

Gestational diabetes mellitus: Pilot study on patient's related aspects

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ABSTRACT

Objective: Gestational diabetes mellitus (GDM) is a common complication during pregnancy and if not managed properly, it can lead to many harmful effects on mother or fetus/baby. Management of GDM largely depends on patient's thoughts, perception and understanding of disease. This study was conducted to evaluate the knowledge, attitude, and treatment satisfaction of GDM patients toward their disease.

Methods: This was a descriptive cross-sectional study conducted during the period of month July 2013 at Penang General Hospital, Penang, Malaysia. The sample consists of 30 established patients of GDM who were diagnosed at least 1 month prior to enrolment. Data were collected by means of self-designed Gestational Diabetes Mellitus Knowledge Questionnaire, modified version of Diabetes Integration Scale (ATT-19) and Diabetes Treatment Satisfaction Questionnaire. Descriptive analysis was used for data elaboration by using SPSS 20.

Results: The results showed that of 30 patients, 23 patients (76.6%) had adequate knowledge. Only, 7 (23.3%) patients had inadequate knowledge. For attitude, 23 (76.66%) of patients had a negative attitude toward disease and only 7 (23.3%) had a positive attitude. In terms of satisfaction, 25 (83.33%) patients were satisfied with the given treatment and 5 (16.66%) were unsatisfied.

Conclusion: We conclude that although participants obtained good score on knowledge and treatment satisfaction, their attitude did not change so as to more effectively cope with their disease.

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as the "degree of carbohydrate intolerance with onset or recognized first time during pregnancy."^[1] Age of mother, socioeconomic status, and ethnicity are key correlates of GDM.^[2] The prevalence of GDM in UK was 5%.^[3] Moreover GDM complicated about 4-14% pregnancies in USA.^[4] The trend of GDM also increased markedly in Southeast Asian countries during the

last two decades.^[5] A study reported prevalence of GDM in Malaysia was 18.3%.^[6] According to national obstetrics registry, Malaysia report of 2009, prevalence of GDM is 11.1% in Malaysia.^[7]

Uncontrolled GDM has severe maternal and neonatal outcomes. Maternal outcomes are miscarriages, cesarean section, increase in weight, and risk of type 2 diabetes mellitus increased in future life.^[4] Neonatal adverse events include macrosomia, neonatal hypoglycemia, respiratory disorders, elevated number of red blood cells, lower levels of calcium in neonate, jaundice, still birth, and even neonatal death.^[8]

Appropriate knowledge and positive attitude with reference to disease, is highly related to prevent the complications of disease by proper management of disease, which permits people to live better with their

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diseased condition.^[9-11] Health care professionals' strategies and abilities can influence positive behavioral changes in diabetic patients so as to adhere to diet, exercise, and blood glucose monitoring, which results in adequate metabolic control.^[12] The importance of studying treatment satisfaction is well-established because greater satisfaction is related to a higher degree of compliance, lower blood sugar level, and lower body weight suggested that higher treatment satisfaction is related to better clinical outcomes.^[13,14]

Based on extensive literature review and best to authors knowledge no study has been reported in Malaysia on GDM patients' related aspects. This study was aimed to evaluate knowledge and attitude of GDM patients toward their disease and extent of their treatment satisfaction with given treatment.

METHODS

A cross-sectional, descriptive study was conducted in Maternity Clinic of Penang General Hospital, Pulau Pinang, Malaysia during the month of July and August 2013. This center was selected as study place because this is the largest tertiary care hospital in terms of multi professional team and the large turnout of patients in this hospital. This study was conducted to check the reliability of questionnaires and to evaluate the initial pattern of patient related aspects. Thirty established GDM patient were enrolled in this study who were diagnosed 1 month prior to enrolment.

The inclusion criteria were: Patients at least 18 years of age, established patients of GDM who can speak, read and understand Malay language. The exclusion criteria were: Patients <18 years of age, patients with severe comorbidities like HIV, patients who didn't sign the patient consent form, patients who didn't understand Malay.

