Effect of Nursing Intervention on Knowledge of Diabetes Mellitus among Pregnant Women Attending Selected General Hospitals in Lagos, Nigeria

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Abstract

Inadequate knowledge of Diabetes mellitus (DM) in Pregnancy among diabetic pregnant women could lead to poor skill about self-care, failure to seek timely medical attention and failure to follow medical prescriptions, which could lead to complications and sometimes death of mother and/or fetus/baby. This study seeks to assess the effect of nursing intervention on Knowledge of DM among diabetic pregnant women attending two general hospitals in Lagos Island, Lagos State, Nigeria.

This study utilizes one group pretest- posttest experimental research design. The purposive sampling technique and total enumeration sampling size method that included seventy-five participants were used for the study. Instrument for data collection consisted of seven demographic data and forty- two (42) test questions. The study was carried out in three sessions: pre-intervention, intervention and the evaluation sessions over a period of six weeks. Paired t test was used to determine significance level between pre and post-intervention knowledge. Ethical approval and consent were obtained from Babcock University Health Research Ethical committee and Lagos State Heath Service Commission respectively.

The results revealed that most of the participants were between the ages of 21 and 45 (88%); most of them had tertiary education (70.7%); most of them (57.3%) had family history of DM. Results also revealed that pre-intervention knowledge among diabetic women was poor (0.28) and the post intervention knowledge was good (0.83). Paired t test results (t= 36.20, p = 0.000) revealed a significant difference between pre-intervention and post-intervention knowledge. This shows that nursing intervention was effective.

Keywords: Intervention, Knowledge, Diabetes, Pregnant, Participants.

Introduction

Diabetes Mellitus (DM) in pregnancy is one of the most common medical disorders encountered during pregnancy. It has been an issue of great concern and threat to maternal and child health because of its negative effects and severe burdens on the lives of mother, fetus/baby, family and the society at large. Diabetes mellitus in pregnancy is an increasing epidemiological health issue with devastating yet preventable complications (World Health Organization, 2019). While Diabetes mellitus comes with high risk in all diabetic patients, DM in pregnancy however has a higher risk. The impact of high prevalence of DM in pregnancy may be associated with maternal and fetal morbidity and mortality (Muche, Olayemi & Gete, 2019). Death of mothers occur on daily basis as a result of complications arising from pregnancy and child birth, when actually, these deaths can be prevented (WHO, 2019). A key goal of Sustainable Development Goals (SDG) is the reduction of maternal mortality to a number that is below 70 in every 100,000 live births by the year 2030 (WHO, 2016). More than 100 women die in Nigeria every day from causes relating to complications of pregnancy and child birth related issues (Izuagbara, Wekesah & Adedini, 2016). If Diabetic pregnant women have good knowledge about diabetes in pregnancy, it will be possible for them to make necessary adjustments about their lifestyle which could improve their general health as well as that of the baby. This

will equally serve as a means of reducing maternal and child mortality, thereby, contributing to the achievement of SDG in the reduction of maternal and child mortality.

