



Association Between Gestational Weight Gain And Initiation Of Breastfeeding After Cesarean Section Delivery

1Dr. Hitarthi Dhama(PT), 2Dr. Nancy Pandya (PT0

1Assistant professor, 2Assistant professor

1Shree Swaminarayan Physiotherapy college(Surat)/ SNTD Women's University,

2KM Patel Institute of Physiotherapy

INTRODUCTION

Pregnancy induces significant physiological and hormonal changes affecting cardiovascular, musculoskeletal, and endocrine systems. Gestational weight gain (GWG) is a natural consequence of pregnancy and is influenced by maternal BMI and lifestyle factors.

The World Health Organization classifies BMI into underweight ($<18.5 \text{ kg/m}^2$), normal ($18.5\text{--}24.9 \text{ kg/m}^2$), overweight ($25\text{--}29.9 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$). The Institute of Medicine provides recommendations for optimal GWG based on pre-pregnancy BMI.

Excessive GWG has been associated with gestational diabetes, pregnancy-induced hypertension, cesarean section delivery, and delayed lactogenesis. Breastfeeding initiation within the first hour of birth is recommended by the World Health Organization and UNICEF to reduce neonatal morbidity and mortality.

Cesarean delivery may delay breastfeeding due to post-operative pain, reduced mobility, and separation of mother and infant. Antenatal exercise, as recommended by American College of Obstetricians and Gynecologists, may help regulate GWG and improve postnatal outcomes.

However, limited research has evaluated the relationship between overall GWG and breastfeeding initiation following cesarean section delivery in Indian women.

MATERIALS AND METHODS

Study Design: Cross-sectional study.

Study Setting: Selected hospitals in Anand district, Gujarat, India.

Sample Size: 116 participants (58 per group).

Inclusion Criteria

- Age 18–35 years
- BMI 18.5–24.9 kg/m² in early pregnancy
- Multiparous
- Cesarean section delivery
- Singleton pregnancy

Exclusion Criteria

- Breast abnormalities
- Gestational diabetes or hypertension
- Neonatal ICU admission
- High-risk pregnancy

Procedure:

Ethical approval was obtained prior to the study. Participants were recruited through convenient sampling. Height and weight records were collected from hospital records. BMI difference (third trimester – first trimester) was calculated as GWG indicator.

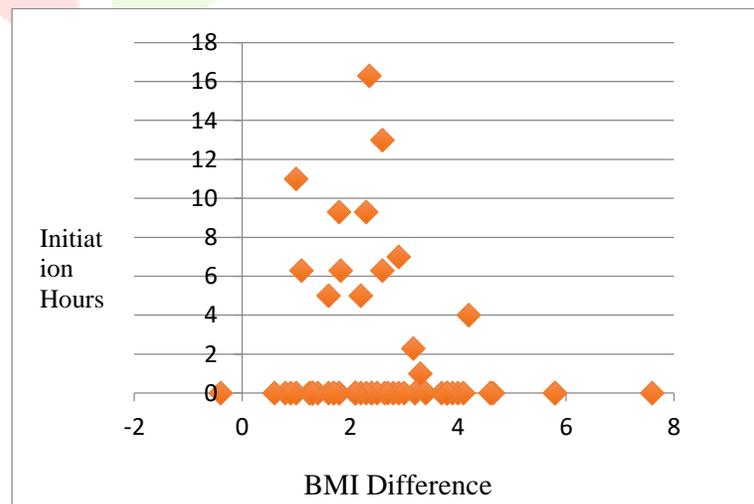
On post-operative day 2 or 3, participants were interviewed regarding time of breastfeeding initiation.

