

Knowledge of Gestational Diabetes Mellitus and Self Care Practices in Pregnancy

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Abstract

Objectives: To examine the relationship between knowledge of gestational diabetes mellitus (GDM) and self-care practice to prevent GDM in pregnant women.

Design: Descriptive correlational design.

Setting: Chitungwiza Central Hospital Antenatal Clinic.

Participants: A random sample of 200 pregnant women aged 18 - 45 years.

Outcome measures: Self-care practice to prevent GDM.

Data collection and analysis: Data were collected using a structured interview schedule that had “demographic”, “knowledge of GDM” and “self-care practice” sections. Data were analysed the Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics were used to analyse data on demographics, knowledge levels and self-care practice. Inferential statistics were used to analyse the relationship between knowledge and self-care practice.

Results: Mean knowledge on GDM was 20.28%. Mean score for self-care practice was 49.6%. There was a moderate positive correlation ($r = 0.499$; $p < 0.01$) between knowledge and self-care practice. Regression analysis ($R^2 = 0.246$, $p < 0.001$) indicated that knowledge explained 24.6% of the variance observed in self-care practice.

Conclusions: Knowledge of GDM was very poor as well as self-care practice. However, self-care practice on GDM improved with increasing knowledge of GDM. It is essential to upscale health education on GDM in pregnant women.

Keywords: Diabetes; Gestational; Knowledge; Self-Care

Introduction

The global prevalence of gestational diabetes mellitus (GDM) is 15% [1]. There was an estimated 199,5 million pregnant women with GDM in 2015 and the number is expected to rise to 313,3 million by 2030 [2]. A systematic review of Sub Saharan countries reported prevalence of GDM ranging from less than 1% in Tanzania to 14% in Nigeria. A recent study done in Zimbabwe reported a prevalence of 6.6%. Another one done in 2016 reported 8.8% prevalence of diabetes in pregnancy [3].

GDM is glucose intolerance with a cut off value of 140 mg/dL, 2 hours after 75 g glucose intake with first onset or diagnosis during pregnancy [4]. Risk factors include age, diet, obesity, ethnicity, family history, history of GDM in previous pregnancy, macrosomia, essential hypertension or pregnancy-related hypertension, history of spontaneous abortions, and unexplained stillbirths [5,6]. GDM results in adverse neonatal outcomes that include congenital defects, retinopathy, nephropathy, central nervous system, cardiac problems, increased fat mass, respiratory distress, respiratory asphyxia, prematurity and macrosomia [6]. In the mother GDM increases the risk of pre-eclampsia, induced labor, caesarean delivery, diabetic ketoacidosis and future type II diabetes [7]. Despite little attention paid to GDM in low and medium income countries, it contributes to maternal mortality and morbidity [8]. Incidence of GDM can be reduced if pregnant women are knowledgeable about the condition and the appropriate self-care practice during pregnancy [5,9]. It is important for all pregnant women to acquire knowledge about GDM, its causes, manifestations, complications, and prevention [9].

The negative effects of GDM on the lives of mothers, children, families, communities and countries at large are enormous. Addressing GDM issues also addresses the third and fourth objectives of the sustainable development goals that seek to reduce maternal, neonatal, child morbidity and mortality rates by 2030 [10]. Lack of information is one of the factors that prohibit women, from seeking or obtaining health care services during pregnancy [11]. An informal study done at Chitungwiza Central hospital revealed very low knowledge of GDM and the appropriate self-care practice to prevent it. The purpose of this study therefore was to examine the knowledge of GDM and self-care practice to prevent GDM.

