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Association Between Knowledge, Attitude and Practice on Gestational Diabetes Mellitus among Antenatal Women in Community Health Clinics in Selangor

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Abstract
Increasing prevalence of Gestational Diabetes Mellitus (GDM) in community was alarming public health issue. Study aim was to identify relationship between knowledge, attitude and practice of antenatal women towards GDM. Knowledge, attitude and practice mean score was 80 ± 1.383, 38.9 ± 5.216 and 23.511 ± 2.511, respectively. There also an association between level of knowledge with level of attitude with *p-value* < 0.005 and in 1 point increase in knowledge corresponds to increase 0.059 in practice and 1 point increase in attitude corresponds to increase 0.088 in practice and strong relationship between level of practice with level of attitude.

Keywords: Knowledge; Attitude; Practice and Gestational Diabetes Mellitus

1.0 Introduction

Every married woman wishes to conceive soon after married and expecting an uneventful process of pregnancy and labour. However, the pregnant mother is often at risk of a medical condition such as Gestational Diabetes Mellitus (GDM). The incidence of GDM in Malaysia was reported as 8.66% in 2011 and was increased to 8.83% in 2012, where GDM rates were higher from pre-existing Diabetes in both years (Jeganathan & Karalasingam,2012). Logakodie et al. (2017) had stated that in Selangor, the prevalence of GDM among new registered antenatal women was 27.9% from the total of 184 in January 2014 and slightly higher than the study before. In Gombak district, statistics from Gombak Health District by Monthly Census of Antenatal Booking & Monthly Prevalence of GDM had reported that about 1892 from 12921 registered antenatal women were diagnosed with GDM in 2017, which represented 14.64% and it was dramatically increased to 16.14% only from January to July 2018, and this was an alarming phenomenon in public health because GDM will increase the risk to Diabetes Mellitus (DM) in later life.

1.1 Gestational Diabetes Mellitus
Gestational Diabetes Mellitus (GDM), or Diabetes in pregnancy, is defined as glucose intolerance with the first recognition during pregnancy (American Diabetes Association,2014). Herath, Herath & Wickremasinghe (2017) had found that pregnant women with GDM have a higher risk of developing Type 2 Diabetes Mellitus (T2DM) in later life by tenfold. World Health Organization (WHO) (2016) had estimated that about 422 million adults in the world were living with Diabetes in 2014 if compared to only 108 million in 1980, and this

statistic will be assumed to be increased more than 592 million in less than 25 years (International Diabetic Federations,2016) and in 2030, there will be double projection deaths from the complication of T2DM (WHO,2017).

2.0 Literature Review

2.1 Knowledge of Gestational Diabetes Mellitus
Most of the pregnant women who had a recurrence of GDM in their pregnancy assumed that GDM only occurs during pregnancy and will be resolved once the baby has been delivered, and this showed that their level of knowledge regarding GDM was low. This statement has been proved by a study of Islam et al. (2017) to 107 obese pregnant women and found that more than half of total respondents have a poor level of knowledge on GDM, representing 60.7%. Similar findings were found in the study by Ogu et al. (2019) to 2595 women with reproductive age between 16 to 49 years old where the overall knowledge score for GDM was 26.2% with knowledge score about GDM and risk factors was 28.8%, knowledge score for screening and treatment was 35.8% and knowledge score for complications of GDM was 30.4%. Another study done by Carolan, Steele & Margetts (2010) in exploring knowledge about gestational diabetes (GDM) among multi-ethnic women in Melbourne, Australia, who were receiving antenatal care in their health setting had found that statistically significant difference in the knowledge of GDM regarding the effect of GDM to baby and care needed during pregnancy with p-value 0.008 and 0.03 respectively.

In contrast, a study by Hussain et al. (2015) done in one of the states in Malaysia to evaluate the knowledge about GDM and its corresponding relation with glycaemic level had found that 76.6% had adequate knowledge regarding GDM with diet values domain was the highest mean score.

2.2 Attitude on Gestational Diabetes Mellitus
A study by Islam et al. (2015) had found that only 23.3% had a positive attitude towards GDM control and investigation, and the respondents also expressed positive responses for the GDM education program. This finding is also similar to Carolan et al. (2010) stated that women from non-Caucasian ethnicities had low attitudes about the risk of poorer self-management of gestational diabetes. Other studies by Hussain et al. (2015) also found similar findings where only 35 participants out of 175 participants had a positive attitude towards GDM and 73.5% of participants had adequately satisfied with the treatment and result also found that higher mean glycaemic level among patients with a negative attitude and inadequate treatment satisfaction.