It has been reported that DM during pregnancy is increasing worldwide (Utz et al., 2017). World Health Organization (WHO, 2016) stated that prevalence of DM in pregnancy worldwide in women between age 20 and 49 years was 16.9%. In another report, it was stated that Pre-Gestational Diabetes Mellitus (PGDM) is also on the increase. This has been linked to the rise in cases of Type 1 and Type 2 diabetes mellitus. According to Coton, Nazareth and Petersen, (2016), Type 1 diabetes rose from 1.56 to 4.09 per 1000 pregnancies in the UK from 1995 to 2015. Type 2 diabetes on the other hand rose from 2.34 to 5.09 per 1000 pregnancies in the UK from 1995 to 2008 and then with almost a doubled increase of 10.69 per 1000 pregnancies from 2008 to 2015. There are similar reports of increased prevalence of DM in pregnancy in some other parts of the world such as Canada (Berger, Gagnon & Sermer, 2016) and Asia (Lee et al., 2018). A recent review of existing literature on prevalence of DM in pregnancy conducted by Muche, Olayemi and Gete, (2019) revealed that occurrence of diabetes in pregnancy in African sub-Sahara region was 14%, but occurrence was reported to range from 8.4 to 24.5% in the Middle East and North Africa respectively. Previous Studies also revealed that there are some variations in the degree of occurrence in different parts of Africa, for instance, East Africa was reported to have 6% while in West Africa, it was reported as 14% (Mwanri, Kinabo, Ramaiya & Feskens, 2014). In Nigeria, the degree of occurrence of diabetes in pregnancy was reported to be as high as 14.9% (Muche, Olayemi & Gete, (2019). Prevalence of diabetes mellitus in pregnancy reported in different parts of Nigeria include 10.5% in Port Harcourt (John, Awoyesuku, MacPepple & Kwosah, 2020); 7.7% in Sokoto (Adoke, Shehu, Nwobodo, Ekele, Sabir & Umar, 2018) and 13.9% in Ibadan (Kuti et al., 2011). It was reported that prevalence of DM in pregnancy in Lagos was 23.2%. (Ajayi, Adegbola & Oseni 2015). These statistics suggests that South-western Nigeria (especially Lagos) have the highest prevalence of DM in pregnancy in Nigeria. This therefore calls for more studies on DM in pregnancy within the region of South-Western Nigeria, especially Lagos.

While DM in pregnancy could result into serious negative outcomes and while available statistics suggests a high prevalence of DM in pregnancy in Lagos, evidence from existing literature revealed that nursing education intervention is commonly used to improve the knowledge of diabetic pregnant women on diabetes mellitus in pregnancy (Song, Li, Leng, Ma &Yang, 2016). However, most previous studies on DM in Lagos did not consider DM in pregnancy (Ubangha, Odugbemi & Abiola, 2016; Ogundele, Dada, & Mosuro, 2016). The few that focused on DM in pregnancy did not consider the effect of nursing intervention on knowledge of DM in pregnancy (Babah, Owie, Ohazurike, & Akinajo, 2018; Ajayi, Adegbola & Oseni, 2015). Additionally, previous study on nursing intervention for diabetes mellitus patients did not consider DM in pregnancy (e.g. Olajide, Nwaokocha, Aina, Ogunfowokan, and Awoniyi, 2017). There is therefore the need to investigate the effect of nursing intervention on knowledge of DM in pregnancy among diabetic pregnant women in Lagos. Based on the foregoing, this study assessed the effect of nursing intervention on knowledge of DM among pregnant women attending selected general hospitals in Lagos Island, Lagos State, Nigeria. For an effective implementation of nursing intervention, Khiyali, Manoochri, Khani, Babaei and Mobasheri, (2017) posited that nursing intervention package must include meaning of diabetes mellitus in pregnancy, causes, risk factors, types, signs and symptoms, diagnostic methods and diagnostic criteria.

Methodology

This study utilizes one group pretest- posttest experimental research design. Two general hospitals located in Lagos Island, Lagos state, Nigeria namely: Lagos Island Maternity and Onikan general hospitals were used for this study. Lagos is one of the 36 states of the Federal Republic of Nigeria, located in the south-western part of Nigeria. Bounded to the west by Republic of Benin, to the North and to the east by another state in Nigeria (Ogun State) and to the south by Atlantic Ocean. Lagos state is divided into six administrative zones (A – F). Zone A comprises of Lagos Island and Eti-Osa Local governments. Four Lagos State owned general hospitals are located in Lagos Island Local government namely: Lagos Island Maternity Hospital,

