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Prevalence of Gestational Diabetes Mellitus in Rural Population of Central India by DIPSI Test :atDoor-Step, an Observational Study

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Abstract

Background: Gestational diabetes mellitus is a growing public health concern worldwide, particularly in low- and middle-income countries like India. Rural populations often face challenges in timely diagnosis due to limited healthcare access and awareness. The Diabetes in Pregnancy Study Group of India (DIPSI) recommends a simplified one-step screening method suitable for resource-limited settings. The present study aimed to determine the prevalence of GDM and identify associated demographic, clinical and lifestyle risk factors among pregnant women in rural area of Central India.

Methods: A community-based cross-sectional study was conducted in 2024 over six months in villages under Rural Health Centre of a teaching Medical College. Antenatal women aged 18 to 45 years, at 24 to 28 weeks of gestation, 568 in number were screened by DIPSI criteria. Two hour blood sugar was estimated after giving 75 gm. oral glucose irrespective of fasting status. Blood glucose level $\geq$140mg/dl was considered positive. Variables studied were; demographic characteristics, socioeconomic status, literacy level, occupation, physical activity, knowledge of GDM, parity, family history of diabetes, BMI and dietary pattern. Associations of risk factors were analyzed by chi-square test in SPSS software.

Results: Prevalence of GDM was 14.4%. Significant association was observed in parameters like family history of diabetes (25.5% vs 10.9%; $p<0.001$), housewife as occupation ($p= 0.018$), sedentary lifestyle (24.9% ; $p<0.001$) as poor physical activity, multiparity, obesity in form of BMI > than 25kg/m^2 (28.3% vs 10.0%; $p<0.001$) and past history of GDM ($p<0.001$). More than half of the participants (58.5%) were unaware of GDM.

Conclusion: Prevalence of GDM in rural population is 14.4%. Significant association with high BMI and sedentary life style suggest a structured antenatal guideline for nutrition, optimum diet and physical activity protocols. Targeting rural population for screening by a door step strategy is the mainstay of this study.

Keywords: Obesity and GDM; DIPSI in rural population;Screening for GDM India

Abbreviations: GDM: Gestational diabetes mellitus; T2DM: Type 2 diabetes mellitus; DIPSI: Diabetes in pregnancy study group of India; RHC: Rural Health Centre; BMI : Body mass index; OGTT: Oral glucose tolerance test; IDRS: Indian diabetes risk score; CWWD: Cooking Well with Diabetes

Introduction

Gestational diabetes mellitus (GDM) is an increasingly recognized public health

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concern worldwide and represents one of the most significant metabolic complications of pregnancy [1]. It has emerged as a major public health issue in India, largely influenced by shifts in lifestyle, dietary habits, rapid urbanization, and rising rates of obesity and physical inactivity [2].

It is defined as glucose intolerance with onset or first recognition of abnormal blood sugar levels during pregnancy and is associated with short and long-term adverse maternal and fetal outcomes. Globally, nearly one in seven pregnancies is affected by hyperglycemia, with approximately 19.7% of live births in 2024 complicated by hyperglycemia in pregnancy, of which the majority are due to GDM [3]. As per a Meta Analysis in 2022, prevalence varies significantly across different regions. In North America, particularly in United States and Canada, GDM is reported in about 7.1% of pregnancies. In contrast, South East Asian countries, including China and India, show higher rates i e 20.8%, while North Africa and Middle East have still higher rates of 27.6% [4]. The rising prevalence of GDM particularly poses concerns as it has serious life-threatening adverse effects on both mother and the unborn child. Female with GDM is at risk of high blood pressure, infections, C-sections, early delivery, and stillbirth. Severe GDM might lead to diabetic ketoacidosis and delivery difficulties. It also affects neonates, increasing the risk of hypoglycemia, respiratory distress, and long-term concerns including metabolic syndrome, obesity, and heart disease [5]. Women with gestational diabetes and their infants are more likely to develop type 2 diabetes mellitus (T2DM) later in life. GDM and T2DM are linked in a vicious cycle as women with GDM are more likely to acquire T2DM postpartum, whereas those with T2DM are more likely to have GDM in previous pregnancies [6,7].