Ethical issues

Local approval was taken from Clinical Research Registry of Penang General Hospital. Central approvals were also taken from National Institute of Health and Medical Research and Ethical Committee, Malaysia to conduct this study.

Data collection

Three different questionnaires were used for data collection. To evaluate the knowledge self-designed questionnaires; Gestational Diabetes Mellitus Knowledge Questionnaire (GDMKQ) was used. For assessment of attitude modified form of Diabetes

Integration Scale (ATT-19) was used. To measure the extent of treatment satisfaction, Diabetes Treatment Satisfaction Questionnaire (DTSQs) was used.

Gestational Diabetes Mellitus Knowledge Questionnaire was originally prepared in English by researchers after an extensive literature review and using some general guidelines of diabetes knowledge questionnaire (DKN-A).^[15] It was validated by the team of experts including three physicians, three pharmacist, two staff members of school of pharmacy, two PhD candidates from discipline of clinical and social pharmacy and two patients whose minimum educational level is maters or equivalent degree and also proficient in English. Then, it was translated to Malay language by two translators who are native speakers of Malay and proficient in English. These two versions were evaluated by one of the researcher who is Malay and compared these two with the original one. This questionnaire was then back translated from Malay to English by the person who hasn't seen the first version in English, to ensure that essential meanings of items remain preserved during translation. Shortcomings were resolved in a consensus meeting between researchers and translation experts and a final version ready for administration was prepared. After the pilot study the reliability was checked. The internal consistency of GDMKQ was Cronbach's alpha 0.774. Subsequently, 5 doctors from Department of Obstetrics and Gynecology who were experts in field judged the face and content validity.

Diabetes Integration Scale ATT-19 is a 19 item scale taken from the handbook of psychology and diabetes of Bradley.^[16] ATT-19 was modified by the research team for this study to make it more specific for GDM patients as there is no GDM specific attitude scale available. In this scale, word diabetes was replaced by GDM where appropriate. In question no. 13 the statement "over a long period" was replaced with "during pregnancy." Then ATT-19 was translated to Malay language by two translators who are indigenous speakers of Malay and proficient in English. These two versions were evaluated by one of the researcher who is Malay and compared these two with the original one. Questionnaire was then back translated from Malay to English by the person who hasn't seen the first version in English to make certain that critical meanings of items were conserved during translation. Inconsistencies were determined in a consensus meeting between researchers and translation experts and a final version was prepared. At the end of the pilot study, reliability was evaluated. The internal

consistency for modified version of ATT-19 was Corbach's alpha 0.833. Simultaneously, 5 doctors from Department of Obstetrics and Gynecology who were experts in field checked the face and content validity.

As the originality of these two questionnaires was stabilized, the final versions were reviewed and approved by researchers.

Diabetes Treatment Satisfaction Questionnaire (DTSQc) was developed by Bradley.^[17] and was already available in Malay version. The internal consistency of Malay version of DTSQc was Cronbach's alpha 0.775.

In addition to these questionnaires a data collection form was also used to collect sociodemographic data that include age, ethnicity, body mass index (BMI), gravida, smoking habit, alcoholic habit, professional status, educational level, family history of diabetes, GDM history, GDM diagnosis time, type of treatment, metabolic control, and history of cesarean section.

Assessment of knowledge

Gestational Diabetes Mellitus Knowledge Questionnaire comprised of 15 items, include questions about basic knowledge of GDM, its risk factors, diet and food values, treatment and management, complications, and outcomes. Each question has 4 options and there is one right answer. Score 1 was given to every right answer and score 0 was given to every wrong answer. Scoring range for GDMKQ was minimum 0 to maximum 15. A cut off level of score ≤ 8 ($<60\%$) was considered to be inadequate knowledge while score >8 ($\geq 60\%$) depicts adequate knowledge about GDM. Knowledge score for individuals were calculated and summed up to give the total knowledge score.

