

## ORIGINAL ARTICLE

# Knowledge, attitude, and practice regarding self-monitoring of blood glucose among pregnant women with gestational diabetes: a tertiary care hospital study

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## ABSTRACT

**Background:** Gestational diabetes is the term for glucose intolerance that develops during pregnancy and results in clinical hyperglycemia. The majority of people with gestational diabetes can be managed with daily self-monitoring of blood glucose (SMBG). SMBG is a key component of gestational diabetes management; however, limited data are available regarding pregnant women's knowledge, attitudes, and practices (KAP) toward SMBG in local population. Therefore, we conducted this study to determine the frequency of good knowledge, positive attitude, and satisfactory practice regarding SMBG among pregnant women with gestational diabetes.

**Methods:** This cross-sectional study was carried out at Department of Obstetrics and Gynecology, Tertiary Care Hospital Gujranwala, Pakistan from June to December 2025. One hundred and twenty women were enrolled from OPD and were asked for their knowledge, attitude and practice for monitoring of blood glucose level. Knowledge, attitude, and practice were assessed using a structured questionnaire, and scores were categorized according to predefined criteria. All this data was recorded in proforma and analyzed in SPSS 25.

**Results:** The median age of pregnant women was 32.00 (IQR: 8.00) years. The median gestational age was 28.00 (IQ: 7.00) weeks. Out of 120, 12 (10%) were primigravida and 74 (61.7%) had sedentary lifestyle. Among 120 women with gestational diabetes, 50.8% demonstrated good knowledge, 55.0% had a positive attitude, and 41.7% reported satisfactory SMBG practices.

**Conclusion:** Approximately half of pregnant women with gestational diabetes demonstrated adequate knowledge and positive attitudes toward SMBG, while satisfactory practice remained suboptimal. Educational interventions may help improve SMBG practices and glycemic management during pregnancy.

**Keywords:** Blood Glucose Level, Gestational Diabetes, Good Knowledge, Self-Monitoring

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## Introduction

Glucose intolerance that causes clinical hyperglycemia and first manifests during pregnancy is known as gestational diabetes.

Negative short-term and long-term health effects for mothers and newborns are linked to hyperglycemia during pregnancy (1,2).

The WHO advises SMBG to make timely treatment decisions and changing lifestyle factors, such as nutrition and exercise, to treat and manage gestational diabetes (3).

Health professionals and a number of professional bodies view self-management of

gestational diabetes through lifestyle adjustment, including food and exercise, as first-line treatment. SMBG levels is a part of gestational diabetes self-management, which is used professionally to track the success of lifestyle modifications, direct treatment intensification, and guide prenatal care (3,4). The majority of females with gestational diabetes can be treated by regular SMBG during fasting and after meals, dietary modifications and nutrition monitoring, exercise and physical activity, control of maternal weight gain, and other lifestyle modifications (5,6). SMBG appears to have little effect on pregnancy outcomes, dietary compliance, or mother feelings of self-efficacy in women with diet-controlled gestational diabetes (7).

Pregnant women with gestational diabetes have benefited greatly from the availability of glucose meters. Data often demonstrate that females who conduct SMBG more closely follow treatment plans because they have a better understanding of the treatment and participate in the recommended course of action (8). The awareness among pregnant women is an important factor that can help in monitoring of blood glucose and its management. The knowledge, attitude, and practices (KAP) survey was considered required to provide basic data for implementation of GDM-preventive program. Studies conducted in a number of nations have revealed that pregnant women had comparatively greater awareness about diabetes in general but insufficient understanding about GDM. Some studies found that more patients had negative opinions about GDM, whereas other studies found that more patients had positive attitudes. Both good and bad client practices have been documented (9,10).

Research has demonstrated that adequate knowledge and positive attitudes toward self-monitoring of blood glucose (SMBG) can facilitate optimal glycemic control during pregnancy. However, limited evidence exists particularly in the local population to inform appropriate management strategies and reduce pregnancy-related complications. Therefore, this study aimed to assess the knowledge, attitudes, and practices regarding self-monitoring of blood glucose among pregnant women with gestational diabetes attending a tertiary care hospital

## Methods

After approval from the Ethical Review Board (ERB No. 03-2024, dated 15-04-2024), this cross-sectional survey was conducted in the OPD of the Department of Obstetrics & Gynecology, Tertiary Care Hospital, Gujranwala, Pakistan, from June 29 to December 28, 2025. A sample size of 120 participants was calculated using the WHO sample size calculator, with a 95% confidence level, 7% margin of error, and an expected prevalence of satisfactory practice of 18.7%.<sup>11</sup>