The recommendations for diagnosing GDM fluctuate from country to country and from healthcare system to healthcare system. When it comes to diagnosing GDM in India, Diabetes in Pregnancy Study group of India test (DIPSI) is a huge step forward, as it is simplified, non-fasting single-step screening method using a 75-g glucose load with a 2-hour plasma glucose value of ≥140 mg/dL as positive, while some authors have documented a poor predictive value and low negative predictive value of this test, putting a question mark on its universal use [8]. This method has gained wide acceptance due to its feasibility, cost-effectiveness, and suitability for resource-limited rural settings, while maintaining acceptable sensitivity and specificity compared to international criteria [9].

As there remains scarcity of reliable epidemiological data from rural regions of Madhya Pradesh, particularly in areas surrounding this district, rationale of this study is high. The rural population in this region represents diverse socioeconomic and cultural characteristics that may influence GDM prevalence and healthcare utilization patterns. Generating region-specific data is essential for guiding policy decisions, optimizing screening strategies, and improving maternal healthcare services in rural settings. Aim of the present study is to determine the prevalence of gestational diabetes mellitus in apopulation of Central India. The study also seeks to determine the risk factors for gestational diabetes within the studied population and to identify and analyze key demographic, clinical, and lifestyle factors associated with GDM.

Methods

This community-based cross-sectional study was conducted in the villages served by the Rural Health Center (RHC), affiliated to a Medical College. In this study house-to-house visits were undertaken to identify pregnant women and screen them for GDM. The study was carried out from January 1st, 2024 to 31st December 2025. Network of village health workers is already functional in this geographical site. All pregnant women residing in the selected villages were considered eligible for inclusion. An informed written consent in form of left thumb impression and name in Hindi language was obtained. Women aged 18–45 years, without previously diagnosed diabetes, and at 24–28 weeks of gestation at the time of screening were included, while those outside the specified gestational age, with known pre-existing diabetes mellitus, or unwilling to provide informed consent were excluded. The sample size was calculated assuming a GDM prevalence of 13.6% [10] with 3% absolute precision and 1.96 (95% confidence level), yielding a minimum sample size of 502. After accounting for a 10% non-response rate, the final target sample size was 553. Systematic household visits were conducted within the RHC catchment area to enumerate and recruit eligible participants. GDM was diagnosed using the DIPSI one-step method [11]. Each participant was administered 75 g of oral glucose irrespective of the last meal. Two-hour capillary blood glucose sample was collected from ante-cubital vein and venipuncture by a vacutainer. Value of ≥140 mg/dL was considered diagnostic. The primary outcome variable was GDM status (yes/no). Another variable was physical activity. Moderate activity is defined as an activity that requires three to six metabolic equivalents, where a metabolic equivalent is the ratio of the metabolic rate while performing the activity to the resting metabolic rate (measured in kcal/min.). Examples of moderate activity include walking briskly (3–4 mph), cycling for pleasure or transportation, and swimming [12]. For practical purpose we used the guidelines as per an Indian Text Book for Medical Graduates. Physical activity was classified as heavy activity (work involving sustained strenuous muscular effort), moderate activity (work requiring moderate physical effort and regular walking/standing), sedentary (work involving mostly sitting or standing with little physical efforts) [13]. Dietary patterns were categorized as traditional rural diet

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mainly (including cereal, pulses and dairy, excluding meat, fish and eggs) and mixed diet (diet including both plant foods and animal foods like meat, fish, eggs, and dairy) [13]. Data were entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics were applied to summarize variables, and GDM prevalence was calculated with 95% confidence intervals, while appropriate statistical tests were used to assess associations between GDM and explanatory variables. Age, parity, literacy, history of GDM, BMI, dietary pattern and physical activity were the variables. The study protocol was reviewed and approved by the Institutional Ethics Committee of Medical College (IEC Ref. No. PG/ OBSTETRICS & GYNAECOLOGY 48/2024). Participation was voluntary, and all eligible participants were provided with detailed information regarding the study objectives and procedures in a language they understood. Written informed consent was obtained prior to enrolment in Hindi (local language) and confidentiality was strictly maintained by anonymizing personal details, ensuring that all data were used solely for research purposes and that ethical standard were upheld throughout the study.

Results

Out of 568 women screened, 82 (14.4%) were GDM positive.

Table 1: Demographic, Clinical, and Obstetric Characteristics of the Study Subjects (n = 568).