Evaluation of attitude

ATT-19 consisted of 19 items. It was designed to meet the need to evaluate the disease's psychological and emotional aspects. The 19 items questionnaire covers six factors: Stress associated with GDM, receptivity of treatment, trust in treatment, personal efficacy, and perception of health and social acceptance. Each answer is measured by 5-point Likert item (score 1 to totally disagree - score 5 to totally agree). Question 11, 15 and 18 has inverse scores. Total score varies from 19-95. Patients who scored low on ATT-19 scale were considered as angry, mortified, uneasy, helpless, lonely, and poorly adjusted to diabetes while those having higher scores were accepting their disease is calm, and have a sense of self-control. Cut-off level of

70 was used. Patients scored above 70 had a positive attitude and lower than 70 had a negative attitude toward diabetes. Attitude score for individuals were calculated and summed up to give the total attitude score.

Extent of treatment satisfaction

Diabetes Treatment Satisfaction Questionnaire contained 8 items. Item 1 and item 4-8 related to various aspects of diabetes treatment satisfaction. The level of satisfaction rated from 0 to 6, while higher scores indicate a greater degree of satisfaction. Total score of these 6 items is minimum 0 and maximum 36. A cut-off level of 0-21 ($<60\%$) were considered as unsatisfied, while score 22 ($\geq 60\%$) or higher depicts satisfaction. Satisfaction score of all 6 items were added up to give total satisfaction score. Item 2 and item 3 in DTSQc measures perceived frequency of hyperglycemia and hypoglycemia respectively. Both items rated from 0 (none of time) to 6 (most of the times).

Data analysis

Descriptive statistics were applied to compute demographic characteristics of patients. All analyses were performed by using SPSS version 20 (IBM). Mean values were used to represent the results of knowledge, attitude, and treatment satisfaction.

RESULTS

Patients demographics

The demographic characteristics of study patients are presented in Table 1, including frequency distribution of study patients and disease related data. The mean age of patients was 32.93 ± 3.57 years. The mean BMI was 30.90 ± 5.83 .

Knowledge scores

Table 2 describes the responses of patients to GDMKQ in descending order. The GDMKQ score ranged between 0 and 15. Over all mean score was 10.76 ± 3.16 . Out of 30 patients 7 (23.33%) had inadequate knowledge, whereas 23 (76.6%) had adequate knowledge about GDM. Poor knowledge was apparent in responses to question 3 (46.6%) that inquired about the best method of blood glucose monitoring and question 5 that were related to risk factor (36.7%). Patients showed the sufficient knowledge about diet or food values where correct answers to these questions were 80.0%, 80.0%, and 96.7% for question 7, 8 and 9. Knowledge was also good related to complications and outcomes (question 13, 14 and 15). Correct answers in response to these questions were 80.0%, 80.0%, and 76.6% respectively.

Table 1: Characteristics of study respondents (n=30)

| Characteristics | Frequency | Percentage |
|--|-----------|------------|
| Body mass index* (30.90±5.83) | | |
| Normal | 6 | 20.0 |
| Overweight | 13 | 43.3 |
| Obese | 11 | 36.7 |
| Age (32.93±3.57) (years) | | |
| 18-25 | 0 | 0 |
| 25-29 | 4 | 13.3 |
| 30-34 | 16 | 53.3 |
| 35 or above | 10 | 33.3 |
| Ethnicity | | |
| Malay | 20 | 66.7 |
| Chinese | 6 | 20.0 |
| Indian | 3 | 10.0 |
| Others | 1 | 3.3 |
| Gravida | | |
| First pregnancy | 10 | 33.3 |
| One to three children | 11 | 36.7 |
| More than three children | 9 | 30.0 |
| Smoking history | | |
| Current smoker | 4 | 13.3 |
| Nonsmoker | 26 | 86.7 |
| Alcohol habit | | |
| Ex-alcoholic | 3 | 10.0 |
| Current alcoholic | 3 | 10.0 |
| Nonalcoholic | 24 | 80.0 |
| Occupational status | | |
| Working women | 26 | 86.7 |
| House wife | 4 | 13.3 |
| Educational level | | |
| Secondary or lower | 12 | 40.0 |
| Diploma | 17 | 56.7 |
| Degree | 1 | 3.3 |
| Family history of diabetes | | |
| No family history | 8 | 26.7 |
| Father is/was diabetic | 8 | 26.7 |
| Mother is/was diabetic | 7 | 23.3 |
| Both father and mother are/were diabetic | 7 | 23.3 |
| GDM history | | |
| GDM in previous pregnancy/pregnancies | 10 | 33.3 |
| No GDM in previous pregnancy/pregnancies | 20 | 66.7 |
| GDM diagnosed | | |
| During first trimester | 9 | 30.0 |
| During second trimester | 13 | 43.3 |
| During third trimester | 8 | 26.7 |
| Type of treatment | | |
| Diet control | 25 | 83.3 |
| Insulin | 5 | 16.7 |
| Oral hypoglycaemic agents | 0 | 0 |
| History of LSCS | | |
| Yes | 8 | 26.7 |
| No | 22 | 73.7 |