Materials and Methods

This was a cross sectional descriptive correlational design on a random sample of 200 pregnant women attending antenatal care clinic at Chitungwiza central hospital. Sample size was calculated using Dobson’s formula using a proportion of 8.8% observed in a study conducted at Harare maternity hospital. Knowledge of GDM was the independent variable while self-care practice was the dependent variable. Data were collected from March 2018 to April 2018 using interviewer administered questionnaires. Approvals for the study were granted by the Joint Research Ethics Committee of the University of Zimbabwe and Parirenyatwa Group of Hospitals, chief executive officer of Chitungwiza central hospital and the Medical Research Council of Zimbabwe. All participants gave informed consent and signed consent forms. Data were collected in a private room. No names appeared on filled in questionnaires and the researcher had sole access to the data that was kept in a lockable cupboard. Data were analysed using SPSS version 21. Descriptive statistics were used to analyse data on knowledge levels and self-care practice and was presented in tables as frequencies. Inferential statistics (Pearson’s correlation and regression analysis) were used to analyse the relationship between knowledge of GDM and self-care practice.

Results

Demographic Data

Table 1 presents demographic data.

Variable	Frequency	Percentage
Age in years		
18 - 20	21	10.5
21 - 25	50	25.0
26 - 30	48	24.0
31 - 35	48	24.0
35 - 40	26	13.0
41 - 45	7	3.5
Body Mass Index		
< 18.5	2	1.0
18.5 - 24.9	26	13.0
25 - 29.9	105	52.5
> 30	67	33.5
Marital status		
Single	26	13.0
Married	162	81.0
Divorced	3	1.5
Separated	3	1.5
Widowed	1	0.5
Cohabiting	5	2.5
Parity		
0	87	43.5
1	53	26.5
2	31	15.5
3	28	14.0
4	1	0.5
Gravidity		
1	53	26.5
2	48	24.0
3	42	21.0
4	54	27.0
5	3	1.5

Table 1: Demographic Data 1 (n = 200).

Table 2 is a continuation of demographic data.

Variable	Frequency	Percentage
Education		
Primary	9	4.5
ZJC	17	8.5
O' Level	126	63.0
A level	24	12.0
College /Tertiary	24	12.0
Occupation		
Employed	62	31.0
Unemployed	112	56.0
Self-Employed	26	13.0
Total income		
\$0 - \$250	68	34.0
\$251 - \$500	96	48.0
Above\$500	36	18.0
Religion		
Christianity	156	78.0
Apostolic Faith	42	21.0
Atheism	2	1.0
Residence		
Urban	177	88.5
Peri-urban	11	5.5
Farms	4	2.0
Rural	8	4.0
Stay with		
Husband	149	74.5
Boyfriend	11	5.5
In-Laws	11	5.5
Parents	9	5.5
Friend	4	2.0
Alone	14	7.0
Siblings	2	1.0

Table 2: Demographic Data 2 (n = 200).

Self-care Practice

Table 3 presents results on self-care practice.

Variable	Frequency	Percentage
Antenatal Booking		
First antenatal booking within 0 - 3 months	67	33.5
Not missing any scheduled ANC visits	166	83.0
Diet		
Takes 5 - 6 meals per day	78	39.0
Takes 2 - 3 snacks in between	129	64.5
Eats 1 cup of starch per meal	95	47.5
Has three/ more portions of fruits a day	101	50.5
Has starch and protein for breakfast	136	68.0
Takes water as the only liquid	67	33.5
Does not add sugars	50	25.0
Does not eat fast foods	118	59.0
Eats lean meats and polyunsaturated fats	141	70.5
Takes 2 small servings of protein/day	131	65.5
Takes calcium rich foods	61	30.5
Does not take sweets/cakes in diet	121	60.5
Exercises		
Does some exercises	149	74.5
House chores	78	39.0
Jogging	14	7.0
Walking	68	34.0
Dancing	6	3.0
Any other exercises	2	1.0
Exercises ≥ 3 times per week	117	58.5
Exercises ≥ 30 minutes per session	115	57.5
Does moderate exercises	104	51.5
Does sleep ≥10 hours per day	148	74.0
Other lifestyle habits		
Does not smoke	198	99.0
Does not drink alcohol/beer	194	97.0

Table 3: Self-care Practices (n = 200).

