

Knowledge about Gestational Diabetes Mellitus amongst Pregnant Women in South Tamil Nadu

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Abstract

Aim: The aim of this study is to evaluate the knowledge of gestational diabetes mellitus (GDM), including risk factors, importance of screening and post-partum follow-up, amongst pregnant women attending antenatal care in maternity clinics in South India. **Methodology:** The study participants were recruited from two antenatal clinics in Chennai and a few primary healthcare centres in South India. A detailed questionnaire was used to obtain basic data regarding general awareness and knowledge about GDM and other issues related to screening, risk factors, monitoring, long-term consequences and post-partum follow-up. Education status was graded as illiterate, primary education, secondary education and graduates. A composite score for knowledge of GDM was calculated. **Results:** A total of 100 pregnant women attending antenatal clinics were interviewed, of whom 59 were from urban Chennai and the rest from Kanchipuram district. Regarding risk factors of GDM, 48.8% of rural women were unaware of any risk factor while 55.9% of urban women reported a family history of diabetes as a risk factor. 49.2% of urban women and 75.6% of rural women did not know the long-term consequences of GDM to babies born to GDM women. 50.8% (urban women) said GDM could lead to type 2 diabetes mellitus in future while only 45% of rural women were aware of this. Mean composite score increased with higher education with graduates in both urban and rural areas, scoring the highest. **Conclusion:** Knowledge about GDM is poor amongst pregnant women, especially in rural areas. This highlights the need for training physicians, paramedical people and the public regarding GDM.

Keywords: Asian Indians, gestational diabetes mellitus, health literacy, knowledge, South Asians

INTRODUCTION

In the past decade, the prevalence of gestational diabetes mellitus (GDM) has been increasing worldwide. In 2015 alone, it was estimated that 20.9 million women had hyperglycaemia in pregnancy, 85.1% of which were due to GDM.^[1] The complications arising due to GDM affect both the mother and the baby.^[2,3]

Unfortunately, due to insufficient focus on prevention and lack of preconception planning, several challenges pertaining to maternal healthcare still remain. Lack of access to care and financial issues are some barriers to utilisation of healthcare.^[4] In addition, health literacy is also becoming a growing and relevant factor that has been shown to decrease the risk of adverse outcomes in non-pregnant diabetic patients.^[5] Improving health literacy helps the individual to comprehend and adopt a healthy lifestyle. The challenge, however, is that managing GDM requires women to come to terms with their

diagnosis in a short period of time. Therefore, building health literacy skills and knowledge that is required to understand the importance of screening and managing the condition, within this short window period, is sometimes challenging.

Knowledge is an important component of health literacy.^[6] Studies show that inadequate knowledge about the disease leads to poor understanding of medical information. This leads to limited adherence to management strategies and ultimately unfavourable pregnancy outcome.^[7] In the Indian context, several cultural factors also play a very important role in health-seeking behaviour, especially amongst pregnant

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women. Several studies have evaluated knowledge and awareness amongst type 2 diabetes mellitus (T2DM) patients; however, the same amongst pregnant women about GDM is limited. This study was aimed at evaluating the knowledge of GDM, including risk factors, importance of screening and post-partum follow-up, amongst pregnant women attending antenatal care in maternity clinics in South India.

METHODOLOGY

The study participants were recruited from two antenatal clinics in metropolitan Chennai and three primary healthcare centres in and around rural Chunampet in Kanchipuram district in South India. A detailed questionnaire was used to obtain basic data regarding general awareness and knowledge about GDM and other issues related to screening, monitoring and post-partum follow-up. Knowledge on risk factors of GDM and long-term consequences of GDM in children born to GDM mothers was assessed using open-ended questions. Other questions were framed as closed-ended (Yes/No/Don't know) questions. Education status was graded as illiterates, primary education, secondary education and graduates. Table 1 shows a partial set of questions used for

the survey. The survey was conducted in both English and local language (Tamil).

