Knowledge of Preconception Care and Associated Factors among Pregnant Mothers with Pre-existing Diabetes Mellitus in selected Governmental Hospitals, Addis Ababa Ethiopia

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Abstract

Background: Many women with diabetes mellitus experience high rates of unintended pregnancies, infant morbidity and mortality and preventable birth defects.Thus, preconception care offers the potential for earlier risk assessment and intervention that can benefit women before pregnancy and ensure the healthiest possible start for the newborn child. The aim of this study is to assess the knowledge and experience of preconception care and associated factors among pregnant mothers with pre-existing diabetes mellitus. Methods: Facility based quantitative cross-sectional study design was employed among 142 conveniently selected pregnant women between March 11and April 12, 2018. Logistic regression including bivariate and multivariate analysis considering 95% CI was utilized to examine association between dependent and independent variables. P-value < 0.05 was considered statistically significant. Result: this study found that 67(42.7%) of pregnant women with pre-existing diabetes mellitus had good knowledge on preconception care. Educational level, occupation and duration of diabetes was associated with knowledge about preconception care AOR= 0.24 [0.065, 0.828], AOR= 0.042[0.102(0.011-0.918] and AOR= 0.035 [3.599(.095-11.833] respectively. Conclusion: women's knowledge on preconception care in this study is low. Education, occupation and duration of diabetes were factors associated with knowledge of preconception care. Establishment of preconception care strategies addressing all components of the care and increasing women's knowledge about preconception care is an important component to ensure prevention of potential risks.

Introduction

Background

Diabetes mellitus (DM) is a global epidemic and common medical conditions in pregnancy. The incidence of the disease during pregnancy is rapidly increasing mainly in type two diabetes mellitus cases. The rise is associated with an increase in the prevalence of overweight and obesity in the population (1). An estimated 28 million women of reproductive age are suffering from diabetes mellitus worldwide. Majority of these women have type 2 diabetes and 80% of the burden is found in low and middle income countries (2). Normal pregnancy itself is regarded as a diabetogenic state in which postprandial glucose levels are elevated and insulin sensitivity is decreased due to the effects of placental hormones, growth factors, and cytokines(3). This complex hormonal adaptations that work to ensure adequate glucose availability and the relatively reduced insulin sensitivity contribute to hyperglycemia which makes pre-existing diabetes even worse during pregnancy. Diabetes mellitus increases risk of pregnancy related complications like: preeclampsia, infections, obstructed labor, postpartum hemorrhage, preterm births, stillbirths, macrosomia, carriage, intrauterine growth retardation, congenital anomalies, birth injuries and death in the pregnant mother and her unborn child (4)Pre-gestational diabetes occurs before pregnancy and this includes type one and type two diabetes mellitus, whereas, gestational diabetes mellitus (GDM) exists during pregnancy. Studies also reported that, the risk of development of type 2 diabetes in later life is 7- to 9.6-times higher among gestational diabetic cases

(5). Pregnant mothers with Pre-existing diabetes, (both type one and type two) are at greater risk of pregnancy complications and likewise pregnancy can make diabetes worse. Pregnancy in individuals with known diabetes requires planning and adherence to strict treatment regimens. Intensive management and normalization of the blood glucose level are essential for individuals with pre-existing diabetes who are planning pregnancy. Preconception care is a care needed to prepare a woman for pregnancy at least six months earlier to conception (6). The care is provided to all diabetic mothers planning pregnancy for the first time or between consecutive pregnancies(7). According to some studies, pregnancy outcomes can be significantly improved by intensifying therapies, rigorous glycaemic control and avoidance of teratogenic medicines(8). A diabetic woman planning to conceive also needs to be aware about the implementation of preconception care components including medication review, folic acid supplementation, weight reduction, smoking cessation counseling, improved nutrition and exercise, as well as addressing other diabetes-related health problems (9). The care is particularly important as fetal development commences in the first trimester of pregnancy. As reported by some studies, diabetic women receiving preconception care more likely to have favorable pregnancy outcomes, including lower rates of congenital anomalies and spontaneous abortions(10). Therefore, this study was conducted to assess the knowledge level of preconception care and associated factors among pregnant mothers with pre-existing diabetes mellitus in selected governmental hospitals.

