RESEARCH PAPER

Comparing Maternal Satisfaction between Midwifery-Integrated Physical Therapy and Conventional Care in Gestational Diabetes Mellitus: A Cross-Sectional Analysis Using General Linear and Multivariate Models.

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ABSTRACT

Background: A common pregnancy issue, gestational diabetes mellitus (GDM) necessitates prompt, all-encompassing care to provide the best possible outcomes for both mothers and newborns. Midwifery-led physical therapy and normal medical care are two of the most popular modes of care, but little is known about how they affect maternal satisfaction. Maternal satisfaction is compared between these two methods in this study.

Objectives: The study's objectives were to measure and compare overall maternal happiness between the two care models, identify important factors impacting satisfaction, and analyze the particular role that midwifery-led physical therapy plays in enhancing the care experience for women with GDM.

Methods: Pregnant women with GDM who received either Standard Care (SC) or Midwifery-Led Physical Therapy (MLPT) were included in a comparative cross-sectional design. A validated maternal satisfaction questionnaire covering topics like tailored care, continuity, communication, physical comfort, and emotional support was used to gauge satisfaction levels. To assess satisfaction between groups and find predictive characteristics, data were analyzed using the proper statistical techniques, such as GLM and multivariate analysis.

Results: Results show that compared to moms receiving normal treatment, those in the MLPT group had far better satisfaction scores. Personalized care, ongoing assistance, comprehensive physical therapy therapies, and better communication provided by midwives were the main factors linked to increased satisfaction. Standard care was seen as more fragmented and less customized, despite the fact that it successfully handled clinical management.

Conclusion: By providing individualized, ongoing, and supportive care, midwifery-led physical therapy significantly increases maternal satisfaction among women with GDM. The findings demonstrate the importance of incorporating midwifery-led elements into routine GDM management to improve patient outcomes and care experiences. To investigate long-term advantages and more comprehensive implementation options, more research is necessary

Keywords: Maternal satisfaction, Midwifery-Led Physical Therapy, Standard care, Gestational Diabetes Mellitus (GDM)
How to cite this article: Nayak D, Tripathy P, Nayak PK., Comparing Maternal Satisfaction between Midwifery-Integrated Physical Therapy and Conventional Care in Gestational Diabetes Mellitus: A Cross-Sectional Analysis Using General Linear and Multivariate Models...Int J Drug Deliv Technol. 2026;16(2s): 785-792; DOI: 10.25258/ijddt.16. 785-792
Source of support: Nil.
Conflict of interest: None

INTRODUCTION

Glucose intolerance initially detected during pregnancy, usually in the second or third trimester, in women without a history of diabetes is the hallmark of gestational diabetes mellitus (GDM) [1]. Macrosomia, hypertensive problems, and an increased risk of cesarean delivery are among the serious health hazards associated with GDM for both mothers and newborns [2]. Therefore, to maximize pregnancy outcomes and guarantee maternal well-being, effective management measures are crucial.

Standard obstetric care, which emphasizes glucose monitoring, dietary modification, pharmacologic therapy when necessary, and regular prenatal observation, is how GDM is traditionally managed [3]. Although this method is clinically structured and successful in addressing metabolic imbalance, it frequently places little emphasis on ongoing caregiver engagement, personalized support, and emotional well-being [4].

Midwifery-Integrated Physical Therapy (MIPT) has become a potential complementary approach in response to the increasing focus on patient-centered maternity care. Midwifery-integrated care combines therapeutic physical interventions specifically designed for pregnant women with GDM with the clinical supervision of midwives. This strategy promotes insulin sensitivity, weight balance, physical comfort, and psychological well-being through supervised exercise, posture and mobility training, breathing exercises, lifestyle changes, and education [5]. Midwives assist women in safely incorporating these physical therapy techniques into everyday routines, improving metabolic control and overall pleasure through ongoing support and individualized coaching [6].

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There is growing evidence that midwifery-integrated approaches, which prioritize holistic care, continuity, and active participation in decision-making, enhance maternal satisfaction [7, 8]. Midwifery-integrated programs provide better communication, emotional support, and a therapeutic alliance than traditional treatment, enabling mothers to more confidently control their illness [9]. Continuity of midwifery support is linked to lower anxiety, higher self-efficacy, and more favorable delivery experiences, according to randomized research [10]. Additionally, it has been discovered that including physical therapy into midwifery care improves blood glucose management, lessens pregnant discomfort, and strengthens maternal well-being, all of which increase satisfaction among GDM women [11].

