

Original Article



Comparison of L-Shape and Side-Lying Positions on Breastfeeding Outcomes among Mothers Delivered by Cesarean Section: A Randomized Clinical Trial

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Received: 17 Dec. 2020

Accepted: 14 Mar. 2021

e-Published: 23 Aug. 2021

Keywords:

Cesarean section, Breastfeeding, Position, Pain, Mother satisfaction

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Abstract

Introduction: Ineffective breastfeeding techniques is one of the factors contributing to poor breastfeeding outcomes in post-cesarean mothers. To assist post-cesarean mothers to find a comfortable breastfeeding position, a trial was conducted to compare different positions of breastfeeding in these individuals.

Methods: A randomized clinical parallel trial was carried out on primipara post-cesarean mothers admitted to All India Institute of Medical Sciences (AIIMS), Rishikesh, Uttarakhand, India. Participants were enrolled by convenience sampling technique, which was further randomized (block size= 4) and allocated to receive either "L" shape (n= 30) or side-lying (n= 30) position for breastfeeding. The assigned intervention was provided at least six times a day for four consecutive days. Data were collected using breastfeeding assessment Tool, maternal breastfeeding evaluation scale and numeric pain rating scale. Data were analyzed using SPSS software version 23.

Results: The baseline characteristics of participants in both groups were similar. The mean comparison of breastfeeding outcome and maternal satisfaction indicated no significant difference between the two positions. However, the mean scores of maternal pain were statistically significant. Hence, it was inferred that the maternal pain was significantly less in post-cesarean mothers in "L" shape compared to side-lying.

Conclusion: There is significantly less pain in post-cesarean mothers during breastfeeding in "L" shape than side-lying. Furthermore, maternal satisfaction and breastfeeding outcomes were found to be similar in both positions.

Introduction

The arduous 9-months result will only be fruitful when breastfeeding is good enough to improve the health, well-being and survival of women and children worldwide. Breastfeeding is important and an inimitable way of providing food to infants for developmental and healthy growth.¹ When breastfeeding was seen in the different regions of the world, it was found that the babies born in low and middle-income countries, nearly 78 million or three in five babies were not breastfed within the first hour of life. Which resulted in a higher risk of death and disease and making them less likely to continue breastfeeding, say United Nations International Children's Emergency Fund (UNICEF) and World Health Organisation (WHO) in a 2018 new report.² Citing to escalating cesarean births, which are also one of the factors of delay breastfeeding.³

According to a recent research report of 2018, cesarean section rates have been nearly doubled worldwide that is

21% since 2000.⁴ According to Indian new research, the census collected by the Union Ministry of Health and Family Welfare under Health Management Information System, over 14% of the total births in 2018-2019 took place through C-section and lastly updated survey under National Family Health Survey (NFHS-4) 2015-2016 Uttarakhand, reported nearly 13% of cesarean section.^{5,6}

To overcome some of the problems related to cesarean section, proper positioning and attachment comes in role and act as a function of effective breastfeeding. Good positioning and attachment of the baby during breastfeeding ease milk production and milk release, which aid in preventing sore nipples, engorgement and mastitis, along with the increase comfortability and good latch to the post-cesarean mothers. Multiple efforts are being envisaged to improve feeding practices in children. WHO and UNICEF launched the Baby-Friendly Hospital Initiative in 1992, Integrated Management of

Childhood Illness (IMCI) in the mid-1990s and Infant and Young Child Feeding (IYCF) in 2002, which stress the importance of breastfeeding. All these programs have been adopted by India for the last one to two decades to promote appropriate feeding practices in children under-five years.^{7,8}

Positioning of mother and baby along with a good attachment of baby to the mother's breast if achieved at first and early feeds result in avoiding many difficulties. There are lots of different positions with pros and cons that mothers use to breastfeed their babies, and these include laid back breastfeeding or biological nurturing, cross-cradle holds, cradle hold, rugby or football hold and side-lying position. The cradle hold position usually works best for the full-term babies delivered vaginally. Some mother complains it makes latching difficult so position may save until the infant is at 4 weeks old and has stronger neck muscles. In clutch or football position slightly more difficult to master than cradle hold.⁹

