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RELATIONSHIP BETWEEN PREVALENCE OF GESTATIONAL DIABETES MELLITUS AND PERIOD OF GESTATION: EVIDENCE FROM A RANDOMIZED CONTROLLED TRIAL

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Abstract

Background: Gestational diabetes mellitus (GDM) is typically diagnosed between 24–28 weeks of gestation when insulin resistance peaks. However, its onset and detection can occur across a range of gestational periods, raising questions about variations in prevalence by gestational age.

Objective: To evaluate the distribution and proportion of GDM diagnoses relative to different gestational age groups at time of presentation and recruitment in a Himachal Pradesh–based randomized controlled trial.

Methods: Sixty women diagnosed with GDM based on IADPSG criteria were enrolled in a double-blind randomized placebo-controlled clinical trial. Participants were grouped according to gestational age at enrollment. Chi-square analysis was used to assess the relationship between period of gestation and distribution of GDM cases.

Results: A majority of participants (35%) were diagnosed during the gestational window of 28+1 to 32 weeks, followed by 24+1 to 28 weeks (21.7%). The earliest diagnoses (<20 weeks) accounted for only 15% of cases. The gestational age distribution did not significantly differ between treatment groups ($p = 0.154$), but late second to early third trimester saw the highest case detection.

Conclusion: The distribution of GDM diagnoses in this cohort closely aligns with the physiologic trajectory of insulin resistance during pregnancy, peaking around the late second trimester. This supports routine screening for GDM around 24–28 weeks, but highlights the importance of early screening in high-risk populations.

Introduction

Gestational diabetes mellitus (GDM) arises due to increased insulin resistance mediated by placental hormones. Typically screened between 24 and 28 weeks of gestation, GDM poses significant risks to maternal and neonatal health. However, variations in its onset and detection relative to gestational age

pose challenges to timely diagnosis. Early-onset GDM, often indicative of previously unrecognized diabetes or high-risk metabolic profiles, may require differentiated management approaches.
This paper evaluates the temporal diagnosis pattern of GDM across gestational age groups using data from a randomized controlled trial conducted at a tertiary care hospital in North India.

Methods

Study Design

Double-blind, randomized controlled trial conducted at Dr. Rajendra Prasad Government Medical College, Tanda, Himachal Pradesh.

Participants

Women between 18–45 years with singleton pregnancies were screened according to IADPSG criteria. GDM diagnosis was made if any of the following 75g OGTT values were met:

- Fasting ≥92 mg/dL
- 1-hour ≥180 mg/dL
- 2-hour ≥153 mg/dL

Based on gestational age (POG) at time of diagnosis, participants were grouped:

- <20 weeks
- 20–24 weeks
- 24+1–28 weeks
- 28+1–32 weeks
- 32+1–36 weeks

Statistical Analysis

Descriptive statistics were used to summarize the data. Chi-square test was employed to determine if period of gestation at diagnosis significantly differed between study groups.

Results

Distribution of GDM by Gestational Age at Diagnosis

Gestational Age (POG)	Probiotic Group (n=30)	Placebo Group (n=30)	Total (%)
< 20 weeks	6 (20%)	3 (10%)	9 (15%)
20–24 weeks	7 (23.3%)	3 (10%)	10 (16.7%)
24+1–28 weeks	7 (23.3%)	6 (20%)	13 (21.7%)
28+1–32 weeks	6 (20%)	15 (50%)	21 (35%)
32+1–36 weeks	4 (13.3%)	3 (10%)	7 (11.7%)

- The peak GDM detection occurred **between 28+1 to 32 weeks** (35%).
- **Only 15%** of the cases were diagnosed before 20 weeks.
- No statistically significant differences were observed in gestational distribution between groups (Chi-square = 6.677, p = 0.154).

Discussion

This study found that most GDM diagnoses occurred during the **late second to early third trimester**, mirroring the known physiological pattern of increased insulin resistance as gestation progresses. The 24–32 week window accounted for over **56.7%** of cases, supporting current international recommendations for routine screening during this timeframe [13].

However, **15% of the patients were diagnosed before 20 weeks**, suggesting possible pre-existing but unrecognized dysglycemia. Early detection is crucial, as early-onset GDM has been linked to increased risks of fetal overgrowth, cesarean section, and adverse cardiometabolic profiles in offspring.

Our findings align with large-scale studies like the **Hyperglycemia and Adverse Pregnancy Outcome (HAPO)** study, which emphasized the role of mid-pregnancy screening but acknowledged the importance of early risk-based screening.

Potential Explanatory Factors:

- Increasing screening at first antenatal visit likely captured asymptomatic, early hyperglycemia.
- The physiology of pregnancy supports a rise in insulin resistance beginning in the second trimester and peaking late in the third.

Conclusion

This study supports the prevailing practice of screening for GDM between **24–28 weeks**, when the majority of cases are likely to be detected. However, the 15% of early-diagnosed GDM suggests the value of earlier screening in high-risk women. A tiered diagnostic approach, beginning with first-trimester risk assessment and continuing with mid-trimester universal screening, may enhance detection and early management of GDM.

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