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RESEARCH ARTICLE
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EFFECT OF PROBIOTIC SUPPLEMENTATION ON FASTING AND POSTPRANDIAL BLOOD SUGAR IN PATIENTS WITH GESTATIONAL DIABETES MELLITUS

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Abstract

Background: Gestational diabetes mellitus (GDM) presents a risk for adverse maternal and fetal outcomes, primarily due to hyperglycemia. Interest in probiotics as adjunctive therapy for glycemic control has increased, but their specific effects on fasting blood sugar (FBS) and postprandial blood sugar (PPBS) remain uncertain.

Objective: To evaluate the effect of a multi-strain probiotic supplement on FBS and PPBS in women with GDM.

Methods: A double-blind, randomized, placebo-controlled trial was conducted at a tertiary care center. Sixty newly diagnosed GDM patients meeting inclusion criteria were randomized to receive either a daily probiotic capsule or placebo for four weeks. FBS and PPBS were measured at baseline and after supplementation. Standard diet and lifestyle counseling were administered to all participants.

Introduction

GDM is a carbohydrate intolerance of variable severity arising in pregnancy, with a prevalence of 9.3–25.5% in India. Hyperglycemia during pregnancy increases the risk of adverse outcomes for both mother and child. Recent literature suggests that probiotics—live microorganisms with potential metabolic benefits—may help improve glycemic control by modulating gut microbiota, inflammatory responses, and insulin sensitivity. However, the effect of such interventions on FBS and PPBS in GDM populations, particularly in Indian settings, has not been fully established[10].

Methods

Study Design

- **Type:** Double-blind, placebo-controlled randomized clinical trial
- **Population:** Newly diagnosed GDM women (n=60), aged 18–45, with singleton pregnancies

- **Intervention:** Daily capsule of either a probiotic blend (Lactobacillus acidophilus, L. rhamnosus, Bifidobacterium longum, B. bifidum, Streptococcus thermophilus, Saccharomyces boulardii) or placebo for 4 weeks
- All patients received medical nutrition therapy and lifestyle counseling

Outcome Measures
- **Primary outcomes:** Fasting blood sugar (FBS), postprandial blood sugar (PPBS)
- **Assessment:** Baseline and post-4-week measurements

Statistical Analysis
Intra- and intergroup comparisons for FBS and PPBS were performed using paired and unpaired t-tests. $p<0.05$ was considered statistically significant.

Results
Baseline Characteristics
- No significant differences between groups in age, gestational age, BMI, family history of diabetes, physical activity, or most demographic/clinical factors, except for body weight and anemia prevalence.

FBS Outcomes
- **Probiotic group (n=30):**
  - Baseline FBS: 92.73±9.84mg/dL
  - 4 weeks FBS: 88.63±9.40mg/dL
  - Mean change: –4.1mg/dL, p=0.015 (significant within group)
- **Placebo group (n=30):**
  - Baseline FBS: 96.17±4.58mg/dL
  - 4 weeks FBS: 93.27±3.70mg/dL
  - Mean change: –2.9mg/dL, p=0.003 (significant within group)
- **Between-group comparison:** No statistically significant difference in FBS reduction between probiotic and placebo groups.

PPBS Outcomes
- **Probiotic group:**
  - Baseline PPBS: 115.77±17.90mg/dL
  - 4 weeks PPBS: 112.50±14.03mg/dL
  - Change: –3.3mg/dL, p=0.149 (not significant)
- **Placebo group:**
  - Baseline PPBS: 119.27±11.98mg/dL
  - 4 weeks PPBS: 120.23±11.45mg/dL
  - Change: +1mg/dL, p=0.418 (not significant)
- **Between-group difference:** No statistically significant difference in PPBS changes.

Table: Glycemic Outcomes

Group	Baseline FBS (mg/dL)	4 Weeks FBS	p-value	Baseline PPBS	4 Weeks PPBS	p-value
Probiotic	92.73 ± 9.84	88.63 ± 9.40	0.015	115.77 ± 17.90	112.50 ± 14.03	0.149
Placebo	96.17 ± 4.58	93.27 ± 3.70	0.003	119.27 ± 11.98	120.23 ± 11.45	0.418

Discussion

Both probiotic and placebo groups showed significant reductions in FBS after 4 weeks, likely reflecting combined effects of medical nutrition therapy, lifestyle intervention, and possibly a placebo effect. No statistically significant change was observed in PPBS for either group. Intergroup differences in FBS and PPBS reduction were not significant, suggesting that while probiotics may be safe and well-tolerated, their additional benefit on these glycemic endpoints in GDM is not clearly established within a 4-week intervention window.

These results are consistent with previous randomized trials and meta-analyses indicating statistically significant, though modest, reductions in FBS with probiotics, but minimal effect on PPBS. Variability across studies may be attributed to factors such as baseline glycemic status, probiotic strains, ethnic background, and duration of supplementation.

Conclusion

- **FBS:** Probiotic supplementation was associated with a significant reduction in FBS within group, but not superior to placebo or standard care.
- **PPBS:** No significant improvement in PPBS with probiotic supplementation.
- **Recommendation:** Probiotics may be considered as safe adjuncts, but routine use for the specific purpose of lowering FBS or PPBS in GDM patients cannot be recommended based on current evidence.

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