Variable	Subgroups	n (%)
Age Group	<30 years	252 (44.4%)
	≥30 years	316 (55.6%)
Family History of Diabetes	Present	137 (24.1%)
	Absent	431 (75.9%)
Past History of GDM	Present	54 (9.5%)
	Absent	514 (90.5%)
BMI	<25 kg/m²	430 (75.7%)
	≥25 kg/m²	138 (24.3%)
Socioeconomic Status (SES)	Low (Class IV & V)	308 (54.2%)
	Middle (Class II & III)	234 (41.2%)
	High (Class I)	26 (4.6%)
Literacy Level	Illiterate	160 (28.2%)
	Primary	141 (24.8%)
	Secondary	160 (28.2%)
	Higher Secondary	84 (14.8%)
	Graduate	23 (4.0%)
Parity	Primi (Gravida 1)	115 (20.2%)
	Multi (Gravida ≥2)	453 (79.8%)
Knowledge Of GDM	Yes	236 (41.5%)
	No	332 (58.5%)

Table 1 presents the demographic, clinical, and obstetric characteristics of the study population comprising 568 pregnant women. More than half of the participants (55.6%) were aged ≥30 years, while 44.4% were below 30 years of age. A positive family history of diabetes was reported by 24.1% of women, whereas the majority (75.9%) had no such history. Only 9.5% of participants reported a past history of GDM. Regarding nutritional status, 24.3% of women had a body mass index (BMI) ≥25 kg/m², while 75.7% had BMI <25 kg/m². Most participants belonged to lower socioeconomic groups, with 54.2% in the low socioeconomic category. In terms of literacy, illiterate and secondary-educated women each constituted 28.2% of the study population. Multigravida women comprised the majority (79.8%). Additionally, 41.5% had knowledge of GDM whereas a larger proportion, 58.5% had no knowledge of GDM.

Table 2: Comparison of Prevalence of GDM in various demographic parameters in 568 WomenGDM n = 82, Non-GDM n = 486.

Variable	Subgroups	GDM n=82 (%)	Non-GDM n=486(%)	p-value
Age Group	<30 years	36 (14.3%)	216 (85.7%)	0.825
	≥30 years	46 (14.6%)	270 (85.4%)	
Socioeconomic Status	Low (Class IV & V)	48 (15.6%)	260 (84.4%)	0.814
	Middle (Class II &III)	30 (12.8%)	204 (87.2%)	
	High (Class I)	4 (15.4%)	22 (84.6%)	
Literacy Level	Illiterate	29 (18.1%)	131 (81.9%)	0.139
	Primary	19 (13.5%)	122 (86.5%)	
	Secondary	16 (10.0%)	144 (90.0%)	
	Higher Secondary	12 (14.3%)	72 (85.7%)	
	Graduate	6 (26.1%)	17 (73.9%)	
Occupation	Farmer	13 (15.1%)	73 (84.9%)	0.018*
	Housewife	32 (15.2%)	179 (84.8%)	
	Laborer	17 (11.0%)	138 (89.0%)	
	Others	16 (27.1%)	43 (72.9%)	
	Service	4 (7.0%)	53 (93.0%)	
Physical Activity	Active	8 (7.0%)	106 (93.0%)	<0.001*
	Moderate	31 (11.0%)	250 (89.0%)	
	Sedentary	43 (24.9%)	130 (75.1%)	
Dietary Pattern	Traditional Rural	46 (13.0%)	308 (87.0%)	0.257
	Mixed	36 (16.8%)	178 (83.2%)	
Knowledge of GDM	Yes	33 (14%)	203 (86.0%)	0.795
	No	49 (14.8%)	283 (85.2%)	

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Table 2 shows the association between selected demographic factors and GDM among the study participants. The prevalence of GDM did not differ significantly across socioeconomic groups, with rates of 15.6% in the low socioeconomic group, 12.8% in the middle group, and 15.4% in the high group (p=0.814). Similarly, literacy level was not significantly associated with GDM (p=0.139), although slightly higher proportions were observed among illiterate (18.1%) and graduate women (26.1%). A statistically significant association was observed between occupation and GDM (p=0.018), with the highest prevalence noted among women engaged in other occupations farming and labourers (27.1%) and the lowest among those in service (7.0%). In contrast, maternal age did not show a significant association with GDM occurrence (p=0.825).Physical activity demonstrated a protective effect, as sedentary women showed the highest GDM prevalence (24.9%) (p<0.001). Dietary pattern showed no statistically significant association with GDM (p=0.257). Similarly, prevalence of GDM did not differ significantly by the knowledge of GDM, with rates of 14% in aware group, 14.8% in unaware group (p=0.795).