Statistical Analysis:

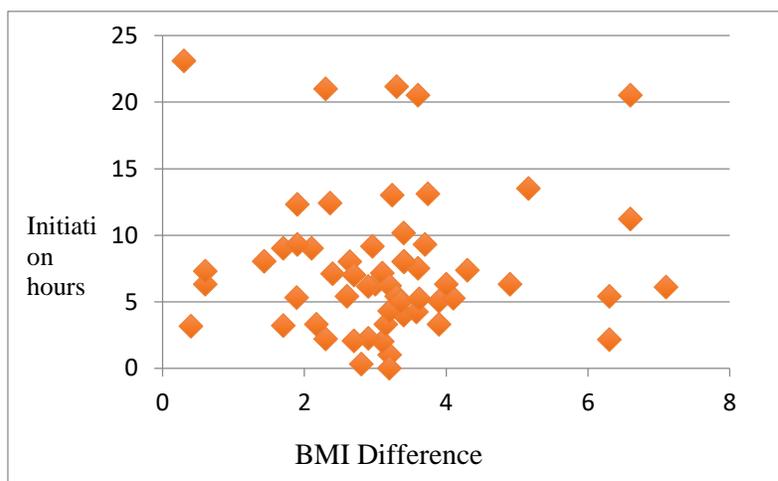
Data were analyzed using descriptive statistics and Pearson correlation test. Significance level was set at $p < 0.05$.

Descriptive Statistics:

The mean age of participants was comparable between groups (Group 1: 25.24±4.39 years; Group 2: 25.77±3.45 years). Mean BMI difference was 2.56±1.41 kg/m² in Group 1 and 3.19±1.44 kg/m² in Group 2.



In Group 1, only 14 participants-initiated breastfeeding, with a mean initiation time of 7.29±4.15 hours. In Group 2, 57 participants-initiated breastfeeding with a mean initiation time of 7.70±5.24 hours.



Correlation analysis revealed a weak, non-significant association between GWG and BF initiation in Group 1 ($r = -0.129$, $p = 0.194$). In contrast, Group 2 showed a moderate and statistically significant association ($r = 0.309$, $p = 0.036$).

Group 1 (No Antenatal Exercise):

- Mean Age: 25.24 ± 4.39 years
- BMI Difference: 2.56 ± 1.41 kg/m^2
- Mean BF Initiation: 7.29 ± 4.15 hours

Group 2 (Antenatal Exercise):

- Mean Age: 25.77 ± 3.45 years
- BMI Difference: 3.19 ± 1.44 kg/m^2
- Mean BF Initiation: 7.70 ± 5.24 hours

Correlation Analysis:

Group	r-value	p-value	Interpretation
Group 1	-0.129	0.194	Weak, not significant
Group 2	0.309	0.036	Moderate, significant

DISCUSSION

This study aimed to determine the association between GWG and initiation of breastfeeding following cesarean section delivery.

In women who did not participate in antenatal exercise, a weak and non-significant association was observed. In contrast, women who participated in antenatal exercise demonstrated a significant moderate association.

Previous literature suggests maternal obesity and excessive GWG delay lactogenesis II and reduce prolactin response. Cesarean section delivery further influences breastfeeding initiation due to pain and post-operative factors.

Antenatal exercise may contribute to controlled GWG and improved physiological readiness for lactation.

CONCLUSION

Gestational weight gain shows an association with initiation of breastfeeding after cesarean section delivery. Participation in antenatal exercise programs may help regulate GWG and improve breastfeeding outcomes.

Encouraging structured antenatal exercise may enhance maternal and neonatal health.

