

**ORIGINAL RESEARCH**

# Study of Knowledge Attitude and Practice regarding screening for gestational diabetes mellitus and role of medical nutrition therapy in antenatal patient in Lok Nayak Hospital Delhi

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Received date: 27 January, 2024

Acceptance date: 24 February, 2024

**ABSTRACT**

**Background:** Gestational Diabetes Mellitus (GDM) is a prevalent disease during pregnancy which has detrimental effects on both the mother and the baby. Present study was aimed at Study of Knowledge Attitude and Practice regarding screening for Gestational diabetes mellitus and role of medical nutrition therapy in antenatal patient in Lok Nayak Hospital Delhi. **Material and Methods:** Present study was a cross-sectional study, conducted in pregnant women of age more than or equal to 18 years attending Antenatal OPD. **Results:** In present study, 200 pregnant women were screened out of those 118 were non-diabetic & 82 were diagnosed cases of GDM. Among 82 GDM cases, 61 were receiving MNT only while 21 were on treatment (either OHA or insulin or both). Majority participants were not aware about HBA1C (95.5 %), were not aware of the fact that fasting status was required for rightly conducting OGTT (50.5 %), had not heard about OGTT (78.5%), were not aware about screening method for GDM (79 %), were oblivious of the fact that history of GDM in previous pregnancy is a risk factor (69 %) & were not acquainted with the condition of GDM (54 %). Majority were aware that all pregnancies should be screened routinely for GDM (73 %), that early diagnosis crucial for preventing complications (68.5%). Majority were following up with weight during pregnancy (60 %) & were visiting doctor regularly during pregnancy (58.5 %). Among diagnosed cases of GDM, majority participants followed diet prescribed by health professional (23 %), remaining followed own diet (11 %) while 10 participants were not following diet at all (5 %). **Conclusion:** This study highlights a lack of awareness about Gestational Diabetes Mellitus (GDM) among pregnant Indian women.

**Keywords:** Gestational Diabetes Mellitus (GDM), awareness, pregnant women, Medical Nutrition Therapy (MNT).

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**INTRODUCTION**

Gestational Diabetes Mellitus (GDM) is a prevalent disease during pregnancy and has detrimental effects on both the mother and the baby. GDM is defined as glucose intolerance that is first detected during the pregnancy. India holds the title of the world's largest diabetes population and is often referred to as the "Diabetes capital of the world." A number of clinical risk factors have been demonstrated to be associated with increased likelihood of GDM, including age, ethnicity, obesity, family history of diabetes,

gestational diabetes in past obstetric history.<sup>1</sup>

The trend toward older maternal age, the epidemic of obesity and diabetes, the decrease in physical activity and the adoption of modern lifestyle in developing countries may all contribute to an increase in prevalence of GDM.<sup>2</sup> GDM screening is not frequently performed, particularly in rural areas under the lower levels of the health care facilities.<sup>3</sup>

Timely screening and adequate treatment of maternal hyperglycemia reduces the risk of GDM in mother to risk level of normal pregnancy. Medical Nutrition

Therapy (MNT) is a vital approach in treating Gestational Diabetes Mellitus (GDM) alongside physical exercise and regular self-monitoring.<sup>4,5</sup> This combination aims to reduce complications for both the mother and fetus in the short and long term.<sup>6</sup> Successful treatment relies on close collaboration between the pregnant woman and the medical team, built on trust and accurate information. Present study was aimed to Study the Knowledge, Attitude and Practice regarding screening for Gestational diabetes mellitus and role of medical nutrition therapy in antenatal patients in Lok Nayak Hospital Delhi.

## MATERIAL AND METHODS

Present study was a cross-sectional study, conducted in department of Obstetrics and Gynaecology at Lok Nayak Hospital and Maulana Azad Medical College, Delhi, India. Study duration was of 7 months (January 2023 to July 2023.)

In this study, pregnant women of age more than or equal to 18 years attending Antenatal OPD at Lok Nayak Hospital Delhi, were included and were willing to participate in present study. Study was explained to patients in local language & written consent was taken for participation & study. The required Sample size was calculated using formula,  $N=4pq/L^2$  where p was 13.8% (based on the study previously done in by V Seshiah et al.<sup>6</sup> with allowable error of  $L = 5\%$  and the total sample size required was rounded off to 200). The antenatal patients attending the hospital for regular antenatal check-up were included in this study. In this study, convenient sampling method was used

for selecting the study participants. A pretested semi-structural questionnaire was prepared which included socio-demographic information and specific question with the aim to assess the knowledge, attitude and practice regarding Gestational Diabetes Mellitus and its control among antenatal patients. The questionnaire was validated by esteemed professionals. The purpose of the study was explained to the participants, and they were given the prepared questionnaires to fill out.

