

Original Article

Awareness and knowledge of gestational diabetes mellitus among pregnant women at the Tema General Hospital, Ghana

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Abstract

Gestational diabetes mellitus (GDM) is a medical condition that occurs during pregnancy. This study sought specifically to determine the awareness of pregnant women on GDM. It also assessed the knowledge level of pregnant women on GDM and determined whether there was a correlation between educational level and knowledge of GDM. The study utilised the quantitative method. A cross-sectional design was used to investigate the awareness and knowledge of pregnant women on GDM. The research setting for the study was at the Tema General Hospital. The study population included all pregnant women who attended antenatal clinic at the hospital for routine maternal health services in February 2015. The average monthly antenatal attendance was 500 pregnant women and 250 respondents were chosen through simple random sampling.

Statistical Package for Social Sciences (SPSS) version 21 was used to analyse the data. The study revealed that majority of respondents was aware of GDM. The sources of awareness included television, radio, newspapers, friends and health personnel. The respondents had knowledge of the causes and risk factors that led to GDM.

Recommendations included the use of mass media as a tool to intensify and disseminate information about GDM and re-emphasis of causes and risk factors associated with GDM during health talks for early detection and early reporting for management.

Keywords:

Awareness; Diabetes mellitus; Gestational; Hyperglycemia; knowledge

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Introduction

Diabetes mellitus [DM] is a chronic metabolic disease caused by hereditary and/or acquired insufficiency in the production of insulin by the pancreas, or by the ineffectiveness of the insulin produced. It is characterised by elevated blood concentrations of glucose, which in turn injure many of the body's systems, especially the blood vessels and nerves. DM is usually classified into four groups – Type 1, Type 2, gestational diabetes mellitus and diabetes related with other conditions - and each group has distinctive causal and risk factors [(World Health Organization [WHO], 2016; Alberti, Zimmet and Shaw 2006)].

Internationally, approximately 422 million adults had diabetes in 2014, compared to 108 Million in 1980. The global incidence (age-standardised) of diabetes had almost doubled since 1980, growing from 4.7% to 8.5% in the adult population (WHO, 2016). In 2000, approximately 171 million people globally had some form of diabetes mellitus and a projected 361 million people will be affected by the condition by 2030 (Reece, Leguizamón and Wiznitzer, 2009). International Diabetes Federation [IDF] (2006) claimed that without concerted action to prevent DM, in less than 25 years, there will be 592 million people living with the disease.

Until about a decade ago, it was popularly believed that DM was rare in Africa. The incidence of diabetes has however increased in Africa due to improved personal incomes and changed lifestyles over poverty that was prevalent in the past. Although the prevalence of diabetes remains relatively low in Africa, people living with diabetes have increased from 4 million in 1980, to 25 million in 2014. Africa being among the world's youngest regions, that number is disturbing for several reasons (Quartz Africa, 2016).

Some epidemiologists predict that the economic impact of DM, as well as the consequent death toll, will surpass the ravages of HIV and AIDS in the near future (Whiting et al, 2013). Hall, Thomsen, Henriksen & Lohse (2011) mentioned that incidence (0-7% of the population) of DM was recorded in African countries such as Cameroon, Ghana, Guinea, Kenya, Nigeria, South Africa and Uganda while an incidence of more than 10% of the population was recorded in Zimbabwe.

In a study conducted by Biritwum, Gyapong and Mensah (2005) the prevalence of DM in Ghana was found to be 5.5% and higher among females 7.4% compared to males 2.8% (. The study also found that DM was more common among the married than unmarried and was highest among the formally employed compared to self-employed. It was evident in the study that DM was highest in Greater Accra at 16.1% and lowest in the Upper East and Upper West regions. By ethnicity, diabetes mellitus was highest among the Ga Adangbes, Ewes and Akans at 14.6%, 6.6% and 6.0% respectively. Another study in Ghana was conducted to establish and rank the maternal risk factors for GDM in the Ghanaian community. The study was strongly associated with women with history of stillbirth (OR=10.42, p=0.0004), relatives having diabetes (OR=8.08, p=0.004), history of more than two miscarriages (OR=3.15, p=0.0001), previous caesarean operations (OR=3.06, p=0.0004) and more than two parities (OR=3.03, p=0.0027) to the development of GDM. There was no significant difference recorded between the body mass index (BMI) of the GDMs and the control groups (p>0.05) (Asare-Anane, Bawah, Ofori & Amanquah, 2014).