Table 4 presents total scores for self-care practice. The mean score for self-care practice was 22% (13.437 out of 27) and the standard deviation was 3.8611. The maximum score was 93% (25 out of 27), minimum was 22% (6 out of 27) and the range was which indicated average self-care practice. The range was 70% (19 out of 27).

Variable (actual score on self-care practice out of 27)	Percentage score on self-care practice	Frequency	Percentage
6	22	3	1.5
7	26	9	4.5
8	30	7	3.5
9	32	1	0.5
9	33	9	4.5
10	37	15	7.5
11	39	1	0.5
11	40	4	2.0
11	41	20	10.0
12	43	1	0.5
12	44	10	5.0
13	48	27	13.5
14	52	21	10.5
15	56	24	12.0
16	59	8	4.0
17	63	11	5.5
18	67	5	2.5
19	70	9	4.5
20	74	3	1.5
21	78	4	2.0
21	79	2	1.0
22	82	1	0.5
23	85	2	1.0
23	86	2	1.0
25	93	1	0.5

Table 4: Total scores on self-care practices (n = 200).

Knowledge of GDM

Table 5 below, presents knowledge of GDM.

Variable	Frequency	Percentage
Awareness of GDM	80	40
Source of information		
Media, TV, Radio	28	14
Antenatal Care	43	21.5
Friends/Relatives	26	13
Internet	8	4
Any other state	5	2.5
Received health education on GDM	38	19.0
Source of Health education		
Midwife/Nurse	33	16.5
Doctor	4	2.0
Friends and relatives	12	6.0
Other	5	2.5
Risk factors for GDM		
High blood pressure	29	14.5
Diabetes mellitus	36	18.0
Hereditary	51	25.5
Previous miscarriage	10	5.0
Obesity	32	16.0
Giving birth at 35/above	11	5.5
Sedentary lifestyle	34	17.0
History of DM in previous Pregnancies	13	6.5
Eating sweet foods	23	11.5
Main signs and symptoms of GDM		
Excessive /frequency urination	61	30.5
Excessive thirst	51	25.5
Polyphagia	54	27.0
Blurred vision	25	12.5
Tiredness/General body weakness	31	15.5
Do not know	106	53.0

Table 5: Knowledge of GDM (n = 200).

Table 6 presents knowledge of GDM.

Variable	Frequency	Percentage
Effects of GDM on pregnancy		
Uncontrolled diabetes mellitus	42	21.0
High blood pressure	39	19.5
Preterm labor	44	22.0
Vulva infections	21	10.5
Frequency in micturition	23	11.5
Abortions	14	7.0
Effects of GDM on the fetus/newborn		
Intrauterine death	29	14.5
Fetal distress	27	13.5
Difficulty in breathing	31	15.5
A big baby	33	16.5
Hyperglycemia	38	19.0
Prematurity	24	12.0
Still birth	23	11.5
Failure to grow	9	4.5
Jaundice	15	7.5
Hypoglycemia in neonates	9	4.5
Prevention of development of GDM		
History of GDM and avoid BMI above 30 kg/m	43	21.5
Blood sugar /urine checkups weekly	44	22.0
Report to the nearest clinic	42	21.0
Exercise daily	40	20.0
Eating low glycemic foods and drinking healthy	43	21.5
Having Blood Sugar or Urine tested	193	96.5
Booking for ANC ,0-3 months	133	66.5
Do not know	101	50.5

Table 6: Knowledge of GDM (n = 200).

Table 7 presents total scores on knowledge of GDM.