Methods

Facility based quantitative cross-sectional study design was employed in six governmental hospitals with diabetic follow-up services in Addis Ababa the capital city of Ethiopia were included. The hospitals were Black lion, Zeweditu memorial hospital, Yekatit 12, Ras Desta Damtew, Minlik II and St. Paul's hospitals. One hundred forty two pregnant mothers with pre-existing diabetes mellitus were conveniently included between March 11 and April 12, 2018. Selection of the hospitals was based on presence of follow-up services for diabetic patients and all hospitals having follow-up service were included. All pregnant mothers with pre-existing diabetes on diabetic follow up earlier than the current pregnancy were included. A structured adapted and modified data collection instrument prepared by reviewing different literatures was used to gather the information. The instrument was translated to the local language for ease of administration and later back translated to English. This instrument involved four parts which include: Socio-demographic, Obstetric history, maternal diabetic condition and knowledge about preconception care. Six data collectors were recruited and trained to gather the information and the principal investigator supervised the whole process of data collection. Ethical clearance and permission letter was obtained from responsible organizations and consent was obtained from respondents. Knowledge was measured based on respondent's correct response to preconception care knowledge questions. Those respondents who correctly respond to 50% or more of the preconception care knowledge questions were considered to have good knowledge and those who scored<50% were considered as having poor knowledge (11, 12). The data was coded and entered into Epi-data version 4.2.0 then exported to statistical package for social science (SPSS) version 25. Descriptive statistics and logistic regression

including bivarriate and multivariate analysis was used and a statistical significance was considered at p-value < 0.05, and 95%confidence interval.

Results

Socio demographic characteristics and obstetric history of study participants

A total of 145 participants were enrolled in this study, and 142 participants responded to the questions that makes the response rate 97.9%. Most participants were above 30 years old with mean age 36.65 and SD ±4.31. All respondents were married, 54 (38%) of respondents and 67 (47.1%) of their husbands completed college and above and 62 (41.3%) of the respondents were government employee (Table 1).

Regarding their obstetric history, 93 (65.5%) of respondents had less than two pregnancies including current pregnancy, 99 (69.7%) of them had history of contraceptive use, about one fourth 45 (31.7%), had history of unplanned pregnancy, 36 (25.3%) abortion and 26(18.3%) had history of stillbirth (Fig. 1).

Maternal diabetic condition: More than half 79(55.6%) were type two diabetes with duration of diabetes mean 6.96, SD±2.12 and (range 3–15 years). Among those who were type two, 26(33.0%) of them were diagnosed as gestational diabetes. Sixty-five (45.7%) of them had less than one month diabetic follow up before current pregnancy, thirty-six (25.3%) have diabetic related complication or co-morbidity (Table 2).

Knowledge on preconception care

Among the total 142 participants, 103(72.5%) know the services provided during pre-pregnancy /preconception visit. From those who know the services provided; blood sugar control, contraceptive counseling, folic acid supplement and advice on diet and weight control were reported as a preconception care component by 70.4%, 67.9%, 50% and 32.4% of respondents respectively.

Knowledge about preconception care

Preconception care knowledge level was measured based on correct response to eight preconception care knowledge questions. The minimum and maximum score of participants ranged between zero and seven. Of the total, 67 (47.2%) respondents scored greater than 50% and were considered to have good knowledge and the remaining 75 (52.8%) respondents score was less than 50% and regarded as having poor knowledge. (Fig. 2)

Response of pregnant women with preexisting diabetes to Knowledge questions

Among the total respondents, 103 (72.5%) were aware about preconception care service being provided in the hospitals. Participants were asked about to whom preconception care is needed, and 54 (38.1%) said to all pregnant women with diabetes mellitus, while 47 (33%) said only for diabetic pregnant women with chronic illness. Of all the participants, 97 (68.3) knew about the purposes of preconception care. Participants were also requested about the length of good blood sugar control before conception and 85 (59.9%) respondents reported the do not know, while 17 (12%) said three months, 33 (23.2%) two months and few 7 (4.9) reported one month. Of the total, 38 (26.8%) knew that pregnancy worsens condition of diabetes, 78 (54.9%) knew about the need of folic acid supplement during pregnancy, of which, 51 (65.3%) said folic acid supplement should be started before pregnancy and 19 (24.3%), said.after pregnancy [table 3]

