out comes.

Subject & Methods:

Research design

A quasi-experimental research (pre- post test) was utilized in this study.

Setting of study

 The study was conducted at Ante- Natal Care (ANC) clinics of Assiut city which serves the west sector. This sector included: Kolta MCH, Hay Gharb MCH,

Elarbaeen MCH. ANC at woman's Health Hospital, Assiut University it is educational university hospital for both public and private hospital in Assiut and other surrounding in Upper Egypt.

Sample

According to convenient Sample   total number was 365   women's attended ANC Clinics in Assiut City during the period of data collection Sample Size.

Sample Size

$$ss = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)
p = percentage picking a choice, expressed as decimal (.5   used   for   sample   size   needed)
c = confidence interval, expressed as decimal (e.g., .04 = ±4)

Correction for Finite Population

$$new\ ss = 1 + \frac{ss}{\frac{ss-1}{pop}}$$

Where: pop = population
On population = 7398 and Confidence interval = 95%
→   Sample size needed = 365

Inclusion criteria:

1. Pregnant women between 28and 36 weeks of gestation with GDM
2. Pregnant women who are eligible and willing to take part in the study

Exclusion criteria:

 Women with any contraindication for exercise
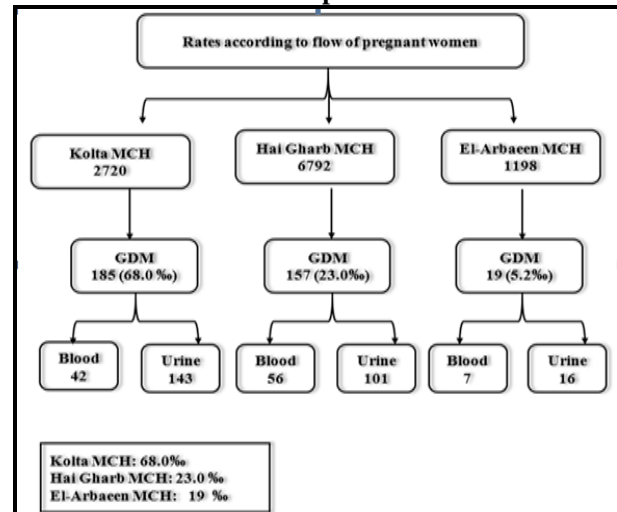
The distribution of the sample size

Figure (1): the distribution of the sample size

Data collection tools

The tools used for data collection consisted of two tools structured interviewing questionnaire and follow- up sheet

Tool (1) A structured interviewing questionnaire was consisted of the following four parts:-

The researcher reviewed related literature (local international), using textbooks, web articles and scientific magazines .the tools were then prepared.

This questionnaire was designed and developed by the researchers after reviewing different related researches, pertinent literature, and revision from three experts in obstetrics and gynecology professor in Nursing and medical science at Assiut University. According to the during feedback of experts necessary modifications were made

Part 1:- Socio demographic data :(Name, age, occupation, address, telephone number, education Level, residence).

Part 2 :-

A- Obstetric History : (number of gravidity, parity living children, abortion, normal vaginal deliveries, cesarean section, abortion and stillbirth).

B- Family History: GDM, Obesity, Hypertension, Diabetes and cardiovascular.

C- Risk factor: age (≥35 yrs.), overweight or obesity, excessive gestational weight gain, excessive central body fat deposition, family history of diabetes, short stature, polyhydramnios, hypertension or preeclampsia in the current pregnancy, history of recurrent miscarriage, malformation, fetal or neonatal death, macrosomia and GDM during prior pregnancies . Life-style habits (nutrition & exercise) may also be a risk factor for GDM and medical history which includes: Chronic diseases.

Part 3: knowledge of women's about GDM (pretest)

This part was include questions to assess women's knowledge about GDM definition, sign and symptoms, risk factors, and effect of GDM on pregnancy complications, Screening for GDM, Physical activity, maternal diet during Pregnancy

Scoring system:-

The scoring systems regarding women's knowledge of GDM were as follow:-

Correct answer was given score (1)

Incorrect answer and don't know was given score zero (0).