General Hospital Odan, Mercy Street Children Hospital and Onikan General Hospital. Only two of these hospitals (Island maternity and Onikan general hospitals) have Obstetrics and gynaecology facilities; both of them are full-fledged secondary health institutions that runs 24 hours' services. Lagos Island Maternity holds antenatal clinics on a daily basis (except Saturday and Sunday) and records a minimum number of 150 pregnant mothers in each clinic. Onikan general hospital on the other hand holds antenatal clinic only on Mondays and Wednesdays and with not less than 100 pregnant women in each clinic. The departments available in each of these two hospitals are: Maternal and Child Health, Neonatal unit, Medicine, pharmacy, Surgery, Microbiology and Haematology department. The hospitals have the general mandate of providing secondary level health-care services to Lagos state residents with the mission of utilizing high skilled personnel for the provision of comprehensive secondary level patient care aimed at ensuring patient satisfaction.

This study utilizes the purposive sampling technique and total enumeration sampling size method. The study population consists of diabetic pregnant women identified at the antenatal clinics of Lagos Island maternity and Onikan general hospital. These were identified using the medical records of the two antenatal clinics with the aid of health workers at the clinics. Therefore, pregnant mothers who had been diagnosed of diabetes, who also expressed willingness and at the same time consented to participate in the study from the two hospitals were included in the study. However, those who's willingness and consent could not be secured were excluded. The study therefore consists of a total of seventy-five (75) participants. Forty-five (45) participants were included at the Lagos Island maternity and thirty (30) were included from Onikan general hospital. Data collection instrument consisted of two sections. The first section is made up of participants' demographic data (which consists of seven questions) while the second section was made up of forty- two questions (42) for testing the knowledge of diabetic pregnant women on diabetes mellitus in pregnancy. These forty - two (42) questions were presented in seven subsections namely: meaning of DM in pregnancy, causes, signs and symptoms, risk factors, types, the methods used in the diagnosis of diabetes mellitus in pregnancy and diagnostic

criteria. Each question was close ended with Yes or No answer. The instrument was tested for its reliability from a pretest conducted among ten pregnant women attending Lagos Island maternity. The computed Cronbach's Alpha reliability value from the pretest was 0.86.

The study was carried out in three sessions: the pre-intervention visits session, intervention session and the evaluation session. At the pre-intervention visit session, participants were met through the assistance of the health professionals at the antenatal clinics of the two hospitals. The researcher familiarizes and got acquainted with participants from where good rapport was established. Participants were informed of the objectives of the research, the number of training sessions involved, they were informed of the topics to be discussed and there was agreement on language of training as well as duration of each training. Participants were equally assured of confidentiality of all information supplied and their freedom to withdraw from the study at any stage without any negative implications on them. The intervention session took place in four stages while each stage lasted for one hour and thirty minutes once per week. At the first stage, participants received further information and instrument paper for testing pre-intervention knowledge was administered. The second and the third stage discussed information about meaning of DM in pregnancy, list the causes, risk factors, types, list of signs and symptoms, diagnostic methods and diagnostic criteria. Stage for was devoted to the review of the previous trainings and opportunity for questions, observations and interactions. The last session (which took place two weeks after the fourth stage of intervention session) was the evaluation session during which the post intervention instruments were administered to determine the participants post intervention knowledge about diabetes mellitus in pregnancy

Participants response to demographic data listed with options from "a" to "e" were coded as 1 to 5. In evaluating pre and post-intervention knowledge, correct response was coded as "1" while incorrect response was coded "0". Initial coding was done in Excel database sheets and later imported to SPSS version 25 from where the analysis was carried out. Frequencies, percentages and means were the descriptive statistics used for analysis while level of significance between pre and post-intervention

knowledge was tested using the t-test statistics. Ethical approval was made available for this study by Babcock University Health Research Ethical committee (BUHREC), Lagos State Heath Service Commission provided the required consent to use the two general hospitals. Informed consent was also obtained from each respondent before administration of instrument.