Factors associated with knowledge of preconception care

In this study, education, occupation and duration of illness were found to be factors associated with knowledge of preconception care among women with preexisting diabetes mellitus. Those mothers with educational level of primary school were less likely to have good knowledge as compared to those women with educational level of college and above AOR = 0.233 [0.065–0.828]. Occupation was another factor associated with knowledge about preconception care among women with pre-existing diabetes mellitus. Government employee women with diabetes mellitus were less likely to have good knowledge compared to others, AOR = 0.102 [0.011–0.918], and duration of diabetes was also associated with knowledge about preconception care. Those pregnant women with duration of diabetes less than five years were more likely to have good knowledge as compared to those women with duration of diabetes illness greater than five years. [Table 4]

Discussion

This study have attempted to assess the level of knowledge of preconception care and associated factors among pregnant women with pre-existing diabetes attending diabetic follow up in selected governmental hospitals of the study area.

A total of 142 mothers were studied, of those 103 (72.5%) respondents reported that they know the preconception care service is provided in the selected hospitals. The study found that 47.2% of the study participants have good knowledge on preconception care. This finding is consistent with other study findings conducted in Zambia, Saudi Arabia and USA among women with pre-gestational diabetes which reported that the proportion of participants having good knowledge about preconception care is low(13–15). Another study conducted in Brazil also found that 51.5% study participants demonstrated good knowledge on preconception care (16). The narrow discrepancy might be due to differences in socio demographic and/or socio economic characteristics between the two countries.

In this study, education, occupation and duration were found to be the factors associated with women's knowledge about preconception care. Women who attended primary school were less likely to have good

knowledge on preconception care than those who attended college and above *AOR = 0.233 [0.065, 0.828].* This finding is supported by a study finding in Zambia where participants who attended primary level of education were 4.54 times more likely to have poor knowledge on preconception care than those with tertiary education(18). Another study in France also showed that those who attended above secondary school were 4.6 times more likely to have good knowledge on preconception care(19). In this study occupation was also found to be associated with women's knowledge about preconception care among pre-existing diabetic patients., Those government employee women were less likely to have good knowledge than those students and market trade vendors *AOR = 0.102 [0.011, 0.918].* The finding is inconsistent with the study in Zambia, where the employees showed no significant association with knowledge on preconception care P-value (0.131)(20). This may be due to the fact that government employees had limited access to attending educational sessions in the current study. The other factor which showed association with knowledge about preconception care among diabetic women was duration of illness/diabetes. Women with duration of diabetes less than five years were more than three times more likely to have good knowledge on preconception care than those with greater than five years duration *AOR = 3.599 [0.095,11.833].* This finding is inconsistent with a study result in France, where participants with duration of diabetes greater than five year were two times more likely to have good knowledge than those less than five years (21).

Limitation of the study

The study used non-probability sampling technique as the accessible population is limited. The cross-sectional nature of the design limits to show cause and effect relationship and it is also prone to recall bias as women's were asked about pre-pregnancy care for the current pregnancy and since the sample size was small, all this may limit generalizability of finding beyond the study settings.

Conclusion

The level of knowledge about preconception care among pregnant mothers with pre-existing diabetes mellitus in this study is low. Education, occupation and duration of diabetes were factors associated with knowledge of preconception care. Establishing preconception care strategies that can address all components of the care and increasing women's knowledge regarding preconception care may help to reduce risk of maternal and fetal complications. Further large scale studies may be recommended.

Implications for practice

It has been shown that knowledge of preconception care among women with preexisting diabetes mellitus in this study was low. A diabetic women planning to conceive needs to be aware about the implementation of preconception care(9). Pregnancy in women with known diabetes mellitus requires planning and adherence to strict treatment regimens. The care is needed to prepare a woman planning pregnancy at least six months earlier to her conception, to reduce risk of pregnancy related complications

like: preeclampsia, infections, obstructed labor, postpartum hemorrhage, preterm births, stillbirths, macrosomia, carriage, intrauterine growth retardation, congenital anomalies, birth injuries and death in the pregnant mother and her unborn child(6).Therefore, the findings of this study will provide direction for health care providers and policy makers to design and implement strategy to address the problem.