The total knowledge score level calculated by (20 questions ×1=20) closed end question and multiple choice questions which was categorized as follows

Unsatisfactory level of knowledge < 60%and

 Satisfactory level of knowledge ≥ 60%

Part 4:- Exercise and Dietary interventions:

This part was including questions to assess type of exercise, duration, frequency, intensity,

contraindications for exercise during pregnancy and benefits of exercise during pregnancy. Diet (type, and the effective dietary components)

Educational program was in Arabic language and a copy of it   gives to each Mother to refresh her knowledge in the form of booklet, it included Definition of GDM, Sign& symptoms, effect of GDM on mother and fetus, Screening for GDM, risk factors and Life style modifications (glycemic control, physical exercises and diet) .

Tool (2) Follow up sheet was consisted of the following two parts:-

Posttest (the same data of pretest after completion of the educational intervention)

Follow up after two weeks from implementation of education program.

Procedures:

The educational program was   conducted on 3 phases

Phase I: (Preparation phase)

A written approval was taken from director of Women's Health Hospital to conduct this study and director of health. Oral consent was taken from women participated in the study. The researcher introduced herself to the clients and explained the nature of the study. The study did not involve any invasive procedure and any risk.

The arrangement of conducting   program done during this phase, the sessions and time of program decided.

 Pre-test was done in the period from January 2018 until December 2018

Teaching time: The average time for completing each questionnaire was around (30-40 mints) the data was collected two days (Monday and Wednesday) per week. The time of teething was decided according to coordination between researcher and women.

Teaching place the program was conducted in in Elarbaeen MCH , Kolta MCH and Hay Gharb MCH.

Teaching methods and materials: it was important before implementing the educational program to prepare simple of teaching methods and audiovisual aids to be used, as discussion, brainstorming, power point presentation, picture and handouts.

Pilot study

Pilot study was conducted before starting data collection on 10 %(n= 40)women during the first two weeks of data collection to test the clarity ,applicability of the questions and time needed for each interview . It is included in the sample size.

Phase II :(Implementation phase)

The present study was carried out at the ANC for 365 pregnant mothers attending the antenatal care clinic in second trimester. Check-up clinic were screened for GDM.

All pregnant women with estimated gestational age between 24th and 28th weeks attending antenatal care clinic visits were included in the study.

The investigator interviewed the woman face to face with each woman to collect the questionnaire data which included: Personal data, Family History, Medical History, Obstetric history and Risk factor of GDM.

According to a pregnant for follow-up schedule, on Monday and Wednesday were identified from each week to collect data.

The investigator was welcoming &greeting pregnant women's with GDM. Before beginning of the first session, an orientation to the program and women were informed about time and place of session taken .Each session started by a summary about what was given during the previous session and the objectives of the new topics. Finally the post test the women's, knowledge was implemented by repeating the same format of pretest each session to determine the effect of the implemented program.

The teaching program conducted during the period from end of March 2018 until end of April2018 the educational program continued for 2 days to complete the program content. The total number of session was3

The program sessions covered the following items

First session: Included definition of GDM, risk factors (maternal and fetal-neonatal), causes, signs and symptoms expected complications of GDM (maternal and fetal/ neonatal complications), screening and diagnosis of GDM, therapeutic management and its effectiveness in preventing complications.

Second session:

Clarified self-care measures regarding GDM as self-monitoring of blood glucose level, self-injection of insulin, monitoring of body weight, dietary intake, physical activity (exercise), as well as self-care measures regarding symptoms of sudden attack of increasing and decreasing blood sugar levels, danger signs, self -monitoring daily fetal movement and hygienic measures.

Third session: Emphasized on diet regimen, physical exercise, medications in addition to prevention of reoccurrence of GDM in next pregnancies, and importance of postpartum follow-up.