However, it is useful for post-cesarean mother's or those with large breasts or flat or inverted nipples. It may also find better if baby is small and has trouble latching on or if have strong let-down reflex. It also works well for feeding twins. Cross cradle is a better position for premature babies or those with weak suckling action. Lying position is good for tired mothers and those recovering from cesarean section or difficult birth (where sitting is uncomfortable).^{8,10} Lacuna of data is evident on post-cesarean mother's way of positioning and attachment of baby in initial days of hospital stay. However, current articles report that side-lying, football and cradle hold can be practiced while breastfeeding with the support of pillows, which put less pressure on the suture line.⁹⁻¹² Use of various types of breastfeeding positions have been observed among post-cesarean mothers, resulting in varied babies' latch scores, but there is a paucity of literature about the effect of each breastfeeding positions on breastfeeding outcomes.

Therefore, assisting a mother to find a breastfeeding position that is comfortable is part of the role of the health care professional. So, different maternal breastfeeding positions should be tried in clinical practices to enhance breastfeeding outcomes which will eventually lead to better nurturing of infants with more proof-based practice. The current study is interested in the comparison of breastfeeding outcomes in different positions, which can provide potent breastfeeding experience to the post-cesarean mother's in Uttarakhand for the betterment of mother and baby. Knowledge and experience acquired during the study will possibly be used in designing more competent and evidence-based practice.

The study has assumed: (1) there may be significant variation in breastfeeding outcomes according to different positions. (2) willingness for "L" shape position may be more as compared to a side-lying position. This study, outcomes of different positions of breastfeeding among cesarean mothers, is a small, randomized clinical trial

(RCT) testing these assumptions in comparison of "L" shape position against side-lying position an active control condition.

Materials and Methods

In this study, the target population was all the post-cesarean mothers who met inclusion criteria admitted to the in-patient department of obstetrics and gynecology.

Post-cesarean primipara mothers with the gestational age of ≥ 28 weeks, newborns who were able to breastfed, with well managed obstetric complications, who were admitted in the labour ward, could read and understand Hindi and English language, were included in the study.

Exclusion criteria were: mothers who were not willing to participate; not willing to sign the informed consent; didn't receive the newborn within 24 hours; not able to follow the instructions due to any psychological illness; had contraindications to breastfeeding like severe breast abscess; referred from other centres after delivery; neonate with any congenital abnormality which interferes with breastfeeding such as cleft palate, cleft lips; and mothers who gave birth to a dead baby.

The sample size was estimated based on the study by Puapornpong et al.,¹³ the pooled standard deviation of both comparison groups = 0.91; the actual margin between two intervention = 0.42; and clinically allowable difference = 0.1; keeping a two-sided significance level of 0.05 and power of 0.80, the sample size was 30 each group (including 10% dropouts).

The primiparous postpartum women admitted to the in-patient department of obstetrics and gynecology, All India Institute of Medical Sciences (AIIMS), Rishikesh, who underwent cesarean section under spinal anaesthesia and met the inclusion criteria were explained about the study protocol. Mothers were enrolled in the study after obtaining written consent. On the day of postpartum (day of operation), after the enrolment, concealed envelop was opened in front of the participant and treatment allocation was revealed.

To ensure equal allocation of the participants to the treatment and exclude the systemic bias, the block randomization (block size of 4) technique was used with the 1:1 allocation of the treatment. An online randomizer website (<http://www.sealedenvelops.com/>) was used in which a total number of participants included in the study and intervention was entered along with a block size number, which created a random list of the intervention allocation along with the unique codes for each enrolled participant. The list and envelop was prepared by a third person other than the primary investigator and subsequently kept with the guide. Every time envelope for each participant was handed to the primary investigator when the participant entered the trial.

Allocation concealment was performed by sequentially arranged opaque sealed envelopes. Participants enrolled in the study received envelopes in the sequence, and the

envelopes were opened in front of the participants; and after their enrollment, treatment allocation was revealed subsequently.