The questionnaire aimed to collect information regarding the socio-demographic details, knowledge on GDM, attitude towards GDM and Practice regarding screening for Gestational diabetes mellitus and role of Medical nutrition therapy.

Data was collected and compiled using Microsoft Excel, analyzed using SPSS 25 version. Statistical analysis was done using descriptive statistics.

## RESULTS

In present study, 200 pregnant women were screened, out of those 118 were normal (non-diabetic) & 82 were diagnosed cases of GDM. Among 82 GDM cases, 61 were receiving MNT only while 21 were on treatment (either OHA or insulin or both). Majority women were from 18-29 years of age (69.5 %), belonging from Muslim religion (66 %), educated more than Higher secondary school (49 %), from Lower middle Socioeconomic status (68 %), were primigravida (44 %) & majority had no history of GDM (79 %).

**Table 1**

General characteristics	No. of patients	Percentage
<b>A) Age groups (in years)</b>		
18-29 years	139	69.5%
>30 years	61	30.5%
<b>B) Religion</b>		
Hinduism	65	32.5 %
Muslim	132	66 %
Christian	1	0.5 %
Jain	1	0.5 %
Buddhism	1	0.5 %
Sikh	0	0
<b>Educational qualification</b>		
Illiterate	35	17.5 %
Secondary school	67	33.5 %
Higher secondary school	78	39 %
Graduate	20	10 %
<b>Occupation</b>		
Homemaker	185	92.5 %
Professional	10	5 %
Farmer	1	0.5 %
Laborer	4	2 %
<b>D) Socioeconomic status</b>		
Upper	0	0%
Upper middle	6	3 %
Middle	42	21 %
Lower middle	136	68 %

Lower	16	8 %
<b>E) Obstetric score</b>		
Primigravida	88	44 %
2nd gravida	58	29 %
3-5th gravida	50	25 %
>5th gravida	4	2 %
<b>F) History Of GDM</b>		
Yes	42	21 %
No	158	79 %

## KNOWLEDGE

Knowledge of participants was assessed by various questions. Majority participants were not aware of HBA1C (95.5 %), didn't know that fasting status was required for OGTT (50.5 %), had not heard about

OGTT (78.5 %), were not aware about screening method for GDM (79

%), did not know that history of GDM in previous pregnancy is a risk factor (69 %) & were unaware of condition of GDM (54 %).

**Table 2: KNOWLEDGE**

<b>A) Knowledge about screening for GDM</b>	<b>YES %,n=200</b>	<b>NO %,n=200</b>	<b>DON'T KNOW %, n=200</b>
Aware about HBA1C	4.5 (9)	95.5 (191)	
Fasting required for OGTT	15 (30)	34.5 (69)	50.5 (101)
Heard about OGTT	19 (38)	78.5 (157)	2.5 (5)
Aware about screening method for GDM	21 (42)	79 (158)	
History of GDM in previous pregnancy	20 (40)	69 (138)	11 (22)
Have you heard of GDM	46 (92)	54 (108)	
<b>B) SOURCE OF KNOWLEDGE OFGDM:</b>	<b>No of Patients</b>		<b>%</b>
Not aware	110		55 %
Medical professional	75		37.5 %
Family	13		6.5 %
Friends	2		1 %
<b>C) How GDM is diagnosed</b>	<b>No. of patients</b>		<b>Percentage</b>
Don't know	105		52.5 %
Blood test after glucose ingestion	87		43.5 %
Urine test	8		4 %
USG	0		0
<b>D) Duration of fasting is recommended before testing fasting blood glucoselevel</b>	<b>No. of patients</b>		<b>Percentage</b>
6 hours	0		0
8 hours	6		3 %
10 hours	8		4 %
12 hours	14		7 %
>12 hours	1		0.5 %
Don't know	171		85.5%
<b>E) Risk factors for GDM</b>	<b>No. of patients</b>		<b>Percentage</b>
Increased intake of sweet dishes	48		24 %
history of GDM in previous pregnancy	24		12 %
Family history of GDM	17		9.5 %
Obesity	13		6.5 %
Don't know	141		70.5 %
<b>F) Knowledge regarding MNT</b>	<b>YES</b>		<b>NO</b>
Have you heard of insulin?	22		78
Do you know any medications, hormones for blood glucosecontrol?	15.5		84.5
Knows MNT control blood glucose?	14.5		85.5
knows how to allocate the daily intake offood groups?	7		93
Knows the total amount of daily food that should be consumed?	8		92
Understand MNT	13		87

heard of MNT	18.5	81.5
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Majority were not aware of GDM (54 %) & among those with knowledge, common source of knowledge of GDM was from medical professional (37.5 %). Majority were not aware of how GDM is diagnosed (52.5 %) & among those with knowledge, majority knew that GDM is diagnosed by blood test after glucose ingestion (43.5%).