During pregnancy, ineffectively managed diabetes increases the risk of maternal and foetal complications. The ninth leading cause of mortality among women globally is diabetes mellitus, which causes 2.1 million deaths per annum (International Diabetes Federation, 2017). Opong, Ntummy, Amoakoh-Coleman, Ogum-Alangea and Modey-Amoah, (2015) found from a study they conducted that GDM was prevalent in 10% of pregnant women in Accra and women who were obese by 20-24 weeks of pregnancy had a significantly increased risk of GDM). The study however did not find much information on the knowledge and awareness of GDM amongst pregnant women. To address the gap, the current study was conducted to assess the knowledge level of pregnant women on GDM and determine whether there is a correlation between educational level and knowledge of GDM.

Design and Methods

A quantitative methodology was adopted for this study using a research design of cross sectional descriptive survey. A group of 250 pregnant women were randomly selected from an average population of 500 pregnant women who visited the antenatal clinic at the Tema General Hospital in February,

2015. Approval was sought from the hospital and respondents before the study was conducted. The researchers briefed prospective respondents on the objectives of the study and semi-structured questionnaires were administered directly to the target population after receiving their consent. Pregnant women who had difficulty in reading or answering questions on their own were given the needed assistance. One month (1st February to 1st March 2015) was used for collection of all data.

The questionnaire was pretested among 20 pregnant women from LEKMA General Hospital, who were not

part of the main study. The questionnaire was reviewed by the research team based on challenges the pre-test group found in their attempt to answer the original questions. Furthermore, the instrument was reviewed to address face and content validity. Statistical Package for Social Science (SPSS) version 21 was used to analyse the data. The research findings were subsequently presented through frequency tables and percentages. Pearson's Correlation was used to analyse data between level of knowledge and variables including causes, risk factors and level of education.

Results

Table 1: Awareness of Respondents about Gestational Diabetes Mellitus (GDM)

Sources of Awareness	Number of Respondents	Percentage (%)
Television	10	5.8
Radio	65	37.8
News papers	13	7.6
Friends	7	4.1
Health personnel	77	44.8
Total	172	100.0

Source: Field Survey, 2015

Table 2 indicates that 77(44.8%) of the total number of respondents heard about GDM from health personnel. This was followed by 65(37.8%) respondents who heard of it from Radio Stations while 13(7.6%) respondents became aware of it through newspapers. Furthermore, 10(5.8%) and 7(4.1%) of the respondents stated that their source of awareness was Television (TV) and from friends respectively.

This means that about 83% of the respondents heard about GDM from health personnel and on radio stations.

Table 3: Awareness on the Risk Factors of Gestational Diabetes Mellitus

Risk Factors	SA	A	U	D	SD
Family history of diabetes	65 (26.0%)	100 (40.0%)	48 (19.2%)	24 (9.6%)	13 (5.2%)
Maternal age over 30 years old	2 (0.8%)	20 (8.0%)	121 (48.9)	62 (24.8%)	45 (18.0%)
Having a history of previous GDM	9 (7.6%)	117 (46.8%)	34 (13.6%)	64 (25.6%)	16 (6.4%)
Having three or more children	-	-	72 (28.7%)	129 (51.6%)	49 (19.6%)

Source: Field Survey, 2015

Key: **SA**- Strongly Agree, **A** - Agree, **U**- Undecided, **D**- Disagree, **SD** - Strongly Disagree

Table 3 indicates that majority of the respondents, 100(40%) agreed, 65 (26%) strongly agreed, 48(19.2%) remained undecided, 24(9.6%) disagreed and 13(5.2%) disagreed strongly with family history of DM being a risk factor that could lead to GDM.