Depending on the post anaesthetic effect and well-being of the mother, 30 minutes of instruction on breastfeeding position “L” shape (experimental group-A) or side-lying position (experimental group-B) was provided an opportunity to practice was given. A numeric pain rating scale was used for the mother’s cesarean pain assessment initially after 24 hours on the first day of postpartum to obtain a baseline pain level score before the intervention. On first post-cesarean day (on the next day of operation), enrolled mothers were encouraged for breastfeeding every 2-3 hours and on-demand using the assigned breastfeeding position. Minimum 6 times a day, position was provided to mother and encouraged to continue the same position in every breastfeed, which was ensured by primary investigator till last day (post-cesarean day 3 of intervention). On day-4 (post-cesarean day-4), before discharge, breastfeeding position and breastfeeding outcomes scores were assessed by the assigned outcome assessor, whereas for numeric pain rating score and mother’s satisfaction level score, participants were asked to fill the tool.

A total of sixty (thirty in each group) participants randomly allocated in experimental group-A (“L” shape position) and experimental group-B (“side-lying” position) (Figure 1). In group-A, mothers were provided with the intervention “L” shape high fowler position (between 60 to 90 degree) with extended legs and placing a pillow beneath the elbow. Mothers in the group-B were

given “L” shape high fowler position (between 60 to 90 degree) with extended legs and placing a pillow beneath the elbow.

The tool for assessing the study variables consisted of following 4 sections: Section-A: The self-structured demographic and obstetric profile sheet was used to obtain demographic profile and obstetrical details of the post-cesarean mothers like age, religion, educational qualification, marital status, occupation, monthly income, habitat, and obstetric profile as birth weight of new-born, gestational age of new-born, and history of abortion. Section-B was for assessing the breastfeeding outcomes. Section-C was for assessing maternal satisfaction. Section-D was for assessing the pain.

Furthermore, Section-B consisted of two subsections; B.1-Bristol Breastfeeding Assessment Tool (BBAT) consisted of 4 items which were positioning, attachment, sucking and swallowing. Each item consisted of 2-5 statements along with scoring of poor (0), moderate (1), good (2).¹⁴

Sub section B.2, additional aspects for breastfeeding assessment consisted of 2 items which included baby’s behaviour and output. Each item consisted of 6-7 statements along with scoring of poor (0), moderate (1), good (2). Scoring of B.1 and B.2 sub-sections were considered as latch score for breastfeeding outcomes (Latch on, Audible swallowing, Comfort, Hold positioning, except types of nipples).^{15,16}

The validity of this was obtained by giving it to seven experts from the department of obstetrics and gynecology and nursing. All the suggestions were incorporated and