Results

Presented in Table 1 below is the socio-demographic data as obtained from the participants. The results revealed that participants who were between the ages of 21 and 35 have the highest number (46.7%), followed by participants with age between 36 and 45 (41.3%). Participants at age range of 46 and 65 were least (12.0). Most of the participants had post-secondary education (70.7%) and others have secondary education. The two major religions in Nigeria were almost equally represented among the participants (Christianity, 50.7% and Islam 49.3). There were more participants (57.3%) with genetic disposition to diabetes because they indicated that one of their immediate family members have history of DM. However, others (42.7%) indicated that no member of their family members had family history of diabetes. At the same time, more respondents (62.7%) indicated no previous history of DM in pregnancy and others (37.3%) indicated previous history. More participants were from Yoruba (70.7%) ethnic group, other ethnic groups among the participants are Igbo (28.0%) and Hausa (1.3%). Majority of the respondents (85.3%) had at least one child while 14.7 percent had none at the time of this study.

Knowledge of Participants on DM in pregnancy

The results about knowledge of participants based on variables are as presented in Table 2. The table shows the maximum scale for evaluation of each variable as well as the number of items on each scale. Additionally, the pre and post intervention knowledge mean scores are presented in a way that it could be compared with the maximum scale. Standard Error (SE, which is an indication of accuracy level of each score) and Standard Deviation (SD, an indication of how central is the mean to the entire data) are presented along with each knowledge mean score. The results of pre-intervention and post-intervention knowledge mean score based on each question as contained in the instrument are presented in Tables 3. Standard Deviation (SD) for pre-intervention mean score and post intervention mean score, which provides information about how much each response deviated from the mean are presented along with the mean scores. Also included in Table 3 are the knowledge mean scores for each variable. The decision rule used for the interpretation of results are as stated below:

Knowledge mean score ≤ 0.49 = No (Poor knowledge);

Knowledge mean score ≥ 0.5 =Yes (Good Knowledge);

Post Intervention mean score > Pre-intervention mean score = Effective Intervention;

Post-intervention mean score < Pre-intervention mean score = Ineffective Intervention.

The questions in the instrument are as shown in the appendix while serial number that corresponds with each question are as contained in Table 3.

Table 1. Demographic data from Respondents

Variable		Frequency (n)	Percentage (%)
Age	21-35	35	46.7
	36-45	31	41.3
	46-65	9	12.0
	Total	**75**	**100**
Educational Qualification	Secondary Education	22	29.3
	Tertiary Education	53	70.7
	Total	**75**	**100**
Religion	Christianity	38	50.7
	Islam	37	49.3

	Total	75	100
Record of Family with history of diabetes	Father	16	21.3
	Mother	19	25.3
	Brother(s)	5	6.7
	Sister(s)	3	4.0
	None	32	42.7
	Total	**75**	**100**
Ethnicity	Yoruba	53	70.7
	Igbo	21	28.0
	Hausa	1	1.3
	Total	**75**	**100**
Number of Children	None	11	14.7
	One	20	26.7
	Two	31	41.3
	Three or more	13	17.3
	Total	**75**	**100**
Previous History of High Blood Glucose in pregnancy	No	47	62.7
	Yes	28	37.3
	Total	**75**	**100**

Source: Authors' field survey, 2020.

Table 2. Knowledge of DM in pregnancy by variables

Variables	Max Scale Point	Items on scale	Pre-Intervention $\bar{x}$ (SE) ±SD	Post-Intervention $\bar{x}$ (SE) ±SD
Pre-Intervention and Post-Intervention Knowledge on Diabetes Mellitus in Pregnancy				
Knowledge of diabetes mellitus in pregnancy (**Main Construct**)	**42**	**42**	11.87(0.42)3.63	34.99(0.47)4.04
Meaning	**1**	**1**	0.91(0.03)0.29	1(0.00)0.0
Causes	**5**	**5**	0.92(0.06)0.13	4.27(0.31)0.70
Risk factors	**7**	**7**	1.91(0.04)0.11	6.57(0.10)0.26
Types	**6**	**6**	1.92(0.10)0.24	4.64(0.13)0.33
Signs and Symptoms	**9**	**9**	2.48(0.10)0.31	7.81(0.04)0.12
Methods of diagnoses	**10**	**10**	2.55(0.10)0.31	8.24(0.05)0.17
Criteria for diabetes diagnoses	**4**	**4**	1.19(0.12)0.16	2.45(0.08)0.33