This simply means that 62% of the respondents agreed that family history of DM is a risk factor that could lead to GDM.

Furthermore, almost half of the respondents, 121 (48.9%) were undecided about maternal age of more than 30 years old being a risk factor that could lead to GDM. However, 62(24%) disagreed, 45 (18.0%) strongly disagreed, 20 (8.0%) agreed and 2 (0.8%) strongly agreed with the notion.

This means that about 50% of the respondents were undecided about maternal age of more than 30 years old being a risk factor that could lead to GDM.

Similarly, majority of the respondents, 117 representing 46.8% agreed and 9, representing 7.6% strongly agreed with the statement that having a previous history of GDM is a risk factor for the development of GDM during pregnancy. Thirty-two percent (32%) of the respondents disagreed with the statement whiles the remaining proportion of respondents were undecided.

This means that about 54% of the respondents agreed with the statement that having a previous history of GDM is a risk factor for the development of GDM during pregnancy.

Finally, a greater percentage of respondents, 121 (51.6%) disagreed and 49(19.6%) remained undecided about having three or more children being a risk factor for GDM. However, none of the respondents either strongly agreed or agreed with the statement.

This simply means that about 52% of the respondents disagreed with the statement that having three or more children is a risk factor for GDM.

Table 4: Association between Level of Knowledge and Causes of GDM

		Level of Knowledge	Causes of Knowledge
Level of knowledge	Pearson Correlation	1.000	0.639
	p-value	-	0.000
Causes of GDM	Pearson Correlation	0.639	1.000
	p-value	0.000	-
Total		250	250

Source: Field Survey, 2015

Table 4 provides information on the association between level of knowledge and causes of GDM. The strength of association between the level of knowledge of respondents and causes of diabetes mellitus was moderate, that is, Pearson’s correlation coefficient of 0.639. The correlation coefficient was significantly different from zero ($p < 0.01$). That is, the p-value of the test, (0.000) is less than then the level of significance of 0.01.

Since the p-value of the test is less that the level of significance, ($0.000 < 0.01$), it mean that there is an association between the level of knowledge of respondents and causes of DM, but the association was positively moderate, as depicted by the Pearson’s correlation coefficient value of 0.639.

Table 5: Association between Level of Knowledge and Risk Factors of GDM

		Level of Knowledge	Risk factors
Level of Knowledge	Pearson Correlation	1.000	0.293
	p-value	-	0.000
Risk factors	Pearson Correlation	0.293	1.000
	p-value	0.000	-
Total		250	250

Study Survey, 2015

Table 5 shows that there was a weak statistically significant association between level of knowledge and risk factors of GDM with Pearson's coefficient value of 0.293. The correlation coefficient was significantly different from zero ($p < 0.01$). That is the p-value (0.000) is less than the level of significance (0.01).

Since the p-value of the test is less than the level of significance, ($0.000 < 0.01$), it means that there is an association between the level of knowledge of respondents and risk factors of GDM, but the association was weak as depicted by the Pearson's correlation coefficient value of 0.293.

Table 6: Level of Knowledge on GDM and Parity

		Level of Knowledge	Parity
Level of Knowledge	Pearson Correlation	1.000	-0.524
	p-value	-	0.000
Parity	Pearson Correlation	-0.524	1.000
	p-value	0.000	-
Total		250	250

Study Survey, 2015

Table 6 provides information on the association between level of knowledge of respondents on GDM and parity. The association between the level of knowledge of respondents and parity was negative and moderate, that is, Pearson's correlation coefficient of (-0.524). The correlation coefficient was significantly different from zero ($p < 0.01$). That is, the p-value of the test, (0.000) is less than the level of significance of 0.01.