Variables (actual total score on knowledge out of 47)	% score on knowledge	Frequency	Percentage
1	2	9	4.5
2	4	72	36.0
3	6	5	2.5
4	9	13	6.5
5	11	3	1.5
6	13	4	2.0
7	15	6	3.0
8	17	9	4.5
9	19	8	4.0
10	21	3	1.5
11	23	3	1.5
12	26	10	5.0
14	30	3	1.5
16	34	1	0.5
17	36	5	2.5
18	38	5	2.5
19	40	3	1.5
21	45	4	2.0
22	47	6	3.0
23	49	6	3.0
24	51	3	1.5
25	53	2	1.0
26	55	4	2.0
27	58	2	1.0
28	60	1	0.5
30	64	1	0.5
31	66	1	0.5
33	70	1	0.5
35	75	3	1.5
37	79	4	2.0

Table 7: Total scores on knowledge of GDM (n = 200).

Table 8 below presents results on the relationship between self-care practice among pregnant women in prevention of GDM and knowledge of GDM.

Variable Y
1.000
X .499**
*p < .05 **p < .01 ***p < .001
(N = 200)

Table 8: Pearson’s correlation of knowledge of GDM and self-care practices (n = 200).
 **: Correlation is significant at the 0.01level (2-tailed).

Table 9 presents regression analysis

Variance B SEB BETA
X 0.199 0.25 0.499
Constant 11.521 0.335
R ² 0.246 F=65.756
*p < 0.05 **p < 0.01 ***P < 0.001
N = 200

Table 9: Regression analysis of knowledge of GDM and self-care practices (n=200).
 Y: Self-care practices; X: knowledge of GDM.

Discussion

Demographic data

The study utilized a random sample of 200 pregnant women. Previous studies had samples ranging from 28 - 1242 [8,12-14]. A large enough sample must be used to ensure representativeness and generalizability of findings. Majority (52.5%) were overweight while 33.5% were obese and mean BMI was 28.95. Obesity is one risk factor for GDM [15]. A BMI of 25 - 29.9 kg/m² is overweight and above 30 kg/m² is obesity [16]. Pregnant women must exercise, avoid sedentary life style and eat a healthy diet to avoid obesity [17]. Majority 162 (81%) were married. This presents an opportunity for male partner involvement in ANC. This is particularly important in this study were 56% were unemployed and more than 80% earned below the poverty datum line for Zimbabwe. It is important to involve spouses, family members and in-laws in ANC to equip them with health information on prevention and control of GDM [18]. Women during pregnancy require a lot in terms of food, baby preparation, treatments and exercises [15]. Majority (63.0%) participants had reached the ordinary level of education meaning that majority were literate. This is an opportunity as well for health education as participants can comprehend even written instruction because cultivating health literacy assists the individual to understand and assume a healthy lifestyle [12,19].

Self-care practice

Self-care activities during pregnancy comprise rest, exercises, maintaining a recommended healthy diet, attending to antenatal care visits and seeking medical attention as soon as one recognizes the signs and symptoms [20]. Mean self-care score observed was 49.6% which was poor. Only 33.5% booked for ANC within the recommended 0 - 3 months of gestation. Early booking ensures early interventions to prevent GDM and other conditions related to pregnancy. It is important for women to register for antenatal care as soon as they notice they are pregnant and they are expected to commence antenatal care within the first 12 weeks of pregnancy [16].

Regarding diet, about 41% participants ate fast foods which is not recommended in the diet. Physiological changes such as weight gain, nausea, vomiting, anorexia nervosa, pica and increased appetite negatively affect eating habits [17,21]. In the current study 88% participants lived in urban areas which could be a risk factor for consumption of refined foods and a sedentary lifestyle. However, the urban setting is an opportunity for responsible health education dissemination using media and social platforms. Poor eating habits even in women with diabetes in pregnancy were also reported in Zimbabwe [8]. They were also reported in a study conducted in adults with type II diabetes in Zimbabwe [22,23]. Studies conducted in developed countries have also reported poor eating habits in pregnancy [24].