For advanced procedures and medical monitoring, however, traditional obstetric care is still essential, especially for women with severe illnesses that call for specialized supervision [12]. Conventional care may be viewed as fragmented because of the numerous providers and low emotional engagement, even when it is beneficial from a clinical perspective [13]. This can lower satisfaction among women who want more individualized and ongoing care. Notwithstanding the benefits of midwifery-integrated care, there are still issues with staffing, consistent training, and system-wide adoption that could limit scalability across geographical boundaries [14,15].

To improve mother outcomes and experience, integrative models that combine the advantages of traditional medical treatment with the tailored approach of midwifery-led interventions are becoming more and more advised [16,17]. Supportive and relationship-centered care approaches are crucial given the psychological effects of GDM, such as stress, anxiety, and a decline in marriage satisfaction [18].

Few studies have explicitly compared Midwifery-Integrated Physical Therapy (MIPT) with Conventional Care in the management of GDM, despite the fact that the literature currently in publication emphasizes increased satisfaction with midwifery-led therapies. Understanding the distinctions between these two approaches is essential for enhancing the quality of care and creating successful, patient-responsive GDM programs since maternal satisfaction affects adherence, glycemic control, and emotional health.

Therefore, the purpose of this study is to assess and compare maternal satisfaction among GDM women getting Conventional Care versus Midwifery-Integrated Physical Therapy, as well as to identify critical elements that contribute to better patient experiences in each model.

METHODOLOGY

In order to investigate maternal satisfaction among women with gestational diabetes mellitus (GDM) receiving two distinct models of care—Midwifery-Integrated Physical Therapy and Conventional Obstetric Care—at IMS and SUM Hospital in Bhubaneswar, Odisha, this study used a comparative cross-sectional design. Pregnant women between the ages of 18 and 45 who had been clinically diagnosed with GDM and were getting either of the two care models during their prenatal follow-up made up the study population. Women with repeated pregnancies, major medical or obstetric issues needing specialist or intensive care management, or pre-existing Type 1 or Type 2 diabetes were excluded. During usual prenatal visits, eligible participants were contacted after being identified from hospital medical records. Prior to enrollment, each participant provided written informed permission after being screened for eligibility.

Based on power analysis for comparing two independent groups, a sample size of 140 was chosen, assuming a statistical power of 80%, a significance level of 0.05, and a medium effect size (Cohen's d = 0.5). The intended sample was 140 after an extra 10% was added to the initial calculation of 128 participants to account for possible attrition. A straightforward random sampling technique was then used to divide the participants into two groups, with 65 women in the Conventional Care group and 75 in the Midwifery-Integrated Physical Therapy group. The lack of stratification caused a little imbalance, but it had no effect on group comparability. Throughout the data collection period, all participants remained in the study, and no significant dropouts or withdrawals were reported. Both groups continued to receive their respective models of care, and all assessments were completed as per protocol.

Data Collection Tools and Techniques

A standardized and validated questionnaire designed to assess the quality of care received by women with gestational diabetes mellitus (GDM) was used to measure maternal satisfaction. The tool was divided into sections that collected demographic data, pertinent clinical data, and specific satisfaction indicators. Personalized Care, Continuity and Convenience of Care, Educational Support and Information, and Emotional and Psychological Support were the four key categories into which the questionnaire's satisfaction section was divided. Each category included a number of items intended to elicit detailed input on mothers' experiences with the two forms of care. Responses were measured using a five-point Likert scale, with 1 denoting extreme dissatisfaction and 5 denoting extreme satisfaction. To create an overall satisfaction score, domain scores were calculated and added together; higher numbers denoted higher levels of satisfaction. To support and contextualize the results, clinical data was obtained from hospital medical records, including GDM care methods followed, maternal and newborn outcomes, and any noted problems, in addition to self-reported data.

Data Collection Procedure

The hospital's electronic and manual medical records were used to identify eligible participants in accordance with the study's inclusion and exclusion criteria. Potential participants were contacted during their planned prenatal visits, regular check-ups, or postpartum follow-up sessions after they were identified. Each woman received a clear and comprehensive explanation of the study's goal and all necessary information. The information sheet was given to those who indicated interest, and before to enrollment, written informed consent was acquired.

The maternal satisfaction questionnaire was administered at a convenient time for the participants to minimize disruption to their clinical routine. Data collection occurred either in person, facilitated by the researcher or trained research assistants, or electronically, through secure digital forms, depending on the participant's preference and accessibility. Participants were encouraged to answer all items honestly and were assured that their responses would not influence their ongoing care.