Composite score for knowledge of gestational diabetes mellitus

The answers to questions were analysed and a scoring was performed as follows: for closed-ended questions, correct answers were graded as 1 and the incorrect ones (including 'don't know') as 0. For questions on risk factors that contribute to GDM, the highest score of 3 was given for women who ticked family history of T2DM and previous history of diabetes, 2 for those who ticked maternal age and obesity and 1 for other options such as fertility treatments while all others were scored 0. Similarly, for the question on long-term consequences of GDM in children born to GDM women, those who ticked glucose intolerance and T2DM were given a score of 2 while childhood obesity was scored 1 and all other responses as 0. Thus, the least possible score was 0 if all answers were incorrect, and the maximum score was 15 if all answers were correct. This was converted into 100%. A composite score in percentage was then derived by dividing each individual's score by maximum score possible. That is, if the individual had five correct answers for open-ended questions (score = 5) and had ticked 'family history of T2DM' for question 3 (score = 3), then the composite score would be $8/15 \times 100 = 53.3\%$.

Table 1: Questionnaire used for data collection (partial set)

1. What are the known risk factors for GDM? (multiple responses allowed)
 - a. Family history of type 2 diabetes mellitus
 - b. Obesity
 - c. Diagnosis in previous pregnancies
 - d. Higher maternal age
 - e. Don't know
 - f. Others: _____
2. GDM is a risk factor for future type 2 diabetes mellitus
 - a. Yes
 - b. No
 - c. Don't know
3. What are the long-term health consequences for the children born to GDM mothers? (multiple responses allowed)
 - a. Weight gain
 - b. Glucose intolerance
 - c. Type 2 diabetes mellitus in childhood and adolescence
 - d. Don't know
 - e. Others: _____
4. Do you think it is necessary for GDM women to have a blood sugar test performed after delivery?
 - a. Yes
 - b. No
 - c. Don't know
5. If yes, how long after delivery should the blood sugar test be performed?
 - a. 6–12 weeks
 - b. Within a year
 - c. Others, specify: _____
 - d. Don't know

GDM: Gestational diabetes mellitus

RESULTS

A total of 100 pregnant women attending the antenatal clinics were interviewed, of whom 59 were from Chennai city and the rest from rural areas of Kanchipuram district. The mean age of the women was 25 ± 4 years.

When questioned about the need for screening GDM, 88.7% of the women from the urban area believed that screening for GDM was necessary during pregnancy, while amongst rural women, only 51.2% felt that screening was essential [Figure 1]. Majority of women in the urban area (64.4%) felt that screening should be carried out during the first trimester itself while people from the rural area were less aware about when they should undergo screening.

Knowledge about risk factors that cause GDM was also poor amongst rural women, with 48.8% of them answering that they were unaware of any risk factor. In contrast, 55.9% of women from the urban area reported that family history of T2DM was an important risk factor [Table 2]. When questioned about the need to control blood sugar level during pregnancy, 58.5% of rural women did not know if proper control was essential, while 88.1% of urban women believed that good control was essential.

Figure 2 shows the knowledge about post-partum conversion to T2DM. Amongst urban women, 50.8% reported that GDM would lead to T2DM in future and the rest either did not know or had reported that GDM does not lead to T2DM. Amongst rural women, only 24.4% believed that GDM would lead to T2DM, 19.5% reported that GDM was only a temporary

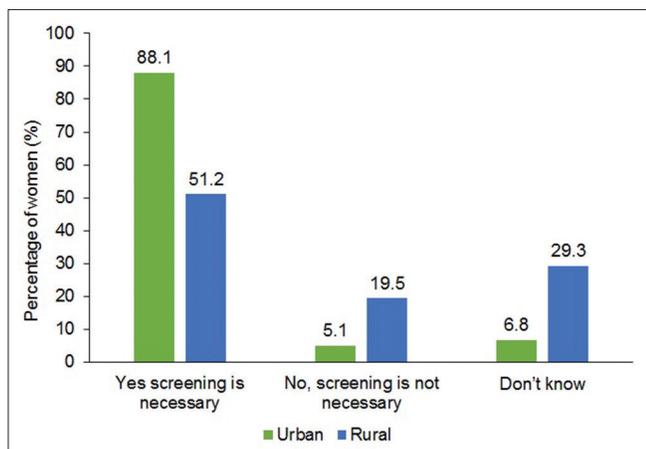


Figure 1: Screening for gestational diabetes mellitus

problem during pregnancy and the vast majority (56.1%) did not know anything about the progression to diabetes. 49.2% of urban women and 75.6% of rural women did not know the long-term consequences of GDM to babies born to GDM women. T2DM in adolescents was the most commonly reported long-term consequence by women in both urban (32.2%) and rural area (14.6%), followed by childhood obesity (urban 15.3%, rural 9.8%) and glucose intolerance in children (urban 6.8%, rural 2.4%) [Table 3].