Maternal nutritional status determines foetal growth and development, and excessive gestational weight gain which is associated with increased risk of GDM [25]. Poverty, food insecurity, sub-optimal healthcare facilities, frequent infections and frequent pregnancies in Sub-Saharan Africa increase risk of poor nutritional status and adverse outcomes [26]. However, obesity, together with undernutrition tend to be challenges in developing countries [27]. This necessitates individualized, intensive and targeted health education on lifestyle management in pregnancy [18]. There is need to dispel myths such as eating for 2 in pregnancy and this leads to obesity that is associated with adverse pregnancy outcomes. This is compounded by the fact that women might not be aware of the risks associated with obesity in pregnancy [28].

A systematic review conducted by Mukona, *et al.* revealed low levels of physical activity in pregnancy in Africa [29] the major forms of which were household activities which fall below the recommended intensity during pregnancy. Physical activity tended to decrease as pregnancy progressed [29]. Though 74.5% reported engaging in physical activity, 73% either walked or did household chores. Reduced risk of Type 11 diabetes with exercise in GDM has also been reported [30]. There is need for health education on proper physical activity in pregnancy to reduce the risk of GDM and eliminate the reliance on household chores as the only form of physical activity. Physiotherapists should be actively involved in education on exercise and appropriate support systems must be put in place [18]. Studies have reported reduced risk of GDM in with exercise [31,32]. Vigorous physical activity prior to conception and continuance of physical activity in early pregnancy may lessen a woman's risk for acquiring GDM [32]. When there are no medical or obstetric complications, moderate exercise for ≥ 30 minutes /day on most of the day of the week is advised for a pregnant woman [33]. The risk of being sedentary increase with advancing pregnancy owing to avoidance of injuries to self and the unborn baby and the general distortion of body frame with a backward sway [34]. Declining physical activity level with advancing pregnancy has also been reported in developed countries [35,36]. Though bed rest for a pregnant woman to reduce stress and prevent development of hypertension [17,37] pregnant women should rest for 8 hours at night and 1 half hours during the day [37]. It is not advised to sit or sleep for more than 10 hours as this is a sedentary lifestyle that can cause weight gain/obesity [21]. Majority participants in this study slept for more than 10 hours a day which is a risk factor for GDM.

Knowledge of GDM

Awareness of GDM in the study was 40%. Mean knowledge score on GDM was 20.28%, which was very low. Poor knowledge of GDM was also reported in a study conducted in India [12]. Limited knowledge about gestational weight gain guidelines, appropriate diet and physical activity in pregnancy have also been reported in other countries [28,38,39]. Majority participants had not had any health education on GDM. Most of health education was from nurses and midwives. Health care workers must take advantage of the constant and frequent interaction with pregnant women during ANC to give health education on GDM. However, lack of up to date knowledge of diabetes in pregnancy among health care professionals has been reported in developing countries [18,40,41]. Comprehensive management of diabetes in pregnancy in developing countries is hampered by lack of qualified staff and general shortages of personnel [1,18,41]. There is need to train physicians, midwives, paramedical people and the public regarding GDM [12].

Knowledge of GDM and self-care practice

There was a moderate positive correlation relationship between self-care practice and knowledge of GDM ($r = 0.499$, $p < 0.01$). Self-care practice improved as knowledge increased. Regression analysis revealed that knowledge explained 24.6% of the variance observed in self-care. Health psychology and behaviour change techniques are important in supporting health professionals to give guidance on adopting healthy lifestyles in pregnancy [27]. They motivate and inform mothers to improve lifestyle during pregnancy to achieve healthier birth outcomes.

Conclusion

Self-care practice to prevent GDM were poor in the study. Knowledge of GDM was also low and there was a moderate positive relationship between knowledge and self-care. There is need to improve health education on GDM in ANC. Health care workers must be equipped with up to date information on GDM to enable them to give relevant health education to promote good self-care practice to prevent GDM.

Limitations

This was a hospital based study which might have introduced response bias as participants might give acceptable responses to the researcher. Self-reports could also have overestimated self-care practice reported. However, all participants were encouraged to be as truthful as possible in their responses as participation in the research would not affect the quality of care they received at the hospital.

Conflict of Interest

The authors report no conflicts of interest.

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