In addition to the questionnaire, other clinical information was taken from the hospital's electronic medical record system, including treatment adherence, maternal health indicators, newborn outcomes, and GDM management guidelines. Strict respect to confidentiality standards was ensured by limiting access to these records to authorized people only. Before being added to the study database, all gathered data was verified for accuracy and completeness.

Ethical Considerations

The investigation was carried out in compliance with accepted ethical standards for human subjects in biomedical research. All participants were given thorough information about the study's goals, methods, projected length, possible hazards, and expected benefits prior to enrollment. Each subject provided written informed consent, guaranteeing their voluntary and knowledgeable involvement.

Each participant was given a unique identifying code to ensure secrecy, and all information gathered was kept in digital files that were password-protected that only the study team could access. To preserve individual privacy, personal identifiers including names, registration numbers, and contact information were eliminated throughout data processing and reporting. Participants were guaranteed that the quality of their continued clinical care would not be impacted by their choice to participate or to stop at any time.

The Institutional Ethics Committee (IEC) of IMS and SUM Hospital, Bhubaneswar, carefully examined and approved the research methodology, ensuring that it complied with all ethical standards and presented no danger to participants. The research team was mindful of any possible emotional pain during the delivery of the questionnaire, even though the study did not entail any intrusive procedures. Referrals, counseling help, and appropriate reassurance were given when individuals were distressed.

RESULT

The frequency and percentage distribution of important factors, such as mother age, educational status, religion, and occupation, are shown in Table 1, which summarizes the demographic and baseline characteristics of the study participants.

In terms of age distribution, most mothers in the experimental and control groups were between the ages of 31 and 35. This category included 33.3% of participants in the experimental group and 41.5% in the control group. Mothers in the 26–30 age range comprised 30.8% of the control group and 26.7% of the experimental group. 18.7% of participants in the experimental group and 15.4% in the control group were between the ages of 36 and 40. Just 1.3% of women in the experimental group and 4.6% in the control group were 41 years of age or older.

The groups' levels of education differed significantly. While moms with secondary education made up the majority of the control group (69.2%), just 37.3% of participants in the experimental group had finished higher secondary education. In the experimental group, 32.0% of women reported having completed primary school, compared to a much lower percentage (7.7%) in the control group. A tiny percentage of participants—10.7% in the experimental group and 15.4% in the control group—had no formal schooling. There was very little representation of moms with higher education levels; only 2.7% of participants in the experimental group were graduates, compared to none of the mothers in the control group.

The study population was primarily Hindu in terms of religion. The percentage of participants who identified as Hindus was 96.0% in the experimental group and somewhat higher at 98.5% in the control group. Muslims made up 1.5% of the control group and 4.0% of the experimental group's remaining members.

Occupational status showed that most mothers in both groups were housewives, comprising 70.7% of the experimental group and 76.9% of the control group. Skilled work was reported by 18.7% of mothers in the experimental group, while only 6.2% of the control group belonged to this category. Professional occupations constituted 10.7% of participants in the experimental group and 16.9% in the control group.

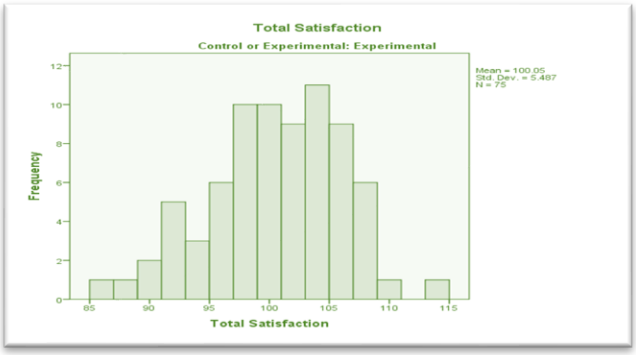
Together, these demographic characteristics indicate that the two groups were generally comparable, with slight variations in education and occupation that were addressed during the analytical phase (Table 1)

Table-1: Frequency and Percentage Distribution of sample characteristics

Characteristics	**Groups**			
	Experimental		**Control**	
Mternal Age in Years	**f**	**%**	**f**	**%**
20-25	15	20	5	7.7
26-30	20	26.7	20	30.8
31-35	25	33.3	27	41.5
36-40	14	18.7	10	15.4
≥ 41	1	1.3	3	4.6
Total	75	100	65	100