2.3 Practice on Gestational Diabetes Mellitus
A study by Utz et al. (2017) done to health care providers regarding knowledge and practice related to GDM findings showed that public health care providers only have basic knowledge and practice related to the fundamental understanding of GDM where makes them refer cases to a specialist for management which represented 88.5%. Muche, Olayemi & Gete (2019) had found that out of 1027 pregnant women, only 33.4% have normal glucose levels and 17.6% from that among women with high physical activity levels. Yizukanji and Mwanakasale (2018) had surveyed 208 pregnant women attending antenatal clinics in Mufulira Town in Zimbabwe had found that more than half of the total respondents (56.8%) had a fair practice score towards GDM with a mean score was 2.62 ± 0.84. The previous study shows that most antenatal women had low and fair practices towards GDM.

3.0 Methodology

3.1 Study design, study setting and population
This study was a cross-sectional survey done in selected public community health clinics in the Gombak area. The target population in this study were pregnant women with GDM who came to Maternal Child Health (MCH) unit for their antenatal appointment from 2nd April 2019 until 30th April 2019.

3.2 Sampling method and sample
The total population in this study was 1475 antenatal women with GDM from six selected clinics under Gombak Health District. Based on the Raosoft sample size calculation, which allows 95% of confidence level and 5% of margin error, the sample needed in this study was 305 respondents. After adding with 20% of attrition rate, the sample needed was 366 respondents with the distribution of each clinic was based from their total antenatal woman with GDM which later make up to 100% from sample needed.

Sample in this study was selected according to the inclusion criteria, which were an antenatal woman with GDM, multigravida, age more than 18 years old and willing to participate in the study meanwhile the exclusion criteria were primigravida, pseudo-primigravida, antenatal women with pre-existing Type 2 Diabetes Mellitus and illiterate in Malay or and English.

3.3 Research instruments
A self-administered questionnaire was used in this study, and it was provided in bilingual English and Malay. The questionnaire was derived based on a previous study by Herath et al. (2017) and Bhavadharini et al. (2017). The written permission to use the instrument was sought and granted via email from the author. The detail of the instrument had been modified and adjusted according to the culture and belief of the Malaysian context, and one independent translator did the forward translation with a background of medical and one independent translator for back-translation. The questionnaire consisted of four sections: section A for sociodemographic data, section B for knowledge towards GDM, section C was an attitude towards GDM and section D was practice towards GDM.

3.4 Reliability and validity
Validity of the instruments had been sought from 6 experts of panels, and a content validity index was calculated. Reliability for the instrument was done with the Cronbach Coefficient Alpha test as most of the questions used a scaled item with a value of 0.714, and a pilot study was conducted to 10% of the total respondents who met the inclusion criteria at the setting area, which was 40 respondents as to test the study instrument.

3.5 Data collection
The researcher did data collection with the help of a data collector who was the nurse in charge of respondents. The researcher was at the study area every day from 2nd April 2019 to 30th April 2019, and respondents were randomly selected at the study setting area who met the inclusion criteria. First, respondents were approached to participate in the study, and who were willing to take part, a consent form was given prior to answering the questionnaire. Next, the researcher gave a set of self-administered questionnaires for respondents to answer, and it took about 15 to 20 minutes to answer. The respondents were also instructed to enclose it in the envelope provided and then put it in the box that the researcher prepared to maintain confidentiality.

3.6 Data analysis
Data were analyzed using Statistical Package for Social Science (SPSS) version 23, and coding was assigned to each variable in the questionnaire accordingly. All data was sorted, organized and arranged according to the identification number, which was tagged at the left upper side of each set of questionnaires and was done to avoid double entering of the data and more accessible to make a quick reference if needed.

Cleaning data was done prior to analysis to ensure all variables were valid and useable value by using 'eye balling', and it was done frequently for every variable. The frequency was checked for valid values and a large amount of missing data. Descriptive analysis was done for the frequency, percentage, mean and standard deviation for age, ethnicity, marital status, academic qualification, occupation and history of GDM. An inferential statistic used was Chi-square with Fisher's Exact test and logistic regression. A Chi-square test was used to answer the research question to determine the association between sociodemographic characteristics with the level of knowledge, level of attitude, and level of practice among antenatal women with GDM. Meanwhile, Chi-Square with Fisher's Exact test was used to answer research regarding the relationship between knowledge and attitude, knowledge and practice and attitude with practice among antenatal women with GDM and logistic regression was used to answer the research question in predicting probability between the level of practice with level of knowledge and level of attitude as level of practice of GDM was the independent variable.