The following formula was used:

$$n = \frac{z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

Participants were recruited through non-probability consecutive sampling. Women aged 18–40 years, with parity <5, gestational age >20 weeks, and a diagnosis of gestational diabetes were eligible. Gestational diabetes was defined as a 2-hour postprandial blood glucose level >186 mg/dL following a 75-g OGTT after 20 weeks of gestation, according to WHO guidelines. Women with pre-existing diabetes diagnosed before pregnancy or

during the first trimester, those taking metformin before pregnancy for other indications, and those unable to understand the local language or cooperate with the researcher were excluded. Written informed consent was obtained after explaining the study objectives and potential benefits. An English-language KAP questionnaire adapted from a previously published study was used. (6) The original questionnaire demonstrated good internal consistency (Cronbach's  $\alpha = 0.890$ ). Before its use in the present study, the questionnaire was reviewed by subject experts for content validity, and a pilot test was conducted among a small group of eligible women to assess clarity, comprehensibility, and applicability. Necessary modifications were made based on expert feedback and pilot testing before final administration. The questionnaire assessed participants' knowledge, attitudes, and practices regarding SMBG. The knowledge section comprised 30 questions on general information about glucose monitoring, the attitude section included 10 questions addressing perceptions and behaviors related to glucose monitoring, and the practice section contained 12 questions regarding SMBG practices. Closed-ended and dichotomous questions were used. Each correct response was assigned one point, whereas incorrect or "don't know" responses received zero points. Scores were converted into percentages. A score  $>75\%$  was considered good knowledge, positive attitude, or satisfactory practice, while scores  $\leq 75\%$  were considered below the respective threshold.

Data was entered and analyzed in SPSS 25. Numeric variables like age, gestational age, BMI, and KAP score, were presented as median with interquartile range, as Shapiro-

Wilk test showed that data was not following normal distribution. Categorical variables like parity, education, occupation, life style, diet pattern, family history of diabetes, good knowledge, positive attitude and satisfactory practice were presented as frequency (%). Data was stratified for age (20-30, 31-40 years), gestational age (20-2 weeks, 29-36 weeks), parity (primigravida, primiparous and multigravida), education (educate or uneducated), occupation (working women or housewife), life style (active or sedentary), diet pattern, and family history of diabetes. Post-stratification, associations between demographic characteristics and KAP categories were assessed using the Chi-square test / Fischer exact test (for frequency  $<5$  in any cell), considering P-value  $\leq 0.05$  as significant. Cases with missing data were replaced by new case.

## Results

In this study, a total of 120 pregnant women diagnosed with gestational diabetes mellitus (GDM) were enrolled. The median age of the participants was 32.0 years (IQR: 8.0), while the median gestational age was 28.0 weeks (IQR: 7.0). Among the participants, 12 (10.0%) were primigravida, and 74 (61.7%) reported a sedentary lifestyle. Only 13 (10.8%) participants reported regular physical activity, including exercise or gym attendance. The majority reported consuming fast food or street food more than twice weekly, while 34 (28.3%) reported skipping meals. Regarding socio demographic characteristics, 82 (68.3%) participants were educated and 52 (43.3%) were housewives. A positive family history of diabetes was reported by 54 (45.0%) participants. Table 1

**Table 1: Demographics of women (n = 120)**

| Parameter                           | n(%) / Median(IQR) |
|-------------------------------------|--------------------|
| Age of women, in years              | 32.00 (IQR: 8.00)  |
| Gestational age, in weeks           | 28.00 (IQ: 7.00)   |
| <b>Parity</b>                       |                    |
| Primigravida                        | 12 (10%)           |
| Primiparous                         | 21 (17.05%)        |
| Parity 2                            | 57 (47.5%)         |
| Parity 3                            | 30 (25.0%)         |
| <b>Lifestyle</b>                    |                    |
| Active                              | 33 (27.5%)         |
| Sedentary                           | 74 (61.7%)         |
| Exercise / gym                      | 13 (10.8%)         |
| <b>Diet</b>                         |                    |
| Home-made                           | 9 (7.5%)           |
| Fast-food                           | 37 (30.8%)         |
| Street-food                         | 35 (29.2%)         |
| Diet plan                           | 5 (4.2%)           |
| Skip meals                          | 34 (28.3%)         |
| <b>Education</b>                    |                    |
| Educated                            | 82 (68.3%)         |
| Uneducated                          | 38 (31.7%)         |
| <b>Occupation</b>                   |                    |
| Housewife                           | 52 (43.3%)         |
| Job                                 | 29 (24.2%)         |
| Business                            | 39 (32.5%)         |
| Positive family history of diabetes | 54 (45.0%)         |