Since the p-value of the test is less than the level of significance, ($0.000 < 0.01$), it means that there is an association between the level of knowledge of respondents and parity, but the association was inversely moderate, as depicted by the Pearson's correlation coefficient value of -0.524.

Table 7 Level of Knowledge on GDM and Educational Level of Respondents

		Level of Knowledge	Educational Level
Level of Knowledge	Pearson Correlation	1.000	0.500
	p-value	-	0.000
Educational Level	Pearson Correlation	0.500	1.000
	p-value	0.000	-
Total		250	250

Study Survey, 2015

There was a modest positive association between level of knowledge of respondents on GDM and their educational level $r = (0.50)$. The correlation coefficient was significantly different from zero ($p < 0.01$). That is the p-value (0.000) is less than then the level of significance (0.01).

Table 7 shows that there was a moderate statistically significant association between level of knowledge and educational level of respondents with Pearson's coefficient value of 0.500. The correlation coefficient was significantly different from zero ($p < 0.01$). That is the p-value (0.000) of the test is less than the level of significance (0.01).

Since the p-value of the test is less than the level of significance, ($0.000 < 0.01$), it mean that there is an association between the level of knowledge and educational level of respondents, but the association was moderate, as depicted by the Pearson's correlation coefficient value of 0.0.500.

Discussions

Awareness of Pregnant Women on Gestational Diabetes Mellitus (GDM)

A greater number of respondents 172 (68.8%) had heard about GDM compared with 78 (31.2%) of the total respondents who had not heard of it. The study was congruent with a study conducted among antenatal women in the primary health centre in South India in which a greater proportion of the women were aware of Diabetes Mellitus (DM) and Gestational Diabetes Mellitus (GDM) (Shriraam, Anitha, Sathiyasekaran, and Mahadevan, 2013). It was revealed in the study that out of the 120 respondents, the majority (102) of pregnant women, representing 85%, were aware of diabetes mellitus and a greater portion of respondents 82 (68.3%) were also aware of the fact that DM could occur during pregnancy (GDM). However, in this study, the aspect of GDM of which the respondents were aware could not be identified. The study failed to reveal the area of awareness among the study population.

Sources of Awareness of Respondents on Gestational Diabetes Mellitus (GDM)

Majority of the respondents, 77(44.8%) of the total

number of respondents heard about GDM from health personnel. This was followed by 65(37.8%) respondents who heard of it from Radio Stations while 13(7.6%) respondents became aware of it through newspapers. Furthermore, 10(5.8%) and 7(4.1%) of the respondents stated that their source of awareness was Television (TV) and from friends respectively. These results are similar to a study conducted by Shriraam, Anitha, Sathiyasekaran, and Mahadevan (2013). They found that the major sources of awareness of GDM were reported to be television or radio, neighbours or friends, and family members. Awareness of Risk Factors of Gestational Diabetes Mellitus (GDM)

While 100 (40%) of the respondents agreed and another 65 (26%) strongly agreed that family history of DM was a risk factor that could lead to GDM, 48 (19.2%) of the respondents remained undecided, 24 (9.6%) disagreed and 13(5.2%) strongly disagreed with the concept. The results from the current study were congruent with a study conducted in Samoa on awareness of GDM and its risk factors among pregnant women. The Samoa study revealed that out of 141 participants, 60, representing 48% respondents identified family history of diabetes mellitus as a risk factor (Price, Lock, Archer & Ahmed, 2017).

Almost half of respondents, 121 (48.9%) were undecided about maternal age of more than 30 years old being a risk factor that could lead to GDM; however, 62(24%) disagreed, 45 (18.0%) strongly disagreed, 20 (8.0%) agreed and 2 (0.8%) strongly agreed with the notion. This implies that respondents were not aware of the fact that maternal age over 30years is a risk factor for the development of GDM. A study conducted in Louisiana, United States of America, revealed that GDM was common in women older than 35years.