*Weight was taken from the patient profile at her first antenatal visit.
LSCS=Lower segment caesarean section, GDM=Gestational diabetes mellitus

Knowledge was assessed by giving 1 to the right answer and 0 to the wrong answer. The scale

Table 2: Responses to GDM knowledge questions

| GDM knowledge item (%) | True (%) | False (%) |
|--|----------|-----------|
| Basic knowledge about GDM | | |
| Q1. | 66.7 | 33.3 |
| Q2. | 80.0 | 20.0 |
| Q3. | 46.7 | 53.3 |
| Knowledge about risk factors | | |
| Q4. | 76.7 | 23.3 |
| Q5. | 36.7 | 63.3 |
| Q6. | 86.7 | 13.3 |
| Knowledge about diet/food values | | |
| Q7. | 80.0 | 20.0 |
| Q8. | 80.0 | 20.0 |
| Q9. | 96.7 | 3.3 |
| Knowledge about treatment and management | | |
| Q10. | 56.7 | 43.3 |
| Q11. | 63.3 | 36.7 |
| Q12. | 70.0 | 30.0 |
| Knowledge about complications | | |
| Q13. | 80.0 | 20.0 |
| Q14. | 80.0 | 20.0 |
| Q15. | 76.7 | 23.3 |

Knowledge was assessed by giving 1 to right answer and 0 to wrong answer. The scale measured knowledge from minimum score 0 to maximum score 15. Scores ≤8 were considered as inadequate knowledge while score <8 means adequate knowledge. GDM=Gestational diabetes mellitus

measured knowledge from minimum score 0 to the maximum score 15. Scores ≤8 were considered as inadequate knowledge, while score <8 means adequate knowledge.

Attitude scores

The responses of patients to modified ATT-19 scale are provided in Table 3. Total score ranged from 19-95 with overall mean score was 56.93 ± 11.16. Of a total of 30 patients, 7 (23.3%) showed a positive attitude and 23 patients (76.66%) had a negative attitude toward GDM.

Attitude was assessed by using 5-point Likert scale. 1 was given to strongly disagree and 5 were given to strongly agree. Scores are reversed for questions 11, 15, and 18. Score ranges from 19-95. Score >70 shows a positive attitude. Mean attitude score was 56.93 ± 11.16

Treatment satisfaction score

Table 4 shows the response of patients toward DTSQc. Total score ranged from 0 to 36 with overall mean score of 27.86 ± 5.77. Of 30 patients, 25 (83.33%) were satisfied with their treatment, while 5 (16.66%) were unsatisfied. The means score for item 2 and 3, which were related to perceive frequency of hyperglycemia and hypoglycemia was 3.66 ± 1.62 for both questions.