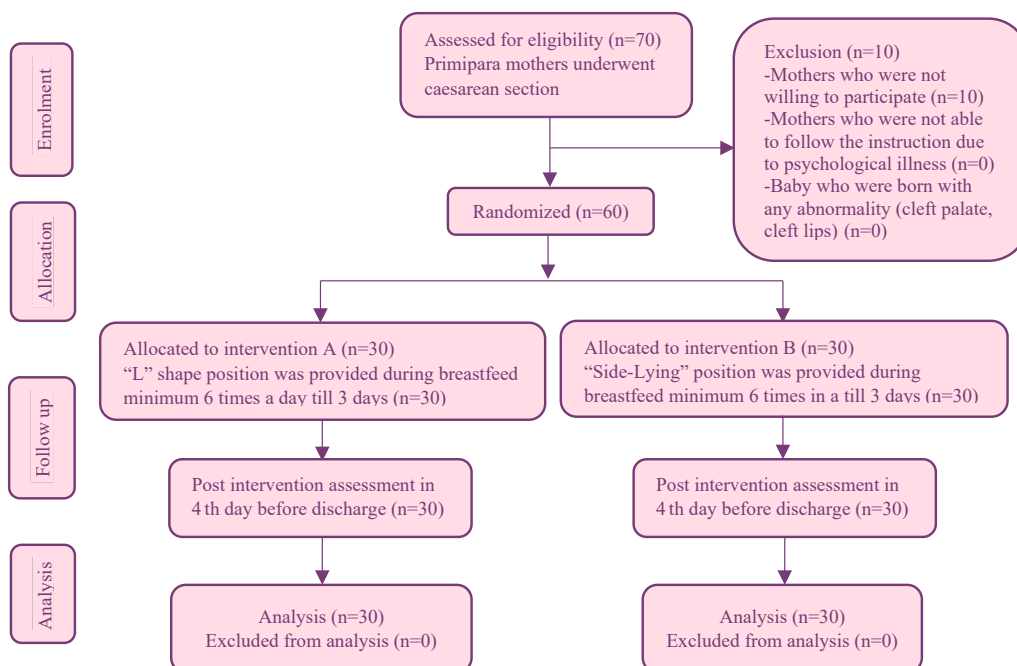


Figure 1. Flow chart of the study

modified accordingly in the tool before the main study. The reliability was computed by using Pearson's coefficient of correlation method, which was $r = 0.8$.

Section-C: The standardized tool selected was Maternal Breastfeeding Evaluation Scale (MBFES) to assess maternal satisfaction by knowing the breastfeeding experience.^{17,18} This tool consisted of the thirty statements given on the five-point rating scale. The MBFES was broken down into three subscales specifically looking at infant satisfaction/growth, lifestyle/maternal body image, or maternal enjoyment/role attainment. This was a standardized tool, reliability was estimated for the local setting, and it was found as $r = 0.9$.

Section-D: The 'Numeric Rating Scale' for pain was selected to assess the physical pain of the mother's while breastfeeding. This tool consisted of ratings over the scale range 0-10, in which 0 indicates no pain, 5 moderate pain and 10 indicates the worst possible pain. The scale was categorized as follows: 1-4 mild pain, 5-6 moderate pain and 7-10 severe pain. This was a standardized tool being used all over the population, and its reliability was already established to be $r = 0.95$.¹⁹

Systematically collected data were analyzed in term of the objective of the study using various descriptive and inferential statistics. Raw data were coded, computed in Microsoft Excel, and all the calculation were done using Statistical Package for the Social Sciences version 23 (SPSS Inc., Chicago, IL, USA). Nominal data were calculated using frequency, percentage, and ordinal data were calculated using descriptive (mean, median and mode) and inferential statistics (Mann Whitney test, chi-square, independent t test).

To assess homogeneity among both the groups, all the variables were subjected to an independent t test/chi-square. It was observed that chi-square/independent t test values were non-significant at 0.05 level of significance. Thus, maintaining homogeneity among demographic variables of both the groups before intervention.

Results

A total of 60 participants were recruited. Socio-demographic variables and obstetrical profile of study participants of experimental group-A ("L" shape) and group-B (side-lying) are presented in Table 1.

To test the normality of the study population Kolmogorov Smirnov test was applied, and it was inferred that the population was not normally distributed. In the following, the mean, SD and median scores of both the groups were computed using descriptive statistics and comparison of the scores among both the groups were done using Mann Whitney test (Table 2).

Breastfeeding Outcomes

Results of the comparison of the breastfeeding outcomes score were done using the median score of breastfeeding

outcomes in experimental group-A ("L" shape) was 12 as compared to 11 in experimental group B (side-lying). Adding further, the mean difference between the two groups was 0.47. Upon comparing the breastfeeding outcomes scores Z-value was -1.68 and the P-value 0.92, which was nonsignificant at 0.05 level of significance, inferring that "L" shape and side-lying positions were equally effective in providing breastfeeding outcomes (Table 2).

Maternal Satisfaction Level

Upon comparison, data in Table 2 and Figure 2 reveal the result of the comparison of the maternal satisfaction score that the median of maternal satisfaction score in experimental group-A ("L" shape) was 120 as compared to 113 experimental group-B (side-lying). The mean difference between the two groups was 7.2, which was statistically not significant. (Z- value= -1.72 and P-value 0.86). Figure 3 represents the frequency and percentage of the maternal satisfaction score in experimental group A ("L" shape) and experimental.