REFERENCES

1. Sapsford R, Bullock-Saxton J, Markwell S. **Women's health: A textbook for physiotherapists**. London: WB Saunders; 1998.
2. Polden M, Mantle J. **Physiotherapy in obstetrics and gynaecology**. Oxford: Butterworth-Heinemann; 1990.
3. Soma-Pillay P, Catherine NP, Tolppanen H, Mebazaa A. Physiological changes in pregnancy. *Cardiovasc J Afr*. 2016;27(2):89-94.
4. Castillo H, Santos IS, Matijasevich A. Maternal pre-pregnancy BMI, gestational weight gain and breastfeeding. *Eur J Clin Nutr*. 2016;70(4):431-437.
5. Pinheiro TV, Goldani MZ. Maternal pre-pregnancy overweight/obesity and gestational diabetes interaction on delayed breastfeeding initiation. *PLoS One*. 2018;13(6):e0194879.
6. Nobles C, Marcus BH, Stanek EJ, Braun B, Whitcomb BW, Manson JE, et al. The effect of an exercise intervention on gestational weight gain: The Behaviors Affecting Baby and You (BABY) Study. *Am J Health Promot*. 2018;32(3):736-744.
7. Winkvist A, Brantsæter AL, Brandhagen M, Haugen M, Meltzer HM, Lissner L. Maternal prepregnant body mass index and gestational weight gain are associated with initiation and duration of breastfeeding among Norwegian mothers. *J Nutr*. 2015;145(6):1263-1270.
8. Chen C, Xu X, Yan Y. Estimated global overweight and obesity burden in pregnant women based on panel data model. *PLoS One*. 2018;13(8):e0202183.
9. Guyton AC, Hall JE. **Textbook of medical physiology**. 11th ed. Philadelphia: Elsevier Saunders; 2006.
10. Konar H. **DC Dutta's textbook of obstetrics**. New Delhi: JP Medical Ltd; 2014.
11. Amir LH, Donath S. A systematic review of maternal obesity and breastfeeding intention, initiation and duration. *BMC Pregnancy Childbirth*. 2007;7:9.
12. Tiwari S, Bharadva K, Yadav B, Malik S, Gangal P, Banapurmath CR, et al. Infant and young child feeding guidelines 2016. *Indian Pediatr*. 2016;53(8):703-713.
13. World Health Organization, UNICEF. **Global strategy for infant and young child feeding**. Geneva: WHO; 2003.
14. Beake S, Bick D, Narracott C, Chang YS. Interventions for women who have a caesarean birth to increase uptake and duration of breastfeeding: A systematic review. *Matern Child Nutr*. 2017;13(4):e12390.
15. Muktabhant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise or both for preventing excessive weight gain in pregnancy. *Cochrane Database Syst Rev*. 2015;(6).
16. Prior E, Santhakumaran S, Gale C, Philipps LH, Modi N, Hyde MJ. Breastfeeding after cesarean delivery: A systematic review and meta-analysis of world literature. *Am J Clin Nutr*. 2012;95(5):1113-1135.
17. Engle WA. Surfactant-replacement therapy for respiratory distress in the preterm and term neonate. *Pediatrics*. 2008;121:419-432.
18. Wojcicki JM. Maternal prepregnancy body mass index and initiation and duration of breastfeeding: A review of the literature. *J Womens Health*. 2011;20(3):341-347.
19. Yang W, Han F, Gao X, Chen Y, Ji L, Cai X. Relationship between gestational weight gain and pregnancy complications or delivery outcome. *Sci Rep*. 2017;7:12531.
20. Jolly R. Breastfeeding and health care services. *Int J Gynecol Obstet*. 1990;31(S1):7-9.

21. Charan J, Biswas T. How to calculate sample size for different study designs in medical research. *Indian J Psychol Med.* 2013;35(2):121-126.

LIMITATIONS

- Small sample size
- Convenience sampling
- Self-reported breastfeeding initiation time

FUTURE RECOMMENDATIONS

- Comparative study between primiparous and multiparous women
- Comparative study between LSCS and vaginal delivery
- Larger multi-center studies

ACKNOWLEDGEMENT

We thank all participating hospitals and mothers for their cooperation.

SOURCE OF FUNDING

Self-funded.

ETHICAL CLEARANCE

Ethical clearance was obtained from the Institutional Ethical Committee of Ashok & Rita Patel Institute of Physiotherapy, CHARUSAT.