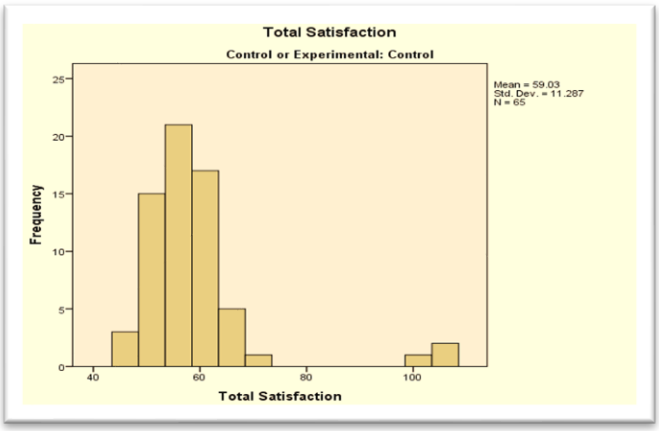
Education				
No formal education	8	10.7	10	15.4
Primary education	24	32.0	5	7.7
Secondary education	13	17.3	45	69.2
Higher secondary	28	37.3	5	7.7
Graduation and above	2	2.7	65	100.0
Religion				
Hindu	72	96.0	64	98.5
Muslim	3	4.0	1	1.5
Occupation				
House wife	53	70.7	50	76.9
Skill Worker	14	18.7	4	6.2
Professional	8	10.7	11	16.9

The distribution of participants' overall satisfaction scores in the experimental group is shown by the histogram in Figure 1. Overall, the pattern shows a roughly normal distribution, with a small positive skew suggesting a propensity for higher levels of satisfaction. The majority of participants expressed quite high pleasure, as indicated by the mean satisfaction score of 100.05, which is centered around this figure. Although individual responses varied, they generally stayed within a constant range, as seen by the standard deviation of 5.487, which shows moderate heterogeneity within the group. The 100–105 range has the highest frequency, and scores are substantially grouped around the mean. The distribution, which spans from about 85 to 115, reveals a few higher and lower outliers in addition to a small fluctuation in the replies. Despite this diversity, most scores are close to the central tendency. When everything is taken into account, the visual distribution demonstrates how successfully the midwifery-led intervention generated consistently high levels of maternal satisfaction. The modest number of outliers and the concentration of scores close to the mean show that the intervention consistently and favorably benefited participants



Fugure-1: Histogram showing Total maternal satisfaction among Experimental Group

The distribution of participants' overall satisfaction scores in the control group is shown by the histogram in Figure 2. Comparatively lower satisfaction with standard care is indicated by the mean satisfaction score of 59.03, which is significantly lower than that of the experimental group. With a standard deviation of 11.287, the control group's satisfaction scores are more variable, indicating a wider range of participant experiences. The majority of scores fall between 50 and 70, with the central value of 60 showing the highest frequency. There are a few outliers, some of which have scores higher than 90, but they are few in number and do not substantially change the distribution pattern as a whole. The greater range of satisfaction responses and overall lower satisfaction levels among individuals receiving standard treatment are shown by the lower mean and wider spread of scores. Overall, the distribution shows that, in comparison to the experimental group, the control group expressed less and more erratic satisfaction. This trend, which shows a distinct difference in satisfaction results between the two groups, supports the beneficial impact of the midwifery-integrated physical therapy intervention



Fugure-2: Bar Diagram showing Total maternal satisfaction among Control Group

There is a noticeable difference between the two groups when the satisfaction scores are compared. With a high mean score of 100.05 and most scores falling between 100 and 105, the experimental group demonstrated consistently

high levels of satisfaction. With scores ranging from 85 to 115, the standard deviation of 5.487 indicates considerable variability. The control group, on the other hand, reported a significantly lower mean score of 59.03, with the majority of replies falling between 50 and 70. A few ratings topped 90, but they had no effect on the overall trend, and the higher standard deviation of 11.287 implies more variety in pleasure. Overall, the experimental group's satisfaction was significantly higher and more constant, as seen in Figures 1 and 2.