Knowledge regarding duration of fasting recommended before testing fasting blood glucose level was assessed. Majority didn't know duration (85.5 %), while only 14 participants knew that fasting is recommended before testing fasting blood glucose level (7%). Majority were not aware of risk factors for GDM (70.5 %). Knowledge for risk factors for GDM revealed following risk factors as increased intake of

sweet dishes (24 %) history of GDM in previous pregnancy (12 %), family history of GDM (9.5 %) & Obesity (6.5 %).

Knowledge regarding MNT was assessed. Majority had not heard of insulin (78 %), didn't know any medications, hormones for blood glucose control (84.5 %), didn't know that MNT control blood glucose (85.5 %), didn't know how to allocate the daily intake of food groups (93 %), didn't know the total amount of daily food that should be consumed (92 %), didn't understand MNT (87 %) & had not heard of MNT (81.5 %). Majority participants didn't know whether GDM causes complications in pregnancy (59 %) while only 42 participants knew that GDM causes complications in pregnancy (21 %).

**Table 3- AWARENESS**

<b>A) About GDM causing complications in pregnancy</b>	<b>No. of patients</b>	<b>Percentage</b>
Yes	42	21 %
No	40	20 %
Don't know	118	59 %
<b>B) About maternal complications of GDM in pregnancy</b>	<b>No. of patients</b>	<b>Percentage</b>
Diabetes mellitus in future	33	16.5 %
Recurrent urinary tract infections	17	8.5 %
Pre-eclampsia	9	4.5 %
Preterm labour	8	4 %
Polyhydramnios	6	3 %
Diabetic ketoacidosis	3	1.5 %
Don't know	161	80.5%
<b>C) About fetal complications of GDM in pregnancy</b>	<b>No. of patients</b>	<b>Percentage</b>
Recurrent pregnancy loss	30	15 %
Stillbirth	30	15 %
Big baby	25	12.5 %
Increased need for instrumental delivery	15	7.5 %
Shoulder dystocia	9	4.5 %
Respiratory distress syndrome	2	1 %
Birth trauma	2	1 %
Don't know	141	80.5 %

Majority participants were not aware about maternal complications of GDM in pregnancy (80.5 %), others had knowledge about complications of GDM in pregnancy such as leading to diabetes mellites in future (16.5 %), recurrent urinary tract infections (8.5 %), pre- eclampsia (4.5 %), preterm labour (4 %), polyhydramnios (3 %) & diabetic ketoacidosis (1.5%). Majority participants were not aware about fetal complications of GDM in pregnancy (80.5%), others had knowledge about fetal complications of GDM in pregnancy such as recurrent pregnancy loss (15 %), stillbirth (15 %), big baby (12.5 %), increased need for instrumental delivery (7.5 %), shoulder dystocia (4.5 %), respiratory distress

syndrome (1 %) & birth trauma (1 %).

#### **ATTITUDE**

Attitude of participants regarding GDM was assessed by various questions. Majority were aware that all pregnancies should be screened routinely for GDM (73 %), that early diagnosis was crucial for preventing complications (68.5 %) while majority were not aware that moderate exercise is useful for control of blood glucose (89 %), were not too frightened to take meal because of concerns about increased postprandial glycemia (66 %) and were not too frightened to eat sweets & fruits because of concerns about increased blood glucose (62.5%).

**Table 4 – ATTITUDE**

<b>A) Attitude</b>	<b>Yes</b>	<b>No</b>	<b>Sometimes</b>
All pregnancies Should be screened routinely for GDM	73 %	27 %	NA
Is early diagnosis crucial for preventing complications	68.5 %	31.5 %	NA

Aware of moderate exercise for control of blood Glucose	11 %	89 %	NA
Too frightened to take meal because of concerns about increased postprandial glycemia	14 %	66 %	20 %
Too frightened to eat sweets & fruits because of concerns about increased blood glucose	14 %	62.5 %	23.5 %
<b>B) Routinely one should pay attention to MNT</b>	<b>No. of patients</b>		<b>Percentage</b>
Strongly disagree	1		0.5 %
Disagree	12		6 %
Neutral	47		23.5 %
Agree	75		37.5 %
Strongly agree	65		32.5 %

Attitude of participants regarding whether one should pay attention to MNT was assessed, majority agreed (37.5 %) and strongly agreed (32.5 %) for the same.