Satisfaction was assessed by using 7-point Likert scale. Score 6 was given to very satisfied, 5 to Satisfied, 4 to slightly satisfied, 3 to neutral, 2 to slightly dissatisfied, 1 to dissatisfied and 0 to very dissatisfied. Score ranges from 0 to 46. Score 0-21 considered as unsatisfied, score 22 or above shows satisfaction. Mean Satisfaction score was 27.86 ± 5.77 .

DISCUSSION

GDM is one of the common complications present during pregnancy with numerous destructive effects on mother and fetus/baby. Its prevalence is quite high in Malaysia because Asian women are increased risk of developing GDM.^[18]

This study explored the patient related aspects in GDM. Although, the patients knowledge was

sufficient but their attitude towards disease was negative. Extent of treatment satisfaction with the given treatment was also adequate.

There were very few studies reported in which knowledge and attitude in GDM patients were evaluated.^[19] Based on extensive literature review and best to our knowledge there is only one study conducted in Australia to access the knowledge and attitude of GDM patients by Carolan *et al.*^[19,20] In this study, modified form of diabetes knowledge questionnaire DKN-A was used for knowledge assessment and for evaluation of attitude; diabetes attitude scale DAS-3 was used. Results suggested that the majority of people from different ethnicities had appropriate knowledge, but they had a negative attitude toward GDM. These results are consistent with our findings. There was a study conducted in India to access the knowledge regarding GDM in all the women attending antenatal clinic.^[21] Our findings corroborated the results of that study, but the main drawback in this study was that all pregnant ladies irrespective of that they were suffering with GDM or not were enrolled in that study.

Another study investigated knowledge and attitude among 82 adult diabetic type 2 patients. In this study, DKN-A was used for knowledge and ATT-19 was used for attitude evaluation. This study concluded that patients obtained a good score on knowledge but their attitude was negative towards disease. These results are consistent with findings of this study.^[22]

The results of this study are consistent in terms of attitude with other three studies conducted in Brazil, India and Scotland on type 2 diabetic patients but conflicting in terms of knowledge; as the majority of patients enrolled in these studies were illiterate and old aged patients therefore in all these studies knowledge of patients was also poor.^[23-25] While in

Table 3: Responses to GDM attitude items

| GDM attitude item | Strongly disagree (%) | Disagree (%) | Neutral (%) | Agree (%) | Strongly agree (%) |
|-------------------|-----------------------|--------------|-------------|-----------|--------------------|
| Item no. 1 | 16.7 | 13.3 | 20.0 | 36.7 | 13.3 |
| Item no. 2 | 13.3 | 23.3 | 16.7 | 36.7 | 10.0 |
| Item no. 3 | 6.7 | 26.7 | 16.7 | 36.7 | 13.3 |
| Item no. 4 | 13.3 | 13.3 | 16.7 | 43.3 | 13.3 |
| Item no. 5 | 10.0 | 33.3 | 20.0 | 33.3 | 3.3 |
| Item no. 6 | 16.7 | 33.3 | 6.7 | 23.3 | 20.0 |
| Item no. 7 | 13.3 | 33.3 | 13.3 | 30.0 | 10.0 |
| Item no. 8 | 3.3 | 20.0 | 10.0 | 43.3 | 23.3 |
| Item no. 9 | 6.7 | 36.7 | 23.3 | 26.7 | 6.7 |
| Item no. 10 | 6.7 | 26.7 | 20.0 | 36.7 | 10.0 |
| Item no. 11 | 0 | 23.3 | 23.3 | 40.0 | 13.3 |
| Item no. 12 | 6.7 | 13.3 | 16.7 | 43.3 | 20.0 |
| Item no. 13 | 6.7 | 33.3 | 23.3 | 30.0 | 6.7 |
| Item no. 14 | 3.3 | 26.7 | 26.7 | 33.3 | 10.0 |
| Item no. 15 | 0 | 13.3 | 10.0 | 63.3 | 13.3 |
| Item no. 16 | 13.3 | 33.3 | 13.3 | 30.0 | 3.3 |
| Item no. 17 | 10.0 | 33.3 | 30.0 | 16.7 | 10.0 |
| Item no. 18 | 10.0 | 16.7 | 13.3 | 56.7 | 3.3 |
| Item no. 19 | 13.3 | 36.7 | 26.7 | 10.0 | 13.3 |