Source: Field survey, (2020)

Table 3. Knowledge of Diabetes Mellitus in Pregnancy

Questions	Knowledge mean score				Average Mean	
	Pre	**Post**	**PrSD**	**PtSD**	**Pre**	**Post**
Meaning of DM in pregnancy						
Q1	0.91	1.00	0.29	0.00	0.91	1.00
The causes of diabetes mellitus in pregnancy						
Q2	0.08	0.83	0.27	0.38		
Q3	0.44	1.00	0.50	0.00		
Q4	0.67	0.97	0.25	0.16	0.18	0.85
Q5	0.16	0.99	0.37	0.12		
Q6	0.17	0.48	0.38	0.50		
Risk factors for diabetes mellitus in pregnancy						
Q7	0.17	0.94	0.38	0.23		

Q8	0.48	0.97	0.50	0.16		
Q9	0.20	0.93	0.40	0.25		
Q10	0.33	0.96	0.48	0.20	0.27	0.94
Q11	0.29	0.91	0.46	0.29		
Q12	0.28	0.97	0.45	0.16		
Q13	0.15	0.88	0.36	0.33		
The types of diabetes mellitus in pregnancy						
Q14	0.36	0.95	0.48	0.23		
Q15	**0.15**	**0.05**	0.36	0.23		
Q16	0.04	0.81	0.20	0.39	0.32	0.77
Q17	0.48	0.96	0.50	0.20		
Q18	0.73	0.99	0.45	0.12		
Q19	0.16	0.88	0.37	0.33		
The signs and symptoms of diabetes mellitus in pregnancy						
Q20	0.73	1.00	0.45	0.00		
Q21	0.01	0.61	0.12	0.49		
Q22	0.05	0.84	0.23	0.37		
Q23	0.05	0.88	0.23	0.33		
Q24	0.21	0.97	0.41	0.16	0.28	0.89
Q25	0.88	1.00	0.33	0.00		
Q26	0.40	0.92	0.49	0.27		
Q27	0.07	0.88	0.25	0.33		
Q28	0.07	0.71	0.25	0.46		
The methods used in diagnosis of diabetes in pregnancy						
Q29	0.92	1.00	0.27	0.00		
Q30	0.81	1.00	0.39	0.00		
Q31	0.04	0.60	0.20	0.49		
Q32	0.08	0.73	0.27	0.45		
Q33	0.12	0.96	0.33	0.20	0.25	0.88
Q34	0.20	0.96	0.40	0.20		
Q35	0.09	0.80	0.29	0.40		
Q36	0.15	1.00	0.36	0.00		
Q37	0.07	0.63	0.25	0.49		
Q38	0.07	0.56	0.25	0.50		
Criteria for the diagnosis of diabetes mellitus						
Q39	0.73	1.00	0.45	0.00		
Q40	0.13	0.37	0.34	0.49		
Q41	0.09	0.21	0.29	0.41	0.30	0.61
Q42	0.23	0.87	0.42	0.34		

*PrSD = Pre-Knowledge Standard Deviation, PtSD = Post Knowledge Standard Deviation

Source: Field survey, (2020)

Paired samples t-test was adopted for the test of hypothesis. The study hypothesis states that:

"There is no significant difference in the pre and post intervention knowledge of diabetes mellitus in pregnancy among the diabetic pregnant women." The decision rule states that if the *p*-value, was less or equal to 0.05, the null hypothesis was rejected, while if *p* value was greater than 0.05, the null hypothesis was accepted. Table 4 contained the results of the paired t test for the study hypothesis.