Amongst urban women, 74.6% believed that it was important to undergo post-partum testing to check blood sugar levels after delivery, with 54.5% of them answering that post-partum testing was to be performed between 6 and 12 weeks after delivery. However, amongst rural women, 41.5% answered that they did not know if a woman should undergo post-partum testing.

The mean per cent score of all the women regarding their knowledge on GDM was 46.1%. Amongst rural women, 19.5% of them received the least score of 0% and only 2.4% of them received the maximum score between 75% and 99%. Amongst urban women, 28.8% received a score between 75% and 99%, another 28.8% received a score between 50% and 74% and 30.5% received a score between 25% and 49%, while 11.9% scored the least between 1% and 24% [Table 4]. Table 5 shows the mean composite score (per cent) in relation to education status. The mean composite score increased with higher education in both urban and rural areas with graduates scoring the highest.

DISCUSSION

One of the major findings of this study is that there is a lack of awareness about GDM amongst pregnant women, especially in rural area. With the prevalence of diabetes and pre-diabetes increasing in India,^[8] GDM is also increasing. In fact, even in the rural areas, there is a rising prevalence of GDM.^[9] Thus, the results from this study pose a major concern. GDM has been understated as a benign condition for many decades. However, due to younger age of onset of T2DM amongst Asian Indians

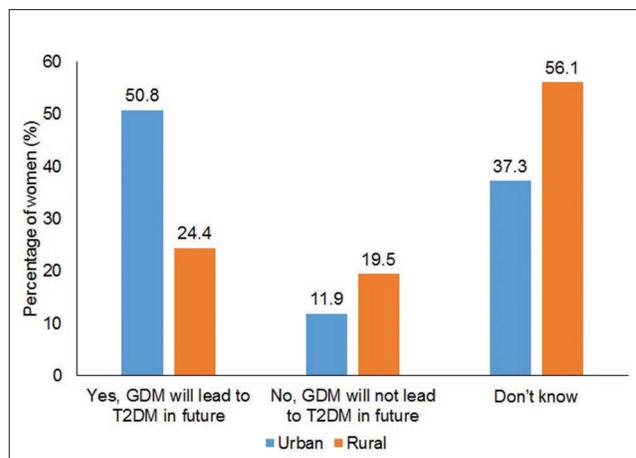


Figure 2: Knowledge about post-partum conversion to type 2 diabetes mellitus

Table 2: What are the risk factors that contribute to gestational diabetes mellitus? (multiple responses allowed)

Risk factors	Urban (n=59) (%)	Rural (n=41) (%)
Family history of type 2 diabetes mellitus	33 (55.9)	17 (41.5)
Obesity	10 (16.9)	6 (14.6)
Previous GDM	10 (16.9)	7 (17.1)
High maternal age	2 (3.4)	6 (14.6)
Don't know	13 (22)	20 (48.8)
Others	5 (8.5)	-

The numbers will not add up to 100% as some had ticked multiple options. GDM: Gestational diabetes mellitus

Table 3: What do you think are the long-term consequences of gestational diabetes mellitus in children born to gestational diabetes mellitus mothers? (multiple responses allowed)

Long-term consequences of GDM in children	Urban (n=59) (%)	Rural (n=41) (%)
Childhood obesity	9 (15.3)	4 (9.8)
Glucose intolerance	4 (6.8)	1 (2.4)
T2DM in adolescents	19 (32.2)	6 (14.6)
Don't know	29 (49.2)	31 (75.6)

The numbers will not add up to 100% as some had ticked multiple options. GDM: Gestational diabetes mellitus, T2DM: Type 2 diabetes mellitus

and transgenerational effects of GDM, detecting and treating GDM is of paramount importance.^[10]

Although majority of the women believed that they should undergo screening for GDM during pregnancy, many were not clear about the timing of screening. Amongst urban women, knowledge about the need for proper control of blood sugars was better; however, this was not the case with women in rural areas. Over 75% of rural women did not have any idea about the long-term consequences of GDM, and 56% of them did

Table 4: Composite knowledge score of gestational diabetes mellitus

Composite score	Urban (n=59) (%)	Rural (n=41) (%)
0	-	8 (19.5)
1-24	7 (11.9)	8 (19.5)
25-49	18 (30.5)	17 (41.5)
50-74	17 (28.8)	7 (17.1)
75-99	17 (28.8)	1 (2.4)
100	-	-

Table 5: Mean composite score (per cent) values amongst urban and rural pregnant women according to education

Education	Mean composite score (per cent) values	
	Urban (n=59)	Rural (n=41)
Illiterate	-	3.4±4.7
Primary education	38.0±28.6	17.3±16.7
Secondary education	60.0±23.7	32.6±23.7
Graduate	60.9±17.5	52.0±12.8

not know that GDM would lead to the development of T2DM in future.