Table 3: Comparison of Prevalence of GDM in various clinical and obstetricparameters in 568 WomenGDM n = 82, Non-GDM n = 486.

Variable	Subgroups	GDM (N=82)	Non-GDM (N=486)	p-value
		n (%)	n (%)	
Family History of Diabetes	Present	35 (25.5%)	102 (74.5%)	<0.001*
	Absent	47 (10.9%)	384 (89.1%)	
Past History of GDM	Present	26 (48.1%)	28 (51.9%)	<0.001*
	Absent	56 (10.9%)	458 (89.1%)	
BMI	≥25 kg/m²	39 (28.3%)	99 (71.7%)	<0.001*
	<25 kg/m²	43 (10.0%)	387 (90.0%)	
Parity	Multigravida	74 (16.3%)	379 (83.7%)	0.032*
	Primigravida	8 (7%)	107 (93%)	

Table 3 presents the association between selected clinical and lifestyle risk factors and GDM. Maternal age was not significantly associated with GDM, as similar proportions of cases were observed among women aged <30 years (14.3%) and ≥30 years (14.6%) (p=0.825). However, a strong association was found between family history of diabetes and GDM, with a significantly higher prevalence among women with a positive family history (25.5%) compared to those without (10.9%) (p<0.001). Past history of GDM also showed a highly significant association, as nearly half of the women with previous GDM (48.1%) developed GDM in the current pregnancy (p<0.001). Increased body mass index (BMI ≥25 kg/m²) was another significant risk factor, with 28.3% prevalence of GDM (p<0.001). Parity also showed a significant association (p=0.032), with multigravida women demonstrating higher GDM prevalence (16.3%) compared to primigravida women (7.0%).

Discussion

A recent systematic review carried out in India describing National and Regional prevalences in GDM has addressed the true scenario. India contributes substantially to the global burden of GDM, with national prevalence estimates ranging from 9% to 16%, although considerable regional variation exists due to differences in population characteristics, healthcare access, and diagnostic methods. Despite sometimes showing slightly lower reported prevalence than urban populations, rural populations face greater challenges in diagnosis due to inadequate screening facilities, limited healthcare resources, lack of knowledge and delayed antenatal care utilization [14]. Consequently, the true burden of GDM in rural areas may be underestimated. This study was carried out in rural area by a doorstep approach. We were co-operated by health workers from department of Community Medicine. As such the Rural Health Centre is functional for the last 25 years. As the women know these workers, they were quite co-operative and we had no hindrance in counseling and collecting the sample. As diagnosing GDM by oral glucose tolerance test (OGTT) is little tedious and impractical, we selected DIPSI as a standard test for GDM diagnosis. This test is practical and specially recommended for illiterate and socioeconomically backward females in rural population of Central India. This also avoids multiple sampling. It is also single step, simple, and economical. While comparing DIPSI and OGTT some Indian authors have documented no difference in between these two [15].

The present study screened 568 pregnant women and identified 82 of GDM, yielding a prevalence of 14.4% using the DIPSI criterion. A statistically significant difference in mean 2-hour glucose levels between GDM-positive and GDM-negative groups (p < 0.001) demonstrated clear diagnostic separation, supporting the validity of the screening approach in this cohort. The observed prevalence aligns with Indian epidemiological trends that demonstrate substantial regional heterogeneity. A multicentric study conducted across various Indian states reported considerable variation in the prevalence of GDM, reflecting differences in demographic profiles, healthcare access, and lifestyle factors [16]. Other Indian studies have highlighted superiority of doing Indian diabetes risk score (IDRS) and OGTT over doing OGTT alone in Indian population reinforcing the need for context-specific public health strategies and more economical approach [17]. Systematic reviews have also emphasized that prevalence estimates are sensitive to diagnostic thresholds and screening methods, particularly in low-resource settings [14,18]. Thus, the prevalence of 14.4% observed in this rural–peri-rural population is epidemiologically plausible and consistent with national observations.