Maternal Pain

Table 2 depicts the results of comparing the pain score on postpartum day 1; the median score of pain in both the groups was 8. The mean difference between the two groups was 0.36. Comparing the pain scores Z- value was -1.79 and P-value 0.07, which was non-significant at 0.05 level of significance and result of comparison of the pain score on postpartum day 4, the median of pain score in experimental group A ("L" shape) was 3 compared to 4 in experimental group B side-lying. The mean difference between the two groups was 0.80. Upon comparing the pain scores Z-value was -1.97 and P value 0.04, which encapsulated to be significant at 0.05 level of significance. Therefore, it was inferred that post-cesarean mothers felt equal pain in both the positions on postpartum day-1, whereas on postpartum day-4, mothers felt less pain in "L" shape compared to side-lying (Table 2, Figures 3 and 4).

Figure 2 illustrates that a large number of participants 21 (70%), had mild pain in the experimental group-A ("L" shape) than the experimental group-B (side-lying) 16

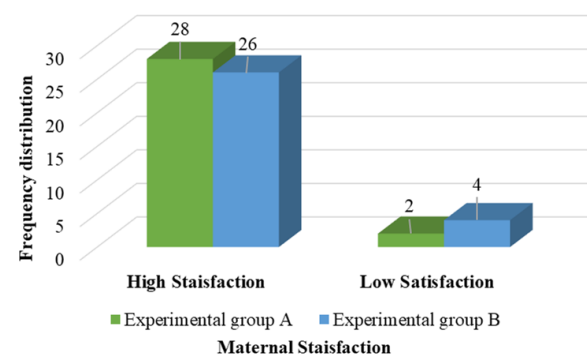


Figure 2. Maternal satisfaction score

Table 1. Socio-demographic variables including obstetrical profile of study participants (N = 60)

Variable	Group-A ("L"shape) N (%)	Group-B (side-lying) N (%)	Total N (%)
Age (years)^a	26.17 (3.75)	24.53 (3.36)	25.35 (3.63)
Religion			
Hindu	29 (97)	28 (94)	57 (95)
Muslim	1 (3)	1 (3)	2 (3)
Christian	0 (0)	1 (3)	1 (2)
Educational qualification			
Primary education	9 (30)	7 (23)	16 (27)
High school education	5 (17)	9 (30)	14 (23)
Higher secondary education	1 (3)	3 (10)	4 (7)
Graduate	10 (33)	8 (27)	18 (30)
Postgraduate/Professional	5 (17)	3 (10)	8 (13)
Marital status			
Married	30 (100)	30 (100)	60 (100)
Occupation			
Govt job	1 (3)	2 (7)	3 (5)
Private job	3 (10)	2 (7)	5 (8)
Self-employed	1 (3)	0 (0)	1 (2)
Housewife	25 (84)	26 (86)	51 (85)
Monthly income (INR)			
>50000	3 (10)	5 (17)	8 (13)
25000-50000	13 (43)	12 (40)	25 (42)
10000-24999	11 (37)	9 (30)	20 (33)
<10000	3 (10)	4 (13)	7 (12)
Habitat			
Rural	21 (70)	15 (50)	36 (60)
Urban	5 (17)	10 (33)	15 (25)
Hilly	4 (13)	5 (17)	9 (15)
Gestational age of new-born (wk)			
< 37	5 (17)	4 (13)	9 (15)
37- 41	24 (80)	23 (77)	47 (78)
≥ 42	1 (3)	3 (10)	4 (7)
Mean (SD)	37.8 (1.94)	38.5 (1.70)	38.1 (1.85)
Birth weight of new-born (kg)			
< 2.5	8 (27)	8 (26)	16 (27)
2.5–3.5	21 (70)	17 (57)	38 (63)
> 3.5	1 (3)	5 (17)	6 (10)
Mean (SD)	2.72 (0.48)	2.85 (0.56)	2.78 (0.52)
History of abortion			
No Abortion	21 (70)	25 (83)	46 (77)
One Abortion	6 (20)	4 (14)	10 (17)
Two Abortions	2 (7)	0 (0)	2 (3)
Three Abortions	1 (3)	1 (3)	2 (3)

^a Data was reported as mean (SD); INR: Indian rupee.