The investigator designed brochures to aid the women for understanding the instructions of health education; all the women received individualized consultation regarding their dietary regimen and physical exercise in each counseling session, providing general and basic information about life style.

At the end of each session, a booklet was provided for the pregnant women to answering their questions associated with their problems and needs. Providing general health education about the dietary requirements during pregnancy throughout written prepared brochure provided for women and answering any question about instructions written in brochure which written in Arabic language to be easily understood by women's.

The investigator was discussed any issues that were not clear or not accepted, plan together what to do next visit and tell client about referral if any complications occurred.

Phase III: (Evaluation phase)

1. After implementation educational program for women, reassessment has done by the posttest which done two weeks after implementation and completing course to assess women knowledge and practice
2. The evaluation was done by the investigator to assess the women's knowledge, effect of the program (healthy nutrition, exercise and blood sugar monitoring)
3. Evaluate patients' knowledge, and practice regarding GDM management after two weeks.
4. Evaluate of dietary practices regarding consumptions of different food groups and, type of food consumed between meals and regular intake of prescribed vitamins during pregnancy.

Administrative design:-

An official permission was obtained from the director of Women's Health Hospital and director of undersecretary of ministry of health to proposal with this study.

Ethical consideration

Research proposal was approved from Ethical Committee in the Faculty of Nursing. The study was following common ethical principles in clinical research. There is no risk for study subject during application of the research. The investigator explained the nature and the aims of study and then an Oral consent of women was obtained. Confidentiality and anonymity was assured. Study woman's have the right to refuse to participate and /or to withdraw from the study without any rational any time. Privacy was considered during collection of data.

Statistical analysis:

Data entry and data analysis were done using SPSS version 22 (Statistical Package for Social Science). Data were presented as number, percentage, mean, standard deviation. Chi-square test was used to compare between qualitative variables. An independent sample t-test was used to compare quantitative variables between two groups and ANOVA test was used for more than two groups. Paired samples t-test was dome to compare quantitative data between pre-test and post-test. P-value considered statistically significant when $P < 0.05$.

Result
Table (1): Distribution of women regarding to their Socio demographic characteristics (n=365)

	No. (365)	%
Age: (years)		
< 30	136	37.3%
30 - < 35	127	34.8%
≥ 35	102	27.9%
Mean ± SD (Range)	30.77 ± 5.11 (19.0-42.0)	
Educational level:		
Illiterate/ Read & write	93	25.5%
Basic education	52	14.2%
Secondary	115	31.5%
University or higher	105	28.8%
Occupation:		
Working	88	24.1%
Not working	277	75.9%
Residence:		
Urban	212	58.1%
Rural	153	41.9%

Table (2): Distribution of women regarding to their obstetric history (n=365)

	No. (365)	%
No. of gravidities:		
One	127	34.8%
2-4	156	42.7%
5 or more	82	22.5%
No. of parities:		
Primiparous	119	32.6%
Multiparous	187	51.2%
Grand-multipara	59	16.2%
Stillbirths:		
Yes	35	9.6%
No	330	90.4%
Abortions:		
Yes	101	27.7%
No	264	72.3%
No. of Natural vaginal delivery:		
None	87	23.8%
One	142	38.9%
Two or more	136	37.3%
No. of Caesarean sections:		
None	217	59.5%
One	108	29.6%
Two or more	40	11.0%
Indication of last Caesarean sections (n= 148)		
Bleeding	8	5.4%
Elective CS	19	12.8%
Fetal distress	3	2.0%
Macrosomic	29	19.6%
Malpresentation	31	20.9%
Maternal distress	3	2.0%
Not engagement	15	10.1%
Oligohydramnios	9	6.1%
Pre-eclampsia	12	8.1%
Previous CSs	19	12.8%

 # More than one answer

Table (3): Distribution of women regarding to current risk factors of pregnant women's with GDM (n=365)