In India, especially in rural areas, the perception about healthy lifestyle with respect to diet and food is driven usually by the cultural habits.^[11] Until quite recently, poor nutrition due to poverty was a major concern and therefore obesity was not considered as a risk for diabetes. With rapid economic development, obesity is becoming a huge burden in both urban and rural areas. Questions about risk factors revealed that a majority of rural women were unaware of any risk factor for GDM such as obesity and family history of T2DM. Poth and Carolan (2013) published similar results in a qualitative study, where they reported that most women were unaware of other factors related to GDM and were unable to understand how lifestyle and diet can reduce the risk of GDM.^[12] Results from a study by Rhoads-Baeza and Reis (2010) also showed that majority of women did not understand the relationship between GDM, T2DM or familial risk factors.^[13]

Most participants were also unaware of the possible effect of GDM on the mother or the baby. These findings are in line with results from the qualitative study by Poth and Carolan (2013).^[12] Conversely, a study by Kaptein *et al.* (2011) showed that many of the women considered diagnosis of GDM as a signal to adapt to a healthy lifestyle, and a majority of them also reported a high perception of diabetes risk in future.^[14] GDM is usually considered by many as a transient condition and that it is likely to exist only during pregnancy.^[15] However, in reality, the rate of progression of GDM to T2DM is increasing. Earlier studies reported that women with GDM developed T2DM within 9 years post-partum.^[16] Data from our recent study showed that as many as 20% convert to T2DM

within a year after delivery.^[17] Therefore, it is imperative that healthcare providers ensure that women receiving regular prenatal care are counselled about the long-term diabetes prevention strategies.

Poor literacy has been identified as a factor affecting adherence to medications, probably due to the fact that such patients are unable to read prescription labels and warnings.^[5] Low literacy has been shown to be associated with worse knowledge on diabetes in the USA,^[18] which in turn, has been linked to poor self-care and management. Similar results have been reported in Malaysia, where patients with the primary education had least knowledge about GDM.^[19] The findings from this study confirm these previous research outcomes that showed that education has a strong impact on health literacy. Given that medication management is fundamental to glycaemic control, it is essential that the efforts are taken to help improve self-care through patient-specific approaches based on their literacy levels.

There may be several reasons for poor knowledge amongst pregnant women. An earlier study in Chennai, conducted amongst a representative population, showed that nearly 25% of the residents of Chennai were not even aware about a condition called diabetes.^[11] Therefore, it is not surprising that knowledge about diabetes during pregnancy or GDM amongst pregnant women is poor, both in urban and rural areas. Moreover, even amongst urban physicians, as seen from an earlier survey of ours conducted all over India, more than half of the diabetologists/endocrinologists and obstetrician/gynaecologists do not consistently follow any recommended guideline for the proper diagnosis of GDM.^[20] If this is the scenario amongst urban physicians, it is reasonable to expect that knowledge about GDM screening and its management would be even much less amongst physicians in rural areas, who are the first point of contact for pregnant women, in antenatal clinics in the primary health centres. In addition, there is also a dearth of trained physicians and support staff like diabetes educators in rural areas. Therefore, it is essential to train physicians, especially in rural areas. Educational strategies then need to be put into a place for women to make them understand that GDM is a serious condition. Physicians, nurses and diabetes educators should ensure to discuss with patients about GDM, as a future risk for T2DM, and not just as a transient condition.

Although the sample size of this present study is limited, these findings nevertheless suggest the need for intensive education about GDM, training not only physicians and paramedical personnel but also the public at large, especially in rural areas of India and other developing countries.

CONCLUSION

Knowledge about GDM is poor amongst pregnant women, especially in rural areas. This highlights the need for training physicians, paramedical people and the public regarding GDM.

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Conflicts of interest

There are no conflicts of interest.

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