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Socio-demographic characteristics in the present study showed limited association with GDM, as maternal age, education level, and socioeconomic status did not demonstrate statistically significant relationships. However, occupational status showed a meaningful association, suggesting that occupation may serve as a surrogate indicator for lifestyle factors such as physical activity levels and occupational stress (Table-2). Similar variability in socio-demographic associations has been reported in national datasets, where contextual factors influence risk distribution [16]. The lack of strong associations with traditional demographic variables may indicate relatively uniform lifestyle patterns across socioeconomic groups in rural populations.

An additional noteworthy finding was the limited awareness of GDM among participants, with more than half of women unaware of the condition despite attending antenatal care services (Table-2). Similar knowledge gaps have been documented in Indian studies assessing maternal awareness of GDM [8]. Some studies have documented that awareness influences management rather than occurrence. There is quite fair knowledge of diabetes in LMIC populations of Nigeria and Sri Lanka, but practices in form of voluntary screening is poor [19,20]. However, other recent studies report low awareness contributing to poor screening and higher disease burden. Lack of awareness represents a critical barrier to early detection and effective management. Integrating structured education on GDM into antenatal programs could improve screening compliance, promote lifestyle modification, and ultimately enhance maternal and fetal outcomes. Health information on GDM prevention diets and exercise during antenatal care may improve this scenario as recommended in an Ethiopian study [21,22].

Physical activity emerged as another important modifiable lifestyle factor significantly associated with GDM risk. Women with sedentary lifestyles demonstrated substantially higher GDM prevalence compared to those who were engaged in moderate and active physical activity ($p < 0.001$) (Table-2). These findings are consistent with the study which reported reduced GDM risk among women performing moderate physical activity, emphasizing the protective metabolic effects of exercise. Physical inactivity contributes to increased adiposity and reduced insulin sensitivity, thereby amplifying metabolic stress during pregnancy. These results support the inclusion of structured physical activity recommendations within routine antenatal counseling programs. The exercise compliance rate of 27.42% in 41% of pregnant women with GDM had sedentary time more than 6 h per day; was the finding of a study in China. Inability to do physical activity due to pregnancy symptoms or discomfort in 32.1% had better glycemic control. The number of sedentary-lifestyle days ($OR = 1.227$, 95% CI 1.090–1.382, $P = 0.001$) were the independent risk factors for failing to meet exercise standard among pregnant women, was the finding in a study in China [23].

A key strength of the present study is the identification of BMI as a major determinant of GDM risk, highlighting the central role of maternal adiposity. Women with BMI ≥25 kg/m² demonstrated significantly higher GDM prevalence compared to those with lower BMI ($p < 0.001$) (Table-3). These findings strongly support evidence from global and regional studies emphasizing obesity as a primary modifiable risk factor. In a systematic review and meta-analysis, it demonstrated that overweight and all types of obesity significantly increase the likelihood of developing GDM across diverse populations [24]. Excessive weight gain in pregnancy is a good predictor of GDM [25]. An Indian context similarly documented increased GDM prevalence among overweight and obese pregnant women, emphasizing the relevance of these findings in local populations [26]. The observed association likely reflects increased insulin resistance and β-cell stress associated with excess adiposity, which becomes clinically significant during pregnancy due to the physiological insulin-resistant state. These results emphasize the importance of pre-pregnancy weight optimization, nutritional counseling, and targeted antenatal interventions aimed at reducing obesity-related metabolic risk. Among modifiable risk factors, increased BMI and sedentary lifestyle highlight the role of counseling in antenatal clinics. These findings are consistent with systematic reviews which demonstrated strong associations between obesity and GDM risk, reporting protective effects of physical activity against GDM [24]. Additionally, limited awareness regarding GDM observed in this study supports earlier findings indicating persistent knowledge gaps among pregnant women [8]. Collectively, these results emphasize the need for targeted screening, lifestyle modification, and structured health education programs to reduce GDM burden in rural populations.