# Risk factors	No. (365)	%
Hypertension	51	14.0%
Overweight/ obese	149	40.8%
Increasing age	64	17.5%
History of GDM during pregnancy	41	11.2%
Family history of diabetes	166	45.5%
Multiparous	203	55.6%
Still birth	35	9.6%
Poly Cystic Ovarian Syndrome	86	23.6%

Table (4): Distribution of women regarding to their knowledge about GDM (n=365)

	Pre-test (365)		Post-test (365)		P-value
	No.	%	No.	%	
Definition of gestational diabetes:					0.000*
Correct	94	25.8%	179	49.0%	
Incorrect	271	74.2%	186	51.0%	
Diabetes can develop during pregnancy:					0.078
Correct	218	59.7%	241	66.0%	
Incorrect	147	40.3%	124	34.0%	
Previous risk factors of GDM:≠					
Overweight/ obese	145	39.7%	183	50.1%	0.005*
Increasing age	26	7.1%	133	36.4%	0.000*
Repeated pregnancy	38	10.4%	145	39.7%	0.000*
Previous history of sugar during pregnancy	88	24.1%	152	41.6%	0.000*
Family history of diabetes	226	61.9%	269	73.7%	0.001*
Multiparous	9	2.5%	121	33.2%	0.000*
Still birth	10	2.7%	122	33.4%	0.000*
Screening time for GDM:					0.000*
Correct	113	31.0%	171	46.8%	
Incorrect	252	69.0%	194	53.2%	
Maternal complications of GDM:≠ Effect of GDM on mother					
Abortions	118	32.3%	173	47.4%	0.000*
Inter uterine fetal death	33	9.0%	132	36.2%	0.000*
Future risk of T2 Diabetes mellitus	32	8.8%	124	34.0%	0.000*
Shoulder dystocia	73	20.0%	138	37.8%	0.000*
Preeclampsia	63	17.3%	148	40.5%	0.000*
None	96	26.3%	11	3.0%	0.000*
Fetal complications of GDM:# Effect of GDM on fetus					
Macrosomia	169	46.3%	199	54.5%	0.026*
Disabled baby	72	19.7%	130	35.6%	0.000*
Preterm baby	53	14.5%	139	38.1%	0.000*
Future risk of T2 Diabetes mellitus	10	2.7%	118	32.3%	0.000*
Obesity	35	9.6%	126	34.5%	0.000*
None	82	22.5%	30	8.2%	0.000*

* *Statistical significant differences* X^2 *test was used*

Table (5): The relation between score of mothers' knowledge about GDM and personal data (n=365)

	Knowledge level							
	Pre-test				Post-test			
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory	
	No.	%	No.	%	No.	%	No.	%
Age: (years)								
< 30	135	99.3	1	0.7	67	49.3	69	50.7
30 - < 35	109	85.8	18	14.2	54	42.5	73	57.5
≥ 35	101	99.0	1	1.0	80	78.4	22	21.6
P-value	0.000*				0.000*			
Educational level:								
Illiterate/ Read & write	93	100.0	0	0.0	93	100.0	0	0.0
Basic education	52	100.0	0	0.0	47	90.4	5	9.6
Secondary	106	92.2	9	7.8	41	35.7	74	64.3
University or higher	94	89.5	11	10.5	20	19.0	85	81.0
P-value	0.002*				0.000*			
Occupation:								
Working	77	87.5	11	12.5	23	26.1	65	73.9
Not working	268	96.8	9	3.2	178	64.3	99	35.7
P-value	0.002*				0.000*			
Residence:								
Urban	202	95.3	10	4.7	110	51.9	102	48.1
Rural	143	93.5	10	6.5	91	59.5	62	40.5
P-value	0.451				0.150			

Statistical significant differences   *X2 test was used*

Table (6): The relation between pre-test and post-test knowledge levels (n=365)