The median knowledge score was 13.0 (IQR: 5.75), with 61 (50.8%) participants demonstrating good knowledge regarding self-monitoring of blood glucose (SMBG) during pregnancy. The median attitude score was 6.0 (IQR: 3.0), and 66 (55.0%) participants exhibited a positive attitude toward SMBG. The median practice score was 6.0 (IQR: 4.0), with 50 (41.7%)

participants demonstrating satisfactory SMBG practices. Table 2

**Table 2: Knowledge, attitude and practice assessment and score presentation (n = 120)**

| Parameter                 | n(%) / Median(IQR) |
|---------------------------|--------------------|
| <b>Knowledge score</b>    | 13.00 (IQR: 5.75)  |
| Good Knowledge            | 61 (50.8%)         |
| Average Knowledge         | 39 (32.5%)         |
| Poor Knowledge            | 20 (16.7%)         |
| <b>Attitude score</b>     | 6.00 (IQR: 3.00)   |
| Positive Attitude         | 66 (55.0%)         |
| Neutral Attitude          | 37 (30.8%)         |
| Negative Attitude         | 17 (14.2%)         |
| <b>Practice score</b>     | 6.00 (IQR: 4.00)   |
| Satisfactory Practice     | 50 (41.7%)         |
| Not Satisfactory Practice | 70 (58.3%)         |

Association of good knowledge was assessed for age, gestational age and other demographics of women. It was observed that women >30 years old had good knowledge of SMBG than women <30 years old. It was also noted that primigravidas had good knowledge than multigravida. Among 33 women with an active lifestyle, 19 (57.6%) had good knowledge about SMBG, as well as 37 (50.0%) women having sedentary lifestyle, while women going to gym or doing exercise had less good knowledge. Among women following diet plans, 5 (100%) demonstrated good knowledge. Among housewives, 28 (53.8%) had good knowledge. Although the association was insignificant with these factors (P>0.05). Table 3

**Table 3: Association of knowledge with age, gestational age and other demographics (n = 120)**

| parameters                |       | Knowledge    |                 |              | p-value |
|---------------------------|-------|--------------|-----------------|--------------|---------|
|                           |       | Good<br>n=61 | Average<br>n=39 | Poor<br>n=20 |         |
| Age, in years             | 20-30 | 24 (47.1%)   | 16 (31.4%)      | 11 (21.6%)   | 0.458   |
|                           | 31-40 | 37 (53.6%)   | 23 (33.3%)      | 9 (13.0%)    |         |
| Gestational age, in weeks | 20-28 | 25 (40.3%)   | 25 (40.3%)      | 12 (19.4%)   | 0.056   |

|                            |                     |            |            |            |       |
|----------------------------|---------------------|------------|------------|------------|-------|
|                            | 29-36               | 36 (62.1%) | 14 (24.1%) | 8 (13.8%)  |       |
| Parity                     | Primigravida        | 8 (66.7%)  | 1 (8.3%)   | 3 (25.0%)  | 0.288 |
|                            | Primiparous         | 10 (47.6%) | 6 (28.6%)  | 5 (23.8%)  |       |
|                            | Multiparous         | 43 (49.4%) | 32 (36.8%) | 12 (13.8%) |       |
| Lifestyle                  | Active              | 19 (57.6%) | 10 (30.3%) | 4 (12.1%)  | 0.702 |
|                            | Sedentary           | 37 (50.0%) | 23 (31.1%) | 14 (18.9%) |       |
|                            | Gym / exercise      | 5 (38.5%)  | 6 (46.2%)  | 2 (15.4%)  |       |
| Diet                       | Home-made           | 3 (33.3%)  | 5 (55.6%)  | 1 (11.1%)  | 0.258 |
|                            | Fast-food           | 22 (59.5%) | 11 (29.7%) | 4 (10.8%)  |       |
|                            | Street-food         | 16 (45.7%) | 11 (31.4%) | 8 (22.9%)  |       |
|                            | Following diet plan | 5 (100%)   | Nil        | Nil        |       |
|                            | Skip meals          | 15 (44.1%) | 12 (35.3%) | 7 (20.6%)  |       |
| Education                  | Educated            | 40 (48.8%) | 27 (32.9%) | 15 (18.3%) | 0.726 |
|                            | Uneducated          | 21 (55.3%) | 12 (31.6%) | 5 (13.2%)  |       |
| Occupation                 | Housewife           | 28 (53.8%) | 18 (34.6%) | 6 (11.5%)  | 0.156 |
|                            | Job                 | 14 (48.3%) | 12 (41.4%) | 3 (10.3%)  |       |
|                            | Business            | 19 (48.7%) | 9 (23.1%)  | 11 (28.2%) |       |
| Family history of diabetes | Positive            | 27 (50.0%) | 16 (29.6%) | 11 (20.4%) | 0.586 |
|                            | Negative            | 34 (51.5%) | 23 (34.8%) | 9 (13.6%)  |       |