In contrast to BMI, dietary pattern in the present study did not show a statistically significant association with GDM ($p = 0.257$), although a slightly higher prevalence was noted among women consuming mixed diets compared to traditional rural diets (Table-2). This observation contrasts with several international studies demonstrating dietary influences on GDM risk. In a meta-analysis the authors reported that diets rich in saturated fats in red meat, fried food and processed foods increased GDM risk, whereas fiber-rich diets and whole grains were protective [27]. Similarly other studies demonstrated the adherence to healthy dietary patterns, particularly Mediterranean-style diets, significantly reducing risk of GDM [28]. Variability in meal composition, portion size, glycemic load, and cooking practices can be changed by guideline of The Texas A&M Agri Life Extension Service developed by Cooking Well with Diabetes (CWWD) group [29]. Therefore, the lack of statistical significance in the present study may reflect variability in dietary practices. Future studies incorporating detailed dietary quantification

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and glycemic load assessment may provide more accurate insights into dietary risk factors.

Beyond lifestyle factors, obstetric and familial characteristics also demonstrated meaningful associations with GDM risk. Increasing parity showed a progressive rise in GDM prevalence, suggesting cumulative metabolic burden with successive pregnancies (Table-3). An observational study conducted among pregnant women reported multiparity as an independent risk factor for the development of GDM [30]. Family history of diabetes emerged as a strong predictor, with higher prevalence being observed among women with affected relatives. Previous history of GDM was associated with a notably high recurrence risk, reinforcing established evidence that prior GDM is a major predictor of future disease (Table-3). A longitudinal follow-up study identified recurrence risk as a major determinant of long-term metabolic complications, whereas a study evaluating familial aggregation emphasized the role of familial clustering in increasing susceptibility to glucose intolerance. Systematic reviews further confirm family history as a well-recognized risk factor for GDM [31,32]. These findings reflect shared genetic predisposition and environmental influences contributing to insulin resistance and β-cell dysfunction.

Strengths and Limitations of the Study

The present study has several notable strengths. Being a **community-based study conducted in a rural setting**, it provides valuable population-level data that better reflects the true burden of GDM compared to facility-based studies. The use of a **standardized DIPSI 75 g oral glucose tolerance test** ensured uniform screening across all participants and enhanced the feasibility of implementation in resource-limited settings. Additionally, the study identified **significant associations with modifiable risk factors** such as BMI and physical activity offering useful insights for targeted prevention strategies. Inclusion of indicators such as antenatal care visits and awareness of GDM further adds **programmatic relevance** for community health planning. Early diagnosis of GDM enables timely management and intervention, which will significantly reduce the risk of immediate pregnancy-related complications. This will also help to prevent long-term health issues in the mother. Beauty of this study is Door-to-door visits for GDM screening as it improves early detection, ensures wider population coverage, enhancing accessibility and compliance. This will promote awareness and facilitate better follow-up care.

However, certain limitations should be considered. The **cross-sectional design** limits causal inference between risk factors and GDM. Some variables were **self-reported**, introducing possible recall bias. Furthermore, the findings from a **single rural area** may limit generalized statement for other populations.

Most recent study in India concludes the prevalence of GDM to be 25%. Regional variability is always there as the agricultural products are diversified. The prevalence of Early GDM is also high. Thus, there is a need for screening of all pregnant women for GDM in early pregnancy. [2].

Conclusion

The present study demonstrates GDM diagnosed by DIPSI criteria representing a significant public health concern in the rural field practice area of Central India, with a prevalence of **14.4%**. The findings indicate that GDM risk was strongly associated with key factors such as **family history of diabetes, previous history of GDM, higher BMI ≥25 kg/m², and sedentary lifestyle;** highlighting the importance of both genetic predisposition and modifiable lifestyle behaviors. Additionally, more than half of the participants lacked awareness regarding GDM, emphasizing gaps in health education. Overall, the study supports the need for advising **universal screening programs by DIPSI, advocating** lifestyle modifications, enhancing awareness and structured antenatal guideline for nutrition, optimum diet and physical activity protocols; will help to reduce the burden of GDM in rural population.

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Authors contribution:

SB – Conceived the idea, wrote manuscript, PB – Data collection and software assistance, PKR – Main guide for the whole study, KM – Writing, assembling and finalizing the manuscript.

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Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This proposal was approved by Ethical Committee at R. D. Gardi Medical College, Surasa, Ujjain (IEC Ref. No. PG/OBSTETRICS & GYNAECOLOGY 48/2024). All participants volunteered consent to participate. An informed written consent was obtained from all participants in Hindi, our local language, as per relevant guidelines and regulations of Declaration of Helsinki.

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Competing Interests

All authors : SB, PB, PKR, KM declare that we have no competing interests.

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