4.0 Findings

4.1 Response rate and test for normality
The response rate for this study was 98.9% out of 366 eligible antenatal women with GDM, as four questionnaires were missing during the data collection period. Test for normality was done using the Kolmogorov-Smirnov test resulting in a significant difference in the data with a *p-value* of 0.01 for total knowledge, total attitude and total practice, which shows that the data was not normally distributed hence rejecting the null hypothesis.

4.2 Demographic characteristics
The mean age for respondents was 31.94 ± 4.88 years with the maximum age, and minimum age of respondents was 45 years old and 22 years old respectively and more than half of the total respondents, which represented 71.8%, were between the age group of below 35 years old with Malay ethnicity was the highest which represented 84.4% followed by Indian 6.4%, Chinese ethnicity 5.2% and 3.6% were from others ethnicity. In addition, 99.2% of total respondents were married women and none of the respondents was a widow in this study. Findings in this study also showed that more than half of respondents had higher educational level which started from Diploma level to Doctor of Philosophy (PhD), which indicates 56.3% and 36.2% of total respondents worked in the private sector, housewives 35.6%, 22.4% worked as a government servant, and only 5.5% had owned a business. Table 1 summarizes the demographic characteristics of respondents in this study with frequency, percentage, mean and standard deviation.

Table 1: Demographic characteristics of respondents participating in the study

Variable	Frequency (%)	Mean ± SD
Age Group		
< 35 years	260 (71.8)	(31.94, 4.88)
≥ 35 years	102 (28.2)	
Ethnicity		
Malay	307 (84.4)	
Chinese	19 (5.2)	
Indian	23 (6.4)	
Others	13 (3.6)	
Marital Status		
Single	3 (0.8)	
Married	359 (99.2)	
Highest education level		
Primary Education	6 (1.6)	
Secondary Education	156 (42)	
Tertiary Education	204 (56.3)	
Occupation		
Unemployed	130 (35.9)	
Employed	212 (58.6)	
Owned Business	20 (5.5)	
History of GDM		
Yes	131 (36.2)	
No	231 (63.8)	

4.3 Level of knowledge, attitude and practice

Level of knowledge, attitude and practice on GDM among respondents was classified into three levels which were low level, moderate level and high level for knowledge and attitude and poor, moderate and good for practice on GDM with the cut-off point was according to Bloom's cut-off point (60-80%). According to Koo, Poh & Ruzita (2015), cited from Bloom (1956) had scored the level of knowledge, attitude and practice (KAP) with three levels where the low level was less than 60% of the total score, moderate was between 60% to 80% of the total score and the high level was between 80% to 100%.

Findings from this study showed that the mean score for total knowledge was 8.80 ± 1.383 with a ranging from 2 to 10 meanwhile, the minimum score that respondents get in this knowledge section was two score which represented 0.3% of total respondents and 38.4% had full marks on total score of knowledge on GDM and most of the total respondents had a high level of knowledge on GDM which represented 87.6% moderate level with 8.3% and low level of knowledge with 6.1%

For attitude, findings showed that most of respondents had total score of 40 which represented 15.5% (n=56) followed by 38 and 39 score which represented 11.3% (n=41) and 10.5% (n=38) respectively. A total score of 20, 21, 25 and 28 is the lowest score in total attitude which represented 0.3% (n=1) and result also showed that most of the respondents were moderate level of attitude which represented 49.5% (n=179).

Total score for the practice section was calculated by summing up all the scores with the maximum score of attitude section was 30 marks meanwhile the minimum score was 10. Findings from this study showed that the mean score for total attitude was 23.51 ± 2.51 with the highest score was 30 and the lowest score was 14 and only 0.3% (n=1) of respondents had high score and more than half of total respondents had good practice towards GDM which represented 54.1% (n=196) and only 1.4% (n=5) had poor practice towards GDM.

4.4 Association between sociodemographic and level of knowledge, level of attitude and level of practice

Chi-Square test with Fisher's Exact test was used in this study as one cell has an expected count less than five. Findings showed that factors significantly associated with the respondent level of knowledge with *p-value* 0.042 were marital status, educational level with *p-value* 0.006 and occupation of respondents with *p-value* 0.020. Meanwhile, for the association between level of attitude and level of practice with sociodemographic characteristics, only educational level was statistically significant with *p-value* 0.001 for level of attitude and 0.011 for level of practice.