Declarations

Ethics: Ethical clearance was obtained from Addis Ababa University, College of Health Sciences, institutional review committee, permission from Addis Ababa regional health Bureau and from the selected hospital administrative offices. An informed verbal consent was obtained from study subjects confidentiality of information was assured.

Consent for publication: All authors who took part in the study have agreed publication of the article in women's health issue journal.

Availability of Data: The datasets generated and/or analysed during the current study are available in the name http://etd.aau.edu.et/handle/123456789/13486? in the Addis Ababa University repository.

Conflict of interest: None

Computing of interest: This article has not been published previously and is not under consideration for publication elsewhere.

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Tables

Table 1: Socio-demographic characteristics of Pregnant mothers with pre-existing diabetes mellitus in Addis Ababa selected hospitals March 11-April 12, 2018 (n=142)

Variable	Category	Frequency (N)	Percent (%)
Maternalage	<30	41	71.1
	≥30	101	29.9
Maternaleducational status	No formal education	14	9.9
	Primary school completed	29	20.4
	Secondary school completed	45	31.7
	College and above	54	38.0
Educational status of husband(if married)	No formal education	8	5.6
	Primary school completed	17	12.0
	Secondary school completed	50	35.2
	College and above	67	47.2
Maternaloccupation	House wife	48	33.8
	Government employee	62	43.7
	Private employee	20	14.0
	Others	12	8.5%

Table 2: Maternal diabetic condition among pregnant women with preexisting diabetes mellitus in selected governmental hospitals in Addis Ababa, March 11-April 12, 2018 (n=142)

Variables	Category	Frequency	Percent
Type of diabetes mellitus	Type one	63	44.4
	Type two	79	55.6
Ever diagnosed as GDM before (if type two)	Yes	26	33.0
	No	53	67.0
Duration of diabetes (in years) (n=126)	<5 year	24	16.9
	≥5year	102	83.1
Frequency follow up before current pregnancy	<1 month	65	45.7
	1-2 month	41	28.9
	≥3 month	36	25.4
Monitor blood sugar at home		69	48.6
Diabetic related co-morbidity		42	29.6
Type of diabetic related co-morbidity reported (n=42).	Hypertension	28	66.7
	Kidney problem	7	16.7
	Vision problem	5	11.9
	Heart problem	2	4.8
Knows availability of Health education sessions regarding diabetes in pregnancy	Yes	22	15.5
	No	68	47.9
	Don’t know	52	36.6
Ever attained Educational sessions	Yes	13	59.0
	No	9	41.0
Consults health care provider between visit	Yes	26	18.3
	No	116	81.7

GDM = gestational diabetes mellitus

Table 3: Knowledge of preconception care among pregnant mother with pre gestational diabetes in selected governmental hospitals Addis Ababa, March 11 to April 12, 2018 (n=142)

Variables	Frequency(N)	Percent (%)
Know serviceis provided before pregnancy visit	103	72.5
Perception on need of preconception care		
For all women planning pregnancy	54	38.1
Only for women with chronic illness	47	33.0
Don't know	41	28.9
Knows benefits of Preconception care	97	68.3
benefit of preconception care (multiple response)		
Improve maternal health	73	75.2
Improve pregnancy outcome	70	72.1
Prevent un wanted pregnancy	67	61.8
High blood sugar levels with pregnancy increases risk of birth defect in newborn baby	8	5.6
Length of good blood sugar control recommended before conception		
Three month	17	12.0
Two month	33	23.2
One month	7	4.9
Don't know	85	59.9
Pregnancy worsens condition of diabetes mellitus	38	26.8
Seasonal medical check-up for complication like retinal screening is important in addition to s monitoring blood sugar before pregnancy.	81	57.0
Knows about need for folic acid supplementation	78	54.9
Whento start folic acid supplementation (n=78)		
Before pregnancy	51	65.3
After pregnancy	19	24.3
Don't know	8	6.4
Folic-acid supplement reduce the risk of birth defect in newborn baby(n=78)	8	10.2

Table 4: Factors associated with knowledge of preconception care among pregnant mothers with pre gestational diabetes, in Addis Ababa, March 11-April 12, 2018(n=142)