Four domains of satisfaction are further compared in Table 2. The experimental group exhibits significantly higher mean scores than the control group ($p<0.001$) in all areas, including Personalized Care, Continuity and Convenience of Care, Educational Support and Information, and Emotional and Psychological Support. Additionally, the experimental group shows more consistent responses, as seen by reduced standard deviations across domains. Overall, the results unequivocally demonstrate that the intervention greatly increased maternal satisfaction in every parameter that was evaluated

Table-2: Comparison of Maternal satisfaction by Mean, MD, SEM, SD, df, t-test between Experimental and Control Groups

Maternal Satisfaction	Groups	N	Mean	Mean Difference	Std. Error Mean	Std. Deviation	df	t- value	Sig. (2-tailed)
Personalized Care	Experimental	75	24.24	10.50	0.33	2.88	138.00	18.16	0.00
	Control	65	13.74	10.50	0.49	3.94	115.59	17.77	0.00
Continuity and Convenience of Care	Experimental	75	28.48	10.74	0.39	3.36	138.00	16.22	0.00
	Control	65	17.74	10.74	0.55	4.46	117.93	15.90	0.00
Educational Support and Information	Experimental	75	37.69	15.75	0.32	2.73	138.00	24.28	0.00
	Control	65	21.94	15.75	0.59	4.80	98.32	23.40	0.00
Emotional and Psychological Support	Experimental	75	12.24	4.13	0.21	1.83	138.00	10.68	0.00
	Control	65	8.11	4.13	0.34	2.72	109.57	10.39	0.00

The findings of the multivariate test comparing the overall degree of maternal satisfaction to the Intercept and Group (experimental versus control) are summarized in Table 3. Even before taking group differences into account, the analysis reveals that the Intercept has a Wilks' Lambda value of 0.013, an F-value of 2579.34 (df = 4,135), and a p-value of <0.001, indicating a highly significant overall effect and confirming that the combined satisfaction scores differ significantly from zero. With a Wilks' Lambda of 0.167, an F-value of 168.38 (df = 4,135), and a p-value of less than 0.001, the Group effect also shows a significant statistical impact on mother satisfaction. A strong and highly significant difference between the experimental and control groups is shown by the low Lambda value and high F-ratio. Overall, the multivariate results demonstrate that the intervention resulted in significant differences in maternal satisfaction, with the experimental group exhibiting noticeably greater levels of satisfaction than the control group

Table– 3: Multivariate Test of Level of Maternal satisfaction

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Wilks' Lambda	.013	2579.34[b]	4.00	135.00	.00
Group	Wilks' Lambda	.167	168.38[b]	4.00	135.00	.00
a. Design: Intercept + Group						
b. Exact statistic						

Across all key aspects of care, the General Linear Model analysis shows large and statistically significant differences in maternal satisfaction between the experimental and control groups. High F-values (329.93, 263.11, 589.40, and 113.98, respectively; $p = 0.00$) indicate that the intervention had a significant impact on Personalized Care, Continuity and Convenience of Care, Educational Support and Information, and Emotional and Psychological Support. The constantly significant group effects verify that the Midwifery-Facilitator–Based Multimodal Approach significantly improved satisfaction scores in the intervention group, while the highly significant intercepts across all categories show a strong underlying baseline of maternal contentment. The credibility of these results is strengthened by low error values, which indicate a well-fitting model. The analysis's robustness is further supported by the R-squared values, which range from 0.452 for Emotional and Psychological Support to 0.810 for Educational Support and Information. These values demonstrate that the model accounts for a significant amount of variance, especially in areas pertaining to education and individualized care. Together, these results confirm that the intervention greatly increased mother satisfaction; Table 4 summarizes the experimental group's consistently higher satisfaction levels across all examined dimensions

Table- 4: General Linear Model for Tests of Between-Subjects Effects on the Key Factors of Maternal Satisfaction

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Personalized Care	3840.18[a]	1	3840.19	329.93	0.00
	Continuity and Convenience of Care	4017.71[b]	1	4017.72	263.11	0.00
	Educational Support and Information	8643.23[c]	1	8643.24	589.40	0.00
	Emotional and Psychological Support	594.61[d]	1	594.61	113.98	0.00
Intercept	Personalized Care	50225.16	1	50225.16	4315.11	0.00
	Continuity and Convenience of Care	74383.66	1	74383.66	4871.20	0.00
	Educational Support and Information	123823.29	1	123823.29	8443.75	0.00
	Emotional and Psychological Support	14417.07	1	14417.07	2763.55	0.00
Group	Personalized Care	3840.19	1	3840.19	329.93	0.00
	Continuity and Convenience of Care	4017.72	1	4017.72	263.11	0.00
	Educational Support and Information	8643.24	1	8643.24	589.40	0.00
	Emotional and Psychological Support	594.61	1	594.61	113.98	0.00
Error	Personalized Care	1606.23	138.00	11.64		
	Continuity and Convenience of Care	2107.27	138.00	15.27		
	Educational Support and Information	2023.70	138.00	14.66		
	Emotional and Psychological Support	719.93	138.00	5.22		
Total	Personalized Care	57943.00	140.00			
	Continuity and Convenience of Care	83393.00	140.00			
	Educational Support and Information	139867.00	140.00			
	Emotional and Psychological Support	16229.00	140.00			
Corrected Total	Personalized Care	5446.42	139.00			
	Continuity and Convenience of Care	6124.99	139.00			