Knowledge level	Pre-test (n= 365)		Post-test (n= 365)		P-value
	No.	%	No.	%	
Unsatisfactory	345	94.5%	150	41%	0.000*
Satisfactory	20	5.5%	215	59 %	

Statistical significant differences

Table (7): Relation between mother reported practices Blood sugar analysis after implementation of the program (n=365)

	Blood sugar analysis		P-value
	Mean ± SD	Range	
Practicing exercise:			
Yes	201.63 ± 37.39	154.0 - 330.0	0.000*
No	226.06 ± 51.56	140.0 - 350.0	
Walking:			
Yes	217.36 ± 57.76	140.0 - 350.0	0.231
No	233.24 ± 45.47	145.0 - 320.0	
A balanced diet during pregnancy at a time:			
Yes	210.32 ± 47.32	140.0 - 330.0	0.163
No	223.41 ± 47.55	145.0 - 350.0	
Foods not allowed to eat:			
Incorrect	210.38 ± 34.91	165.0 - 310.0	0.607
Correct	217.08 ± 49.68	140.0 - 350.0	
Impact of unhealthy diet:			
Incorrect	207.35 ± 48.40	145.0 - 350.0	0.186
Correct	220.79 ± 46.90	140.0 - 330.0	
Hazards of large carbohydrates:			
Incorrect	203.62 ± 33.90	159.0 - 310.0	0.125
Correct	220.15 ± 50.89	140.0 - 350.0	

Statistical significant differences   *t test was used*

Table (1): Shows the socio-demographic characteristics of the studied women. The mean age of recruited women was (19.0±42.0) years, while the level of education it was found that less than one third (31.5%) of women had secondary school, and it was observed that the three quarters (75%)of women were house wife's. As regards to residence, more than half (58.1%) of the sample were living in urban areas.

Table (2): Regarding to Obstetric profile, more than two fifths (42.7%) of women had (2-4) gravidity. While concerning to history of abortion, still birth they were (27.7%, 9.6 %) respectively among pregnant women also, table show that fifth (20.9%) of women hade mal presentation.

Table (3): Represented that the commonest risk factors ware Presence of Multiparous followed by History of GDM during pregnancy (55.6%&45.5%) respectively.

Table (4): Shows that there was a statistically significant difference between Pre-test & Post-test knowledge and personal data with pregnant mothers (p.v= 0.000).

Table (5): Illustrated that there was a statistical significant difference between pre-test and post-test knowledge related to personal data (p.v= 0.000).

Table (6): Showed that there was statistically significant difference between pre-test & post-test knowledge level regarding to GDM (p.v= 0.000*)

Table (7): Showed that there was statistical significant difference between practicing exercise and blood sugar analysis (p.v= 0.000).

Discussion

The prevalence of DM as a major non communicable disease, in Egypt is rapidly growing probably due to the rapid socio demographic changes. Egypt was identified to be the ninth leading country worldwide DM with a prevalence rate of 15.9%. Accordingly, it is not surprising to expect an increase in GDM prevalence despite the paucity of literature in this regard **(El Sagheer & Hamdi, 2018).**

Aim: - to assess the effect of Educational program among women with gestational diabetes at Woman's Health Hospital, Assiut University.

The Study shows prevalence of GDM among pregnant women was 3.4% The Study supported by **Khalil et al., 2017** They reported that the prevalence of GDM among women was 8% in their study "Screening for Gestational Diabetes Among Pregnant Women Attending a Rural Family Health Center- Menoufia Governorate- Egypt" and agreed with **Said & Aly, 2019** who reported in their study(The Prevalence and Risk Factors for Gestational Diabetes Mellitus in the Expecting Outpatients of Mashhad University of Medical Sciences, Iran (2018-2017)

who found that the prevalence of GDM was estimated at 4.3%.