Association of positive attitude was assessed for age, gestational age and other demographics of women. It was observed that women less than 30 years old had positive attitude than women older than 30 years old. It was also observed that primigravidas had positive attitude than multigravida. Among women with sedentary lifestyle, 46 (62.2%) women had positive attitude, than women having active lifestyle or going to gym or

doing exercise during pregnancy. Among women following diet plans, 4 (80%) demonstrated positive attitude. Among women doing job, 18 (62.1%) had positive attitude as compared to housewives and women doing business. Although the association was insignificant with these factors ( $P>0.05$ ). Table 4

**Table 4: Association of attitude of women with age, gestational age and other demographics (n = 120)**

| Parameters    |       | Attitude     |                 |              | p-value |
|---------------|-------|--------------|-----------------|--------------|---------|
|               |       | Good<br>n=66 | Average<br>n=37 | Poor<br>n=17 |         |
| Age, in years | 20-30 | 29 (56.9%)   | 17 (33.3%)      | 5 (9.8%)     | 0.490   |
|               | 31-40 | 37 (53.6%)   | 20 (29.0%)      | 12 (17.4%)   |         |
|               | 20-28 | 34 (54.8%)   | 18 (29.0%)      | 10 (16.1%)   | 0.785   |

|                            |                     |            |            |            |       |
|----------------------------|---------------------|------------|------------|------------|-------|
| Gestational age, in weeks  | 29-36               | 32 (55.2%) | 19 (32.8%) | 7 (12.1%)  |       |
| Parity                     | Primigravida        | 7 (58.3%)  | 4 (33.3%)  | 1 (8.3%)   | 0.845 |
|                            | Primiparous         | 11 (52.4%) | 8 (38.1%)  | 2 (9.5%)   |       |
|                            | Multiparous         | 48 (55.2%) | 25 (28.7%) | 14 (16.1%) |       |
| Lifestyle                  | Active              | 14 (42.4%) | 14 (42.4%) | 5 (15.2%)  | 0.136 |
|                            | Sedentary           | 46 (62.2%) | 20 (27.0%) | 8 (10.8%)  |       |
|                            | Gym / exercise      | 6 (46.2%)  | 3 (23.1%)  | 4 (30.8%)  |       |
| Diet                       | Home-made           | 4 (44.4%)  | 3 (33.3%)  | 2 (22.2%)  | 0.834 |
|                            | Fast-food           | 20 (54.1%) | 12 (32.4%) | 5 (13.5%)  |       |
|                            | Street-food         | 22 (62.9%) | 8 (22.9%)  | 5 (14.3%)  |       |
|                            | Following diet plan | 4 (80.0%)  | 1 (20.0%)  | Nil        |       |
|                            | Skip meals          | 16 (47.1%) | 13 (38.2%) | 5 (14.7%)  |       |
| Education                  | Educated            | 44 (53.7%) | 27 (32.9%) | 11 (13.4%) | 0.757 |
|                            | Uneducated          | 22 (57.9%) | 10 (26.3%) | 6 (15.8%)  |       |
| Occupation                 | Housewife           | 30 (57.7%) | 16 (30.8%) | 6 (11.5%)  | 0.276 |
|                            | Job                 | 18 (62.1%) | 5 (17.2%)  | 6 (20.7%)  |       |
|                            | Business            | 18 (46.2%) | 16 (41.0%) | 5 (12.8%)  |       |
| Family history of diabetes | Positive            | 30 (55.6%) | 17 (31.5%) | 7 (13.0%)  | 0.942 |
|                            | Negative            | 36 (54.5%) | 20 (30.3%) | 10 (15.2%) |       |