Similarly, results of a study conducted at Baqai Medical University in Pakistan also agreed with the above mentioned studies that women aged greater than 35 years were more prone to GDM (Wang, Chen, Xiao, Horswell, Besse & Johnson, 2012; Naheed, Kammeruddin, Hashmi & Narijo, 2008; Bibi, Saleem & Mahsood, 2015).

Majority of the respondents, 121 (51.6%) disagreed and 49(19.6%) remained undecided about the possibility

that having three or more children could be a risk factor for GDM. However, none of the respondents either strongly agreed or disagreed with this. This was incongruent with a study conducted to determine the risk factors for gestational diabetes mellitus among Sudanese Pregnant women, which found a significant association between GDM and maternal age of 30 or more years. Pregnant women agreed to advanced maternal age being a risk factor for the development of GDM (Mardi & Lutfi, 2012).

Level of Knowledge of Pregnant Women on risk Factors, Complications, Signs and Symptoms of Gestational Diabetes Mellitus (GDM)

Knowledge and Risk Factors

Table 4 above shows that there is a statistical significant relationship between knowledge and risk factors with ($p = 0.000$, $r = 0.293$). This implies that the higher the level of knowledge on GDM, the higher the level of awareness on risk factors on GDM, hence proper management and better outcomes. This was incongruent with a study conducted in Samoa, assessing the awareness of gestational diabetes and its risk factors among 141 pregnant women attending Tupua Tamases Meaole Hospital in May 2015. This study found out that although, a majority of women (58%) were aware of GDM, only one woman was able to identify all four factors for GDM (Price, Lock, Archer & Ahmed, 2017).

Level of Knowledge on GDM and Parity of Respondents

The level of knowledge of respondents on GDM and parity had an inverse association, ($p = 0.000$, $r = -0.524$). This means that the higher the parity of the respondents, the lower their level of knowledge on GDM. This implies that multiparous women with many pregnancies and possibly, children had very little knowledge about GDM probably due to illiteracy and poverty. This was inconsistent with a study conducted in South India on the awareness of gestational diabetes mellitus among 120 antenatal women in a primary health centre. In the Indian study, parity was not found to be significantly associated with the level of knowledge of pregnant women about GDM (Shiraam, Rani, Sathyasekaran & Mahadevan, 2013).

Level of Knowledge on GDM and Educational Level of Respondents

There was a moderately positive association be-

tween level of knowledge of respondents on GDM and their educational level ($r = 0.500$). This implies that the higher the level of education of the respondent the better their knowledge on GDM. This was inconsistent with a study conducted in India by Elamurugan & Arounassalame (2016) to determine what mothers knew about gestational diabetes in terms of knowledge and awareness among 200 antenatal mothers. Although majority, 61% of the respondents had undergone formal education, it was found out that the level of education did not show any a significant influence on level of knowledge of GDM.

Implications for the Study to Nursing Practice, Education, Policy and Research

The findings of the study imply that healthcare professionals need to intensify education of pregnant women on GDM. The positive effects of the mass media should be explored in making pregnant women more aware of the risk factors and management of GDM. The government and other stakeholders should empower women educationally to be able to search for information about their health including GDM. Further studies could be done to determine maternal and foetal outcomes associated with GDM.

Conclusion

The study revealed that most of the pregnant women were aware of gestational diabetes mellitus basically through health education given by healthcare professionals. They identified that some risk factors for the development of GDM included family history and a previous history of the condition; conversely many of them disagreed with having three or more children as a risk factor. Many of the respondents however, remained undecided about maternal age of more than 30 years being a risk factor. Pregnant women with higher level of education were more aware of the risk factors associated with GDM and possibly, its management and outcomes. However, pregnant women with higher parity had inadequate knowledge of GDM probably due to illiteracy and poverty. The study pointed out that pregnant woman who had higher levels of education had higher levels of knowledge on GDM.

Conflict of Interest

There was no conflict of interest during the conduct and reporting of this study.

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