Table 2. Comparison of breastfeeding outcomes, maternal pain and satisfaction between experimental group A and B (N= 60)

Variable	Experimental group-A ("L" shape) Mean (SD)	Experimental group-B (Side-lying) Mean (SD)	P value ^a
Breastfeeding outcomes	11.17 (1.08)	10.7 (1.26)	0.92
Maternal satisfaction score	122.1 (13.54)	114.9 (9.59)	0.86
Maternal pain score			
Day 1	7.77 (0.85)	8.13 (0.86)	0.07
Day 4	3.37 (1.71)	4.17 (1.57)	0.04 ^a

^aSignificant at P value < 0.05.

^a Mann-Whitney test.

(53%) on postpartum day-4.

Discussion

Many people assume breastfeeding is a natural process, but it is a learning process for many mothers and babies, and in that learning, one aspect is breastfeeding techniques, which plays a prominent role in successful breastfeeding. The current study was conducted to compare the breastfeeding outcomes in different positions among 60 post-cesarean mothers who were selected by a consecutive sampling technique. The result of the data was interpreted from statistical analysis, and the findings of the current study have been discussed in accordance with the study objectives and result of other studies.

The breastfeeding outcomes in different positions ("L" shape and side-lying) among primipara post-cesarean mothers were observed in consideration to arising need in young mothers as study Prajapati et al.,²⁰ also reveal the emerging need in new mothers due to poor breastfeeding techniques so can have compelling breastfeeding outcomes. Current study breastfeeding outcomes were assessed by breastfeeding assessment Tool administered on postpartum day-4, and result portrayed the mean (SD) score of breastfeeding outcome 11.17 (1.08) in the experimental group a whereas 10.7 (1.26) in experimental group B, with P-value of 0.92 indicating no significant difference between the breastfeeding outcomes in two different positions, inferring that "L" shape and side-lying position are equally effective in providing breastfeeding outcomes. The current study finding on breastfeeding outcome was supported by Puapornpong et al.,¹³ trial, which was done to compare breastfeeding outcomes between laid-back and side-lying breastfeeding position in mothers delivering by cesarean section. Result revealed that there were no statistically significant differences in the breastfeeding outcomes, LATCH scores in both positions. It may probably be due to educating mothers before the initiation of breastfeeding, which was done in the present and supporting study. As Nagendra et al.,²¹ and Tella et al.,²² also concluded that educating the postnatal mothers improves the position and the attachment of the

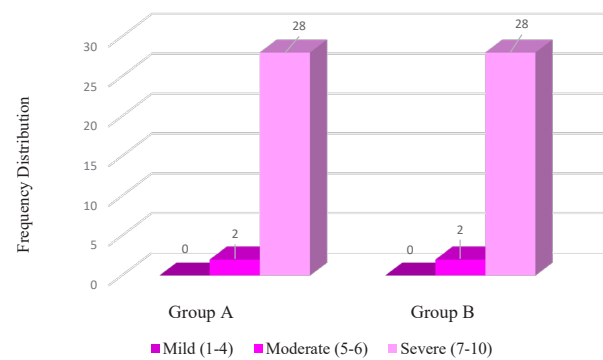


Figure 3. Maternal pain on postpartum day 1

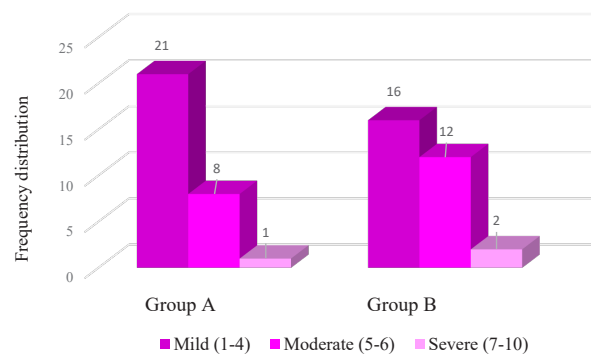


Figure 4. Maternal pain on postpartum day 4

baby to the breast.