Association of satisfactory practice was assessed for age, gestational age and other demographics of women. It was observed that women above 30 years old had satisfactory practice than women less than 30 years old. It was also observed that multigravida had satisfactory practice than primigravida or primiparous women. Among women with active lifestyle, 18 (54.5%) women had satisfactory practice, than women having sedentary lifestyle or going to gym or doing exercise during pregnancy. Women following

diet plans had better understanding of importance and 3 (60.0%) women had satisfactory practice about it. Among women doing job, 16 (55.2%) had satisfactory practice as compared to housewives and women doing business. Women with positive family history of diabetes, 27 (50.0%) women had satisfactory practice than women with negative family history. Although the association was insignificant with these factors ( $P>0.05$ ). Table 5

**Table 5: Association of practice of women with age, gestational age and other demographics (n = 120)**

| Parameters                | Sub category | Practice             |                          | p-value |
|---------------------------|--------------|----------------------|--------------------------|---------|
|                           |              | Satisfactory<br>n=50 | Not satisfactory<br>n=70 |         |
| Age, in years             | 20-30        | 20 (39.2%)           | 31 (60.8%)               | 0.640   |
|                           | 31-40        | 30 (43.5%)           | 39 (56.5%)               |         |
| Gestational age, in weeks | 20-28        | 23 (37.1%)           | 39 (62.9%)               | 0.294   |
|                           | 29-36        | 27 (46.6%)           | 31 (53.4%)               |         |

|                            |                     |            |            |       |
|----------------------------|---------------------|------------|------------|-------|
| Parity                     | Primigravida        | 3 (25.0%)  | 9 (75.0%)  | 0.268 |
|                            | Primiparous         | 7 (33.3%)  | 14 (66.7%) |       |
|                            | Multiparous         | 40 (46.0%) | 47 (54.0%) |       |
| Lifestyle                  | Active              | 18 (54.5%) | 15 (45.5%) | 0.210 |
|                            | Sedentary           | 27 (36.5%) | 47 (63.5%) |       |
|                            | Gym / exercise      | 5 (38.5%)  | 8 (61.5%)  |       |
| Diet                       | Home-made           | 4 (44.4%)  | 5 (55.6%)  | 0.328 |
|                            | Fast-food           | 19 (51.4%) | 18 (48.6%) |       |
|                            | Street-food         | 10 (28.6%) | 25 (71.4%) |       |
|                            | Following diet plan | 3 (60.0%)  | 2 (40.0%)  |       |
|                            | Skip meals          | 14 (41.2%) | 20 (58.8%) |       |
| Education                  | Educated            | 34 (41.5%) | 48 (58.5%) | 0.947 |
|                            | Uneducated          | 16 (42.1%) | 22 (57.9%) |       |
| Occupation                 | Housewife           | 19 (36.5%) | 33 (63.5%) | 0.234 |
|                            | Job                 | 16 (55.2%) | 13 (44.8%) |       |
|                            | Business            | 15 (38.5%) | 24 (61.5%) |       |
| Family history of diabetes | Positive            | 27 (50.0%) | 27 (50.0%) | 0.094 |
|                            | Negative            | 23 (34.8%) | 43 (65.2%) |       |

## Discussion

In this study, we observed the out of 120 women, 61 (50.8%) women had good knowledge about SMBG level during pregnancy, 66 (55.0%) had positive attitude and 50 (41.7%) had satisfactory practice of SMBG level. In our study, we observed low practice level of SMBG among pregnant women. This may be because of non-availability of glucometer at home. Another factors may include poor knowledge about SMBG, financial constraints, healthcare support, fear of finger-prick pain, and low self-efficacy.

Previous research has shown that a sizable portion of patients are already utilizing the device, either independently or with help. Despite this, a sizable portion either used improper practice methods or were unaware of how to use the gadgets correctly. Even if having access to a device and being able to use it correctly does not necessarily translate into adequate glycemic control in some groups, it still plays a big part in deciding how often to monitor, which helps minimize negative outcomes. (12)