Table 4. Paired Samples t-Test Analysis of Difference in Knowledge of DM in pregnancy

Intervention	N	Df	Mean	Standard Deviation	T	P	Remark
Post-Intervention	75	74	34.99	4.04	36.20	**0.000**	Significant
Pre-Intervention	75		11.87	3.63			

Source: Field survey, (2020)

Discussion of Results

The findings of this study show that participants' pre-intervention knowledge on DM in pregnancy was poor. Results revealed that participants had good knowledge about the meaning of diabetes mellitus in pregnancy ($\bar{x}$ = 0.91). Since participants were all diagnosed of DM in pregnancy, having good knowledge about the meaning as the results indicated is expected. However, apart from meaning of DM in pregnancy, participants' pre-intervention knowledge means scores on other variables (causes, methods of diagnoses, risk factors, signs and symptoms, criteria for diagnosis and types, listed from the least mean score to the highest mean score) were all poor. Consequent on the foregoing, participants' pre-intervention knowledge about DM in pregnancy was poor. Previous reports by Monir, Zeba and Rahman (2018) in Bangladesh as well as Khiyali, Manoochri, Khani, Babaei, and Mobasheri, (2017) in Iran, both supported the result of this study that pregnant women's knowledge about DM in pregnancy was poor. The finding of this study also revealed that participants' post-intervention knowledge mean score on DM in pregnancy was good. The only question where respondents' post intervention score was less than the pre-intervention score borders on whether diabetes mellitus diagnosed before booking at the Ante- Natal Clinic was a type of DM in pregnancy. Their response that this could not be a type of DM in pregnancy suggest that majority of the respondents are cases of GDM. Apart from this question, respondents' post intervention knowledge on all other questions was better than their pre-intervention score. Additionally, post intervention knowledge mean score on all variables were also good and better than the pre-intervention knowledge mean score. Consequently, post-intervention knowledge mean score was good (Table 2). Results of the t test conducted on pre and post intervention knowledge of DM in pregnancy was (t= 36.20, *p* = 0.000). The pre-intervention knowledge mean score was 11.87 while the post intervention knowledge mean score was 34.99 giving a knowledge difference of 23.12. The test therefore revealed a significant difference in the pre and post intervention knowledge of DM in pregnancy among diabetic pregnant women. Since the computed *p* value in Table 4 was 0.000, which is less than 0.005, the condition to reject the null hypothesis was satisfied. Therefore, the null hypothesis that there is no significant difference in the pre and post intervention knowledge of diabetes mellitus among diabetic pregnant was rejected. This is a clear indication that health education intervention significantly improved the knowledge of diabetic pregnant women on knowledge of DM in pregnancy. The results of this study agree with those of Liu, Xie and Guo, (2017) who had reported that health education significantly impacted the post intervention knowledge of diabetic pregnant women on knowledge of DM in pregnancy. The result also corroborated the previous findings of Xu et al., (2017) who documented evidence of significant improvement in the post intervention knowledge of diabetic pregnant women on knowledge of diabetes in pregnancy. Having a good understanding of DM in pregnancy could assist pregnant mothers in seeking prompt assistance from healthcare provider. It could assist in making appropriate lifestyle adjustments (Liu, Xie & Guo, 2017). These could assist in the prevention of complications, improvement of the general health of the mother as well as reduce maternal and child morbidity and mortality.

Conclusion

The study concluded that diabetic pregnant women had poor knowledge of DM in pregnancy prior intervention. It also showed that health education intervention significantly impacts the knowledge of diabetic pregnant women on DM in pregnancy attending Island Maternity and Onikan general hospitals, in Lagos, Nigeria. This study therefore recommends regular training of diabetic pregnant women at every antenatal clinic from the period of registration to delivery to enhance

pregnant mothers' knowledge and improve their quality of life. Further study is recommended to evaluate the effect of nursing intervention on prevention of DM complications in pregnancy.

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