4.5 Relationship between level of knowledge and level of attitude, level of knowledge with level of practice and level of attitude with level of practice

Researcher was used Fisher's Exact test following Chi-square test to analyze the association between level of knowledge with level of attitude, level of knowledge with level of practice and level of attitude with level of practice. Finding of the study showed that there is an association between level of knowledge with level of attitude with *p-value* 0.001 thus rejecting the null hypothesis meanwhile for level of knowledge with level of practice and level of attitude with level of practice, the *p-value* was >0.05, therefore, the null hypothesis was accepted. Table 2 summarize the findings

Table 2: Relationship between level of knowledge with level of attitude, level of knowledge with level of practice, level of attitude with level of practice on GDM

		Level of Knowledge	Level of Attitude	Level of Practice
Level of Knowledge	Fisher's Exact Test		0.000*	
Level of Attitude	Fisher's Exact Test			0.099
Level of Practice	Fisher's Exact Test	0.062		

* Exact Sig.(2 sided) at *p-value* <0.05

4.6 Regression between level of practice with level of knowledge and level of attitude

Logistic regression used to determine the prediction for the probability of practice among respondents whether it has an association between level of knowledge and level of attitude of the respondents and this study had found that, in one-point increase in knowledge of respondents was corresponds to an increase the practice of 0.059 meanwhile in one-point increase on attitude was corresponds to increase to 0.088 on practice. For level of knowledge, the standard error for unstandardized beta (*SE B*) was 0.060 for level of knowledge and 0.051 for level of attitude which indicates that there is a significant level of knowledge and attitude with the level of practice.

There is a positive relationship between level of attitude with level of practice and level of knowledge with level of practice but it only had a strong relationship between level of practice and level of attitude. Even though there is a positive relationship, but *p-value* for both levels of knowledge and level of attitude does not show any statistical significance as the *p-value* >0.05 indicates that level of knowledge and level of attitude is not a significant predictor for level of practice of respondents related to GDM.

5.0 Discussion

This was the first study done in Malaysia related to KAP of GDM where most of the previous study was only focused on Type 2 Diabetes but only 1 study had done by Universiti Sains Malaysia (USM) on exploring the knowledge rather than attitude and practice. This study found that only educational level was statistically associated with the KAP level of GDM. This was similar to a study by Bhowmik et.al (2018) stated that educational level until university was one of the factors to have good knowledge on GDM.

Findings also showed that level of knowledge was high among respondents and this was inconsistent with studies by Sriraam et.al (2013) and Bhavadharini et.al (2017) where their study findings showed level of knowledge on GDM was low among their respondents. For the level of attitude on GDM among respondents, this study had found that near half of the respondents had a moderate level of attitude on GDM and this was similar with Islam et.al (2017) most of their total respondents had a positive attitude regarding control of GDM, investigation and had positive responses for GDM education program. This was in contrast with the study by Hussain et.al (2014) on the study to evaluate knowledge, attitude, and treatment satisfaction of GDM towards their disease, which resulted in more than half of their total respondents having a negative attitude towards GDM.

Most of the respondents in this study had good practice on GDM with the highest score are related to prevent complications such as monitoring baby's movement, planning for contraception method and related to dietary intake of GDM. However, a study by Adznam, Sedek & Kasim (2018) on study related to knowledge, attitude and practice regarding anemia among pregnant women in Putrajaya had found that the mean score for total practice was 69.9 ± 13.1 for practice score which was low if compared to mean score for knowledge which was considered as high with mean score of 84.2.

Educational level was found statistically significant with level of knowledge, attitude, and level of practice with *p-value* of less than 0.05. This was similar to a study by Bhowmik et al. (2018) found that, age below 30 years old, a high-income group, level of education until university, health professional and had a family history of Diabetes was found statistically significant with good knowledge score. There is a relationship between level of knowledge with level of attitude, level of knowledge with level of practice, and a relationship between level of attitude and level of practice where the *p-value* is less than 0.05. Yizukanji and Mwanakasale (2018) with their study aim to establish awareness, level of knowledge, attitude and practice among pregnant women attending antenatal care had found similarities with these study findings where findings showed that knowledge and attitude able to indicate good practice towards GDM. However, even though the knowledge is there, but the attitude and practice were still not so good. Logistic regression analysis found that the level of knowledge and attitude of a

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respondent could not be the predictor to have good practice on GDM among respondents. Therefore, future researchers need to see what need to do to change the attitude of a person, thus changing the practice of respondents towards GDM.

6.0 Conclusion and Recommendations

Findings from this study indicate that knowledge only can't be a predictor to increase awareness of the public regarding GDM. Even antenatal women understood the impact of GDM on them and their fetuses, they still not practice every knowledge they had in their daily life especially in preventing complications caused by GDM. Future research needs to be carried out in order to explore the practice and attitude of antenatal women regarding GDM as this not only can cause harm to them and the fetus but also increase their chances to get non-communicable diseases such as Diabetes Mellitus in later life.

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