A study including 499 pregnant women with gestational diabetes was conducted by Tan et al. They found that the average knowledge score was  $11.55 \pm 3.04$ , indicating a modest level of knowledge among the women examined. The significance of limiting daily total nutritional intake was only recognized by 26.25% of the women. (6) In a different study involving 187 pregnant women, Ibrahim et al. found that women's mean knowledge score for SMBG was  $14.13 \pm 3.05$ , indicating that 0.5% of them had good knowledge, 31% had average knowledge, and 68.5% had poor knowledge. Similarly, the mean attitude score for SMBG was  $8.76 \pm 1.39$ , indicating that 85.5% of respondents had a positive attitude, 10.2% had an average attitude, and 4.3% had a poor attitude. The mean score for practice was  $73.10 \pm 1.52$ , indicating that 18.7% of women had good practice, 42.8% had moderate practice, and 38.5% had bad practice when it came to SMBG. (11) These findings contradict to the findings we observed in our study. This may be due to differences in populations, as Lebanon is a under developed country and

mostly females belong to poor socioeconomic class, as well as difference in cultural and healthcare system as compared to Pakistan.

The distribution of a booklet containing information on SMBG, dietary management, and lifestyle change is implied by the educational approach covered in the study by Staynova et al. (13) A comparable study was conducted on sixty pregnant women by George et al. Fifteen of them had gestational diabetes. Regarding gestational diabetes mellitus and SMBG, they found that roughly 33.3% of women had low knowledge, 33.3% had moderate knowledge, and 33.3% had strong knowledge. In terms of practice, 53.3% had good practice and 46.7% had satisfactory practice. Knowledge and practice are positively correlated ( $p=0.04$ ). (14) These findings contradict to the findings we observed in our study. This may be due to differences in populations, as in few places in India are under developed areas and mostly females belong to poor socioeconomic class.

When combined with a package of interventions such as insulin therapy, dietary counseling, and ongoing prenatal care with health professionals, SMBG during pregnancy is both feasible and acceptable for women with gestational diabetes, and it is typically linked to comparable or better maternal and neonatal health outcomes when compared to standard care during prenatal check-up. However, in environments with restricted resources, more research is required. (15,16) The four quasi-experimental studies' comparability was further undermined by the inconsistent methods used to evaluate compliance. When at least 80% of the total (pre- and post-prandial) SMBG tests were completed, Cosson et al. deemed the individuals to be compliant.(17) In contrast, Peleg et al. calculated compliance by dividing the number of SMBG tests performed over a

given time period by the prescribed number of SMBG tests.(18) However, when eighteen SMBG samples were performed each week, compliance was guaranteed according to Mackillop et al.(19) According to Sousa et al., the compliance determination method was unclear.(20)

Additionally, Mohamed et al., conducted an observational cross-sectional study on 125 pregnant women with gestational diabetes and found that 82 of the patients had previously learned the fundamentals of SMBG equipment. Only seven of the twenty-four patients used it every day. They came to the conclusion that many diabetic individuals use SMBG equipment. To enable continued self-use with appropriate practice in line with education and access, however, a number of issues need to be addressed. (21) In a cross-sectional study, Ewunetu et al., found that fewer than half of the women used a glucometer to SMBG levels at home. Home SMBG was determined by a number of characteristics, including ownership of glucometers, receiving guidance on SMBG, educational attainment, and place of residence. As a result, medical professionals should educate diabetic patients about SMBG at home. (22)

The findings of this study proposed that fewer than half of females showed satisfactory SMBG practices suggests the need for structured educational interventions during antenatal care visits. In order to effectively manage gestational diabetes mellitus, SMBG is essential. Regular blood glucose monitoring helps pregnant women understand how diet, physical exercise, stress, and medication affect their blood sugar levels. It lowers the risk of problems for both mother and child, enhances glycemic control, and permits prompt therapy modifications.

**Limitations of study:**

We observed few limitations in the study. These limitations included that it was a single-center study, with cross-sectional study design. The response of females was based truly on self-reported responses that could be biased, possible recall bias. Moreover, for inclusion of females, we applied Non-probability sampling, which also reduce the authenticity of the data, as there are more than thousands pregnant women attending Gyne OPD, and the findings may not be generalizable to all pregnant women with gestational diabetes.

### Conclusion

This study reveals a significant knowledge-practice gap. Our findings highlight the urgent need for structured educational interventions during antenatal care to improve practical SMBG skills and address barriers such as glucometer access and fear of pain. Future research should focus on evaluating SMBG educational programs, exploring barriers through qualitative studies, and assessing technology-based interventions (e.g., mobile health apps) to enhance adherence and glycemic control, ultimately reducing pregnancy-related complications.

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### Conflict of Interest:

The authors declare that they have no conflicts of interest related to this study or its publication.

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| All the authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed. |                   |