Maternal pain during breastfeeding was another outcome variable which was observed while positioning the mother as post-cesarean pain hinder effective breastfeeding Karlström et al.,²³ and Padmavathi et al.,²⁴ findings revealed that early infant care and breastfeeding interfere due to high level of pain in post-cesarean mothers. Maternal pain was assessed by numeric rating scale for pain one before the intervention, i.e., day-1 and another after the intervention, i.e., day-4. Results showed that most of the participants (93%) had severe pain in each group on postpartum day-1 with mean (SD) of pain score on day-1 of experimental group A 7.77 (0.85) and experimental group B 8.13 (0.86) and P-value of 0.07 which indicated there was no significant difference between both the groups in pain score. On the other hand, on postpartum day 4, most mothers (70%) in experimental group A and nearly half (53%) in experimental group B had mild pain. Mean (SD) of pain score was 3.37 (1.71) in experimental group A and 4.17 (1.57) in experimental group B with P value of 0.04, which indicated to be significant. Therefore, the null hypothesis was accepted on postpartum day-1 but rejected on postpartum day-4. Hence, it encapsulated that post-cesarean mothers felt equal pain in "L" shape and side-lying positions on postpartum day-1 but less pain on postpartum day-4 in "L" shape position compared to a side-lying position. Discordant to findings of the current study, Puapornpong et al.¹³ found no statistically

significant differences in the pain score between the two groups at the first and second day postpartum; contrary findings may be due to pain assessed on later days decrease the pain intensity.

Maternal satisfaction was the third outcome assessed during the positioning by maternal breastfeeding evaluation scale on postpartum day 4. Results revealed that almost all participants (93%) in experimental group-A and nearly three-fourth (87%) in experimental group-B mothers had high satisfaction but statistically did not show any significant differences. Therefore, inferring that “L” shape and side-lying position was equally effective in providing maternal satisfaction. One conceivable explanation is that the “L” shape provides more comfortability which will provide frequent breastfeeding sessions, hence providing more satisfaction. Contrary to the present findings, studies showed a statistically significant difference in satisfaction scores in the side-lying group compared to the laid-back group.^{13,25} Therefore, keeping the primary and secondary objectives of the current study in mind, it can be said that side-lying and “L” shape were equally effective in providing breastfeeding outcomes and maternal satisfaction, but significant difference was evident in maternal pain as post-cesarean mothers felt less pain in “L” shape position compared to a side-lying position. The researchers were unable to conduct the study in more than one setting to increase generalizability.

Conclusion

The best breastfeeding positions enable a baby to latch on to the breast well and comfortable. Both the breastfeeding positions are equally effective; however, “L” shape position provides more comfort and less painful during feeding in the early post-cesarean period. The study findings enlighten the effectiveness of “L” shape in improving breastfeeding so provisions can be made to provide alternative breastfeeding position for post-cesarean mothers in clinical settings. Furthermore, we recommend

Research Highlights

What is the current knowledge?

Scholarly literature presents the correct position of baby, attachment, effective suckling, practice regarding breastfeeding and breastfeeding outcomes assessment in caesarean mothers.

However, there have been a less comparable documented study conducted on the comparison of breastfeeding outcome in different maternal positions.

What is new here?

The current study revealed that both the breastfeeding positions (side-lying and “L” shape) are equally effective; however, “L” shape position provides more comfort and is less painful during feeding in the early post-cesarean period.

having more similar study trials can be conducted to add to the evidence.

Acknowledgements

We thank all the study participants for their participation and cooperation.

Ethical Issues

Institutional ethical clearance (IEC) for the trial was taken before the pilot try-out and data collection for the trial with IEC protocol. Besides getting institutional clearance, the trial was also registered in the Clinical Trials Registry- India (CTRI) before study commencement with CTRI registration number CTRI/2019/09/021401. Informed written consent forms (Hindi/English) were obtained from all participants who met the inclusion criteria and were willing to enter the trial. Participants were assured of anonymity and confidentiality.

Conflict of Interest

The authors declare no conflict of interest in this study.

Authors' Contributions

GA, PJ, RSH: Conceived the study and designed the trial with assistance from; PJ, RM: Supervised the conduct of the trial and data collection; GA: Managed the data; RSH, PJ, RM: Advised statistical part according to study design and analysed the data; GA, PJ, RM, RSH: Takes responsibility for the paper as a whole in drafting the manuscript and approval of the final submitted version.

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