## PRACTICE

Knowledge of practices regarding GDM were assessed by various questions. Majority were following up with weight during pregnancy (60 %) & were visiting doctor regularly during pregnancy (58.5 %).

**Table 5 – PRACTICE**

<b>A) Practices regarding GDM care</b>	<b>Yes</b>	<b>No</b>
Did you follow up with weight during pregnancy?	60 %	40 %
Do you visit the doctor regularly during pregnancy?	58.5 %	41.5 %
<b>B) Screening method used by subject for GDM</b>	<b>No. of patients</b>	<b>Percentage</b>
OGTT	171	85.5 %
DIPSI	16	8 %
HBA1C	5	2.5 %
Random blood glucose	5	2.5 %
Urine complete examination	1	0.5 %
Fasting blood glucose	1	0.5 %
Not done	1	0.5 %
<b>C) Gestational age to screen for GDM</b>	<b>No. of patients</b>	<b>Percentage</b>
<12 weeks of POG	61	30.5 %
12-20 weeks of POG	106	53 %
>20 weeks of POG	33	16.5 %
<b>D) Practices followed to control blood glucose level</b>	<b>No. of patients</b>	<b>Percentage</b>
Balanced diet	74	37 %
Regular antenatal checkup	68	34 %
Medications	21	10.5 %
Moderate exercises	17	8.5 %
None	5	2.5 %
Not applicable	115	57.5%
<b>E) Adherence to the diet given</b>	<b>No. of patients</b>	<b>Percentage</b>
Following diet prescribed by health professional	46	23 %
Following own diet	22	11 %
Not following diet	10	5 %
Not applicable	122	61 %
<b>Frequency of hospital visits for fasting and bloodsugar testing</b>	<b>No. of patients</b>	<b>Percentage</b>
Once every week	7	3.5 %
Once every 2 weeks	17	8.5 %
Once a month	50	25 %
Randomly	0	0
Not applicable	122	61 %
Don't know	5	2.5 %
<b>G) Responsible person for your diabetic care</b>	<b>No. of patients</b>	<b>Percentage</b>
Yourself	81	40.5%
Doctor	59	29.5%
Family	45	22.5%
Friends	0	0
Not applicable	118	59%

Majority had impression that common screening method used for GDM are OGTT (85.5 %) followed by DIPSI (8 %), HBA1C (2.5 %), random blood glucose (2.5 %), urine examination (0.5 %), fasting blood glucose (0.5 %) and not required (0.5 %). According to participants, appropriate gestational age to screen for GDM was 12-20 weeks (53 %) followed by <12 weeks (30.5 %) & >20 weeks of POG (16.5 %).

Among diagnosed cases of GDM, appropriate practices followed by participants to control blood glucose level were taking balanced diet (37 %), coming for regular antenatal checkup (34 %), taking prescribed medications (10.5 %), doing moderate exercises (8.5 %) and none followed (2.5 %). Among diagnosed cases of GDM, majority participants following diet prescribed by health professional (23 %), remaining followed own diet (11 %) while 10 participants were not following diet (5 %).

Among diagnosed cases of GDM, majority participants were visiting hospital for fasting and blood sugar testing once a month (25 %). Among diagnosed cases of GDM, majority participants didn't know that patient herself is responsible for her diabetic care (40.5 %) while other participants were of impression that doctor & family is responsible for the patient's diabetic care (29.5 % & 22.5 % respectively).

## DISCUSSION

The prevalence rate of the women with GDM in India is eleven-fold higher than that of Europe. The increase in the prevalence recounts to bio-psycho-social factors which includes maternal age, obesity, migratory patterns, hypertension body mass index, number of abortions and stillbirth, stress, a positive family history of diabetes, and ethnicity.<sup>7</sup>

Knowledge is an important component of health literacy.<sup>8</sup> 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 unfavorable pregnancy outcome.<sup>9,10</sup> Shriram V et al.,<sup>4</sup> found that only 17.5% of women had good knowledge of GDM where the significant sources of awareness are the television, radio, neighbors and family members. Awareness of the GDM plays a vital role in the prevention and early diagnosis of the diseases.<sup>4,5</sup> The existing community network can be used to refer all pregnancies identified at the community level for ANC booking and GDM screening to the facilities.<sup>6</sup>