	Educational Support and Information	10666.94	139.00			
	Emotional and Psychological Support	1314.54	139.00			
a. R Squared = .705 (Adjusted R Squared = .703)						
b. R Squared = .656 (Adjusted R Squared = .653)						
c. R Squared = .810 (Adjusted R Squared = .809)						
d. R Squared = .452 (Adjusted R Squared = .448)						

DISCUSSION:

The results of this study are in line with previous research that highlights the importance of patient-centered therapies in raising maternal satisfaction. Maternal experiences during gestational diabetes control may be effectively improved by midwifery-integrated physical therapy, which combines individualized care, continuity, educational assistance, and emotional guidance, according to the experimental group's significantly better satisfaction scores. Personalized care has a positive effect on maternal satisfaction, according to prior study. In comparison to traditional care, Miller et al. (19) showed that group-based prenatal care models, which provide individualized attention and active engagement, dramatically increased maternal satisfaction. In a similar vein, women who received midwife-led continuity of care during the prenatal, intrapartum, and postnatal phases reported higher levels of satisfaction than those who received standard maternity services, according to Nassar et al. (20). These results are congruent with the current study, which found that the experimental group consistently scored higher in the Personalized Care domain (21).

Maternal satisfaction was found to be significantly influenced by continuity of care. According to Sandall et al. (23), compared to fragmented care models, continuous midwifery care decreased maternal stress and increased satisfaction. The experimental group in the current study scored considerably higher in the Continuity and Convenience of Care domain, highlighting the significance of stable caregiver relationships and smooth care transitions for pleasant maternal experiences. The results of the current study are supported by Hodnett et al. (22), who also highlighted how individualized and ongoing care enhances communication, emotional support, and tailored attention, all of which lead to increased satisfaction.

Maternal satisfaction is significantly influenced by information and educational support. Comprehensive prenatal education increases maternal knowledge, lowers anxiety, and raises satisfaction with maternity services, according to Walker et al. (24). Accordingly, structured educational interventions successfully address maternal concerns and boost confidence in managing gestational diabetes, as evidenced by the experimental group's significantly higher satisfaction scores in the Educational Support and Information domain in the current study.

The emotional and psychological components of treatment were equally important. Maternal satisfaction and mental health were significantly impacted by emotional and psychological care during pregnancy and the postpartum period, according to Youssef et al. (25). In line with these results, the experimental group's greater satisfaction scores were largely attributed to emotional and psychological support, highlighting the importance of comprehensive interventions that attend to both clinical and psychosocial requirements.

Overall, the study supports the mounting evidence that structured, patient-centered interventions significantly increase maternal satisfaction. These interventions are typified by individualized attention, continuity of care, focused education, and emotional support. The experimental model showed quantifiable improvements across all evaluated aspects by combining midwifery-led physical therapy with traditional care, underscoring its potential as a successful tactic to maximize maternal experiences in gestational diabetes treatment.

CONCLUSION:

When compared to normal care, this study shows that the midwifery-integrated intervention considerably increased mom satisfaction in all areas. The intervention demonstrated the need of organized, patient-centered approaches in maternal care by improving individualized treatment, continuity, education, and emotional support. The long-term impacts of these interventions, their suitability in various cultural and socioeconomic contexts, and methods for broader adoption should all be investigated in future studies. Furthermore, research investigating the incorporation of cutting-edge technology, such telemedicine and mobile health, may enhance overall pregnancy outcomes and maternal satisfaction.

Acknowledgement

The authors express their sincere gratitude to Prof. Dr. Manoj Ranjan Nayak, Chairman of Siksha "O" Anusandhan (Deemed to be University), Bhubaneswar, and Dr. Pushparaj Samantsinghar, Medical Superintendent, Institute of Medical Sciences & SUM Hospital, Bhubaneswar, for providing the facilities, direction, and support required for the study. Their assistance was crucial to the accomplishment of this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest related to this study

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