Also the present study supported by **Salem et al., 2019** who reported that "Prevalence and Predictors of Gestational Diabetes Mellitus among Pregnant Women Attending Fanara Family Center in Egypt", they discovered that GDM affects only 6% of pregnant women. In addition, and in accordance with the study conducted in Aswan by **Eltoony et al., 2021** who found 7.5% of the screened cases had GDM.

The reported variations in the prevalence rates of GDM could be attributed to multiple factors, such as the use of different criteria of diagnosis, and many health factors including lifestyle factors such as diet and physical activity, social and economic situation, and feasibility of medical care.

According to the findings of the current study, it can be observed that the mean age of the study 30.77 ± 5.11 (19.0-42.0) disagreed with a study was conducted in El-Minya **by El Sagheer & Hamdi , 2018** who reported in their study" Prevalence and risk factors for gestational diabetes mellitus according to the diabetes in pregnancy study group India in comparison to the International Association of the Diabetes and Pregnancy Study Groups in El-Minya, Egypt" who discovered that the participants' average age was 26.55.5 years (range 18-42 years), with 380 (54.28 percent) of them under 25 years.

In addition, the results contradicted a study conducted in India. **by Muche et al., 2019** who reported in their study "Effect of Physical Activity during Pregnancy on Gestational Diabetes Mellitus "Who found that The mean age of the women was 27.22 (SD ± 5.24) years. And dis agreed with a study was conducted in in Egypt by **Salem et al., 2019** who reported that the mean age of the women was (26.47 ±4.41) in their study "Prevalence and Predictors of Gestational Diabetes Mellitus among Pregnant Women Attending Fanara Family Center in Egypt".

The current study showed that there was GDM risk among 30 - < 35years of age dis agreed with a study was conducted in urban Chidambaram **by Lakshmi et al., 2018** who reported in their study "Study on knowledge about gestational diabetes mellitus and its risk factors among antenatal mothers attending care, urban Chidambaram" who reported that less than half of the respondents were within the range of 21-25 years. These findings are also consistent with a study was conducted in India by **Makwana et al., 2017** who reported in their study "Gestational diabetes mellitus with its maternal and fetal outcome: a clinical study" who found that the incidence of GDM increased with increasing age and was highest in age ≥30 year **Lakshmi et al., 2018** in their study in urban Chidambaram Found that occupationally vast majority were home makers for most of the

antenatal women were similar, when compared to this study and similar with a study was conducted in El-Minya by **El Sagheer & Hamdi , 2018** who reported that vast majority of the participants were housewives, while only 8.57% were working. According to the current survey, more than three quarters of people are unemployed, which is in line with a study conducted in India by **Muche, et al., 2019**, which found that 60.5 percent of people are unemployed. Also agree with **Said &Aly, 2019** who reported that three fifths of the study sample were Housewives, and with **Panigrahi & Panda, 2020** who reported in their study "Gestational diabetes mellitus, its associated factors, and the pregnancy outcomes among pregnant women attending tertiary care hospitals in Bhubaneswar India "that the majority of the study sample were Housewives (83.3%).

The current study more than Three quarter were not working disagreed with a study was conducted in Tanzania by **Mdoe et al., 2021** who found that less than Three quarter(22.7%) of study sample housewife

The present study illustrated that, less than third of women had secondary education this finding dis agreed with a study was conducted in Tanzania **by Mdoe et al., 2021** who reported in their study "Prevalence and predictors of gestational diabetes mellitus among pregnant women attending antenatal clinic in Dodoma region, Tanzania: an analytical cross-sectional" who reported that less than three fifth had Primary education. Also dis agreed with **Khalil et al., 2017** who reported that three thirds had secondary education. Also dis agreed in Occupation who report that tow fifth (40%) of women's had Governmental employee but the present study illustrated that more than fifth had Working.