Attitude was assessed by using 5-point Likert scale. 1 was given to strongly disagree and 5 were given to strongly agree. Scores are reversed for questions 11, 15 and 18. Score ranges from 19 to 95. Score >70 shows positive attitude. Mean attitude score was 56.93 ± 11.16 . GDM=Gestational diabetes mellitus

Table 4: Responses to DTSQs scale

| Diabetes treatment satisfaction item | Very satisfied (%) | Satisfied (%) | Slightly satisfied (%) | Neutral (%) | Slightly dissatisfied (%) | Dissatisfied (%) | Very dissatisfied (%) |
|--------------------------------------|--------------------|---------------|------------------------|-------------|---------------------------|------------------|-----------------------|
| Item no. 1 | 33.3 | 43.3 | 13.3 | 6.7 | 3.3 | 0 | 0 |
| Item no. 4 | 20.0 | 36.7 | 16.7 | 20.0 | 3.3 | 3.3 | 0 |
| Item no. 5 | 20.0 | 40.0 | 13.3 | 16.7 | 6.7 | 3.3 | 0 |
| Item no. 6 | 13.3 | 36.7 | 33.3 | 6.7 | 3.3 | 3.3 | 3.3 |
| Item no. 7 | 40.0 | 40.0 | 10.0 | 10.0 | 0 | 0 | 0 |
| Item no. 8 | 36.7 | 30.0 | 16.7 | 10.0 | 3.3 | 3.3 | 0 |

Satisfaction was assessed by using 7-point Likert scale. Score 6 was given to very satisfied, 5 to satisfied, 4 to slightly satisfied, 3 to neutral, 2 to slightly dissatisfied, 1 to dissatisfied and 0 to very dissatisfied. Score ranges from 0-36. Score 0-21 considered as unsatisfied, score 22 or above shows satisfaction. Mean Satisfaction score was 27.86 ± 5.77 . DTSQs=Diabetes treatment satisfaction questionnaire

this study, 18 (60%) of participants had an educational level above secondary school and belonged to the middle age group as the mean age of respondents was 32.83 ± 3.57 .

A study was conducted in United Arab Emirates on type 2 diabetic patients, which is consistent with the outcomes of this study in terms of knowledge and attitude in which patients had sufficient level of diabetes awareness, but they had a negative attitude toward having diabetes.^[26] There were studies conducted in Pakistan and UK on type 2 diabetic patients, which showed the poor knowledge of diabetic patients, which is contrary to results of this study.^[27,28]

About 83.33% of patients were satisfied with the diabetes specific treatment given to them. However, patients were not seems to be much satisfied with their perceive frequency of hypoglycemia and hyperglycemia as the scores in the results indicated that patient gave neutral opinion to these 2 items (item 2 and 3 of DTSQc). Based on extensive literature review, there is no study conducted on GDM patients to evaluate treatment satisfaction. Hence, there is no previous study in this area that can be compared with this study.

Limitations of study

This is descriptive cross sectional study conducted at a single center. We can't generalize the results at this point because it's a single centered study. Availability of limited information on patients' related aspects of GDM patients is another limitation. Despite these limitations this study is very important in terms of evaluation of internal consistency of questionnaires used in this study and also gives initial idea about the trends of patients towards their disease in terms of knowledge, attitude, and treatment satisfaction.

CONCLUSION

The patients had a good score for knowledge of GDM, sufficient treatment satisfaction but the attitude was identified as negative. Instead of only to access the knowledge further studies should also focus on the educational program. There is limited data available on patient related aspects in GDM so future studies are required to access knowledge, attitude, and treatment satisfaction among GDM patients. As poor knowledge, negative attitude and low treatment satisfaction can lead to many detrimental effects on mother and fetus/baby.

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