Variables	Category	Knowledge on PCC		AOR=95%CI	P-value
		Good	Poor		
Maternal Educational status	No formal education	11(16.4%)	3(4.0%)	0.251(0.040-1.578	0.141
	Primary school	19(28.4%)	10(13.3%)	0.233(0.065-0.828	**0.024***
	Secondary school	13(19.4%)	32(42.7%)	1.318(0.455-3.819	0.611
	College and above	24(35.8%)	30(40.0%)	1	
Maternal Occupation	House wife	20(29.9%	28(37.3%)	0.269(0.031-2.328	0.233
	Gov't employee	39(58.2%)	23(30.7%)	0.102(0.011-0.918	**0.042***
	Private employee	6(8.9%)	14(18.7%)	0.476(0.045-5.038	0.538
	Others	2(3.0%)	10(13.3%)	1	
Duration of diabetes	<5 years	6(8.9%)	18(24.0%)	3.599(.095-11.833	**0.035***
	≥5 years	61(91.2%)	57(76.0%)	1	

Figures

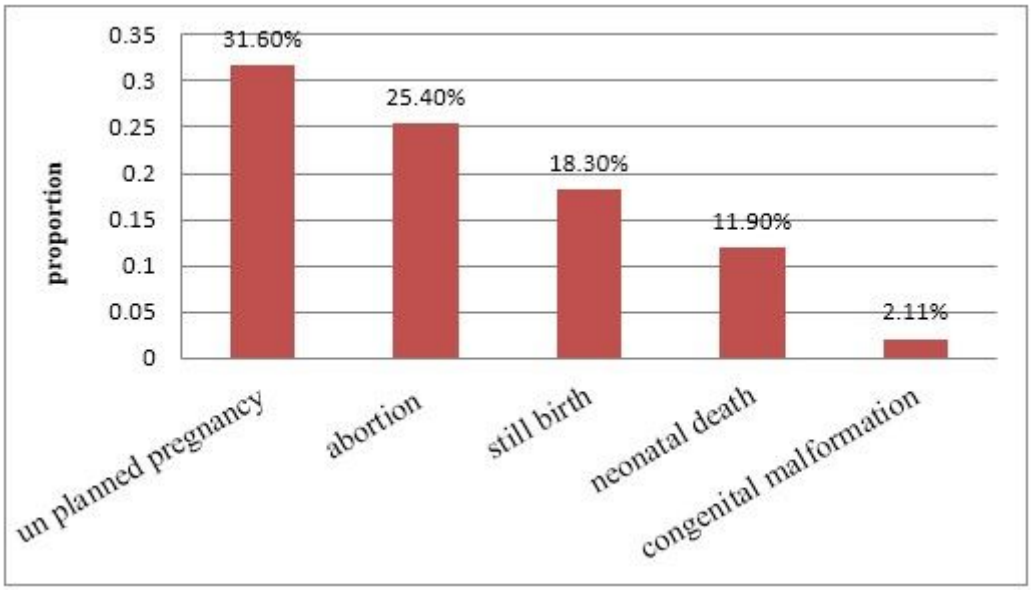

Figure 1

Obstetric history of pregnant women with pre-gestational diabetes mellitus in selected governmental hospitals, in Addis Ababa March 11-April 12, 2018 (n=142)

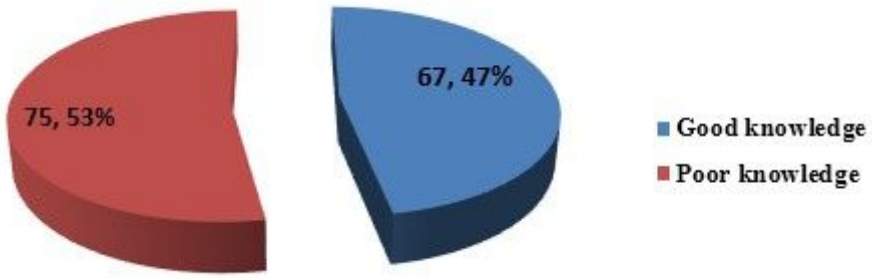

Figure 2

knowledge level of preconception care among pregnant women with pre existing diabetes mellitus in selected governmental hospitals, Addis Ababa, March 11-April 12, 2018 (n=142)