Concerning to Obstetric history, the present study indicated that more than tow fifths of women were multigravida, this finding agreed with a study was conducted in Tanta by **El-Nagar et al., 2019**) who found that more than one third (36.0%) of the study group were pregnant more than three times compared to slightly less than half of the control group. And agreed with a study was conducted in in Tanzania by **Mdoe et al., 2021** who reported that more than half (53.3%) multigravida.

Also agreed with by **Larebo & Ermolo, 2021** who reported more than two fifths were Multiparous. Also agree with Panigrahi, et al., 2020 who reported that more than two fifths had Multiparous.

While it is incongruent with a study was conducted in India by **(Makwana et al., 2017)** who reported in their study The incidence of GDM increases with increasing parity. Also agreed with a study was conducted in Benha by **Said & Aly, 2019** who

reported that less than half (48.6%) had three or more number of pregnancy.

The current study indicated that less than fifths had Macrosomic this finding agreed with a study was conducted in Egypt by **Khalil et al., 2017** who reported that more than one third (35%) had Large size baby. Also agree with **Larebo et al., 2021** who reported only 12.6%had Macrosomic. As noted from the current study more than two fifth (40.8%)had Overweight/ obese This results dis agreed with **Eltoony et al., 2021** who found that 72% of the studied pregnant women were overweight and obese

The current study showed that less than half had Family history of diabetes This results agreed with a study was conducted in Aswan by **Eltoony et al.,2021** who reported in their study (Prevalence and Risk Factors for Gestational Diabetes in Aswan, Egypt According to International Association of the Diabetes and Pregnancy Study Groups (IADPSG)) who found more than thirds of women's had family history of diabetes. Also the current study showed that only 11.2% had History of GDM during pregnancy these results agree because who reported only 5.9% had History of GDM.

The current study showed that more than half had Multiparous and less than half had Family history of diabetes. This results is supported with a study was conducted in Assiut University by **(El Toony et al., 2018)** who reported in their study "Assessing the effectiveness of an educational program for patients with gestational diabetes in Assiut University" who found family history of diabetes was a highly significant risk for developing GDM.

Also this finding is similar with a study was conducted in Egypt by **Salem et al., 2019** who reported in their study " Prevalence and Predictors of Gestational Diabetes Mellitus among Pregnant Women Attending Fanara Family Center, in Egypt" who found family history of diabetes31.6%.

This result supported with a study was conducted in Assiut by **Mohamed & Ahmad, 2019** "Educational program for Health Literacy among Pregnant Women with Gestational Diabetes: its effect on Maternal & fetal outcomes" who found that more than two fifths of women's answered first-degree relatives have DM.

The current study showed that more than two fifths had family history of DM these finding are supported by **El-Nagar et al., 2019** who reported that less than two thirds (64%) reported that family history of DM**.**

The current study showed that only 11.2%had History of GDM during pregnancy this results disagreed with **Larebo & Ermolo, 2021** who reported 23.8% had History of GDM.

This study showed the most of women's of university education the highest knowledge score whereas participants who had Illiterate participants

had the least knowledge score these findings supported by study conduct in Bangladeshi by **Bhowmik et al., 2018 i**n their study "Evaluation of knowledge regarding gestational diabetes mellitus: a Bangladeshi study" who reported that Illiterate participants had the least knowledge score whereas participants who had university education showed the highest knowledge score the presence more than one third

According to the findings of the current study answer Correct and Incorrect Definition of gestational diabetes Pre-test and Post-test .This results dis agree with **El Toonya et al., 2018** who found that (66.7% and33.3%) answer Correct and Incorrect before education respectively and 60 (100 %) Correct answer after education.

Women's knowledge regarding GDM before and after the implementation of the health education sessions, the current study revealed that less than one third had Correct answers , more than three fifths Incorrect answers about diagnosis of gestational diabetes Pre-test and less than half ,more than half Correct and Incorrect answers diagnosis of gestational diabetes Post-test respect answer Correct and Incorrect before and after education .This results dis agree with **El Tonya et al., 2018** who found that(25.0%,75.0%& 83.3% ,16.7%) answer Correct and Incorrect before and after education respectively

This study showed the comparison between of knowledge before and after education score and data reflected statistical Significance after receiving program at (P. value = 0.000) This results was supported by another study in Assiut by **Mohamed & Ahmad, 2019** who found that the comparison between of knowledge before and after education score and data reflected statistical significance after receiving program at (P. value <0.001) .