Medical nutrition therapy (MNT) plays an important role in the management of gestational diabetes mellitus (GDM), and accordingly, it has a significant impact on women and newborns. The primary objective of MNT is to ensure adequate pregnancy weight gain and fetus growth while maintaining euglycemia and avoiding ketones. However, the optimal diet (energy content, macronutrient distribution, its quality and amount, among others) remains an outstanding question.<sup>10</sup>

In study by Bhalge UU et al.,<sup>11</sup> among 193 antenatal mothers in rural hospital, 48.19% were in the age group 21-25 years and 90.15% antenatal mothers were literate. 80% heard about diabetes mellitus and 38% mothers knew that diabetes could occur first time in pregnancy.

Only 28.50% mothers heard about GDM from different source of information. Karthiga Prabhu J et al.,<sup>12</sup> studied 200 participants, only 92 (46%) knew that diabetes can occur for the first time during pregnancy. Good knowledge about GDM was present in 103(51.5%), fair knowledge in 68 (34%) and poor knowledge in 29 (14.5%). Among the knowledge about risk factors of GDM, family history of diabetes was considered as a major

risk factor (84.5%) followed by obesity (53.5%). Only 34.5% of patients were aware that GDM screening should be done for all antenatal women. Knowledge about fetal and neonatal complications was seen in only 30-50% of participants. Education and family history of diabetes were found to be significantly associated with better knowledge score ( $p = 0.0002$ ,  $p = 0.03$  respectively).

Shriram V et al.,<sup>4</sup> noted that the majority of the participants had good knowledge about GDM ( $N = 410$ , 76.1%). According to Dhyani et al.<sup>13</sup> study in Karnataka, 57.6% of women had an average understanding of GDM, whereas 21.8% had strong knowledge and 19% had low knowledge. Only 35.2% of people, according to Mahalakshmi et al.<sup>14</sup> and only 17.5% of women in Shriram et al.<sup>13</sup> study, had adequate awareness of GDM.

In study Dhyani V et al.,<sup>13</sup> most of the women were working (54.8%), resided in slum areas (43.2%), and had body mass index (BMI) between 19.8 and 26 kg/m<sup>2</sup> (67%). The mean BMI level was  $28.07 \pm 4.11$  kg/m<sup>2</sup>. The mean blood sugar levels at diagnosis ranged between 88 and 300 mg/dL and the mean blood sugar level was  $201.36 \pm 38.67$  mg/dL and the median blood sugar level was 190 mg/dL. Majority of the women, that is, 57.6% of the women, had an average knowledge about GDM while 21.8% of the women had good knowledge, 1.6% had excellent, and 19% had poor knowledge. The mean knowledge score was  $6.51 \pm 3.41$ .

The mean percentage of the knowledge was  $36.14\% \pm 18.94\%$ . Statistically significant association was noted between knowledge about GDM with maternal age and educational status, religion, and occupation ( $P < 0.050$ ), but the GDM knowledge was independent of that found between place of residence ( $P = 0.715$ ) and family history of DM ( $P = 0.661$ ).

Bhavadarini B et al.,<sup>3</sup> studied 100 pregnant women attending antenatal clinics. 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.

GDM is a challenge to the health systems management especially for the LMICs, more specifically in the rural areas with multi-dimensional resource constraints. Awareness and information dissemination for GDM management both for the community including the pregnant women and the lower-level healthcare providers could be effective as suggested by other studies.<sup>15</sup>

Identifying barriers that reduce adherence to healthy behaviors is important because this can facilitate the design and implementation of interventions to improve the self-management of GDM. Knowledge, attitude and practice (KAP) surveys provide useful information regarding baseline knowledge, attitudes, beliefs, misconceptions and behaviors towards a health-related topic.<sup>16</sup> Furthermore, the data provided by KAP surveys can facilitate the development and implementation of education/training programs to overcome issues and barriers that hinder the management of patients with a health problem.<sup>17</sup>

## CONCLUSION

This study highlights a lack of awareness about Gestational Diabetes Mellitus (GDM) among pregnant Indian women attending the antenatal clinic at LNH, Delhi. This knowledge gap could negatively impact the health of both the mother and fetus. Therefore, it's crucial to provide education to these pregnant women about GDM, its screening, and the significance of Medical Nutrition Therapy (MNT) in managing blood sugar levels. By informing women about potential complications and the importance of MNT, there's potential for improved attitudes, better adherence to MNT recommendations, and more consistent follow-up.

**Ethical issues:** Nil

**Conflict of Interest:** None to declare

**Source of funding:** Nil©

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