The current study showed that relationship between knowledge of studied women with their characteristic data before and after education. Where the women at age 30 - < 35years old were more knowledge than women at age < 30 and ≥ 35before education This results dis agree with **Mohamed & Ahmad, 2019 who** found that women at age 40 years old were more knowledge than women at age 20-<30 before education .The current study showed that less than three quarters were answered Incorrect this finding agreed with a study was conducted in Tanzania by **Mdoe et al .,2021** who found that vast majority(96%) had awareness about GDM

This study showed that only 5.5%had knowledge This results dis agree with study in India by **Lakshmi et al.,2018** in their study "Study on knowledge about gestational diabetes mellitus and its risk factors among antenatal mothers attending care, urban

Chidambaram" who found that more than thirds (35.2%) had adequate knowledge about GDM.

In the present study, educational of a mother was found to have statistically significant association with their knowledge about GDM Pre-test and Post-test with (p0.027&p 0.046) respectively this result agree with study in India by **Lakshmi et al.,2018** who reported that statistically significant association with their knowledge about GDM with (p<0.05).And the present study, educational of a mother was found to have statistically significant association with their knowledge about GDM with (P.v=0.000) Similarly, because who reported that participants with higher educational status were found to have significant higher mean knowledge Score than their counterparts.

Also This results was supported by **Bhowmik et al.,2018** in their study "Study on knowledge about gestational diabetes mellitus and its risk factors among antenatal mothers attending care, urban Chidambaram" who found to have statistically significant association with their knowledge about GDM with p<0.05.

This finding may be due to the reason for this association may because educated women might have greater access to gain knowledge from health-related articles or literatures. Also they can better understand the health information given by the health personnel during antenatal visits. Our result is also in agreement with **Bhowmik et al., 2018 & Lakshmi et al., 2017** also reported similarly that those who were from urban areas had significantly higher knowledge about GDM than those from rural areas.

This may be due to that women from urban areas when compared to rural areas have better exposure to mass media like TV, Radio, Internet through which they can gain health information and knowledge.

The present study is also in agreement with **Piere, et al., 2017 & Bhowmik, et al., 2018** reported that younger age group (<30 years) greater awareness/ knowledge about GDM when compared to those who were aged above 30 years with statistically significant p value of <0.05. The present study showed that younger age group (<30 years) greater awareness/ knowledge about GDM when compared to those who were aged (≥ 35& < 30 years) with statistically significant (p.v= 0.000).

The current study showed that statistically significant knowledge score when compared to housewife or unemployed women this result was agree with by study conduct in Iran by **Jafari et al., 2015** in the study "Prevalence and Risk Factors of Gestational Diabetes in Iran: A Systematic Review and Meta-Analysis "who reported that antenatal women who were employed showed. Significantly high knowledge score when compared to housewife or unemployed women. This may be because those employed mothers gain knowledge by interaction with others at their work

place and also because of their own experience. However, there was no such significant association found between occupation and knowledge about GDM in this study.

Conclusion

The prevalence of GDM was 3.4% among pregnant women's attending Ante- Natal Care (ANC) clinics which serves the west sector of Assiut city. Knowledge about GDM was poor amongst pregnant women especially in   rural areas. There is a statistical significant difference between Pre-test and Post-test Knowledge level. The comparison between of knowledge before and after education score   data reflected statistical significance after receiving program.

Recommendations

Planning   and   developing   antenatal health educational classes for all women to increase their awareness about the importance of early, proper screening and effective GDM management to improve their pregnancy outcomes.

Acknowledgment

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