RESEARCH PAPER

A Quasi-Experimental Study To Assess The Effectiveness Of Foot And Hand Massage In Reduction Of Pain Intensity Among Post-Caesarean Mothers In Selected Maternity Hospitals At Noida, Uttar Pradesh

Ms. Shine Jose[1*], Dr. Bikramjit Singh[2], Prof. (Dr.) Prabhjot Singh[3]
[1*]Ph.D. Scholar (Nursing), Faculty of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab
Email- shineunny.jose@gmail.com
2Assistant Professor, Faculty of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab
3Deputy Director, Faculty of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab
Corresponding Author
Ms. Shine Jose
Ph.D. Scholar (Nursing), Faculty of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab*
Email- shineunny.jose@gmail.com

ABSTRACT

Background: Post-caesarean pain is a common challenge during the early postpartum period that can interfere with maternal comfort, movement, sleep, breastfeeding, newborn care, mother–infant bonding, and recovery. While pharmacological therapies are essential for controlling postoperative pain, growing attention is being given to safe, convenient, and economical non-pharmacological approaches that can be used alongside routine care. Foot and hand massage is one such supportive intervention that may enhance relaxation, improve blood circulation, relieve muscular tension, and reduce the perception of pain. Therefore, it can serve as a simple and practical complementary nursing intervention for promoting comfort and recovery among post-caesarean mothers. Hence, the present study aimed to assess the effectiveness of foot and hand massage in reducing pain intensity among post-caesarean mothers in selected maternity hospitals at Noida, Uttar Pradesh.

Method: A quantitative research approach with a quasi-experimental two-group pre-test post-test control group design was adopted. A total of 210 post-caesarean mothers were selected using a non-probability purposive sampling technique and allocated equally into experimental and control groups, with 105 participants in each group. Pain intensity was assessed using the standardized Visual Analogue Scale (VAS) along with collection of socio-demographic and obstetric information. The experimental group received foot and hand massage for 20 minutes once daily for three consecutive days, beginning within 24 hours of caesarean section, along with routine treatment, whereas the control group received routine treatment only. Post-test pain intensity was assessed at the end of the third day using the same tool. Data were analysed using descriptive and inferential statistics, including paired t-test, independent t-test, and Chi-square test at the 0.05 level of significance.

Results: The findings demonstrated a substantial reduction in pain intensity among post-caesarean mothers in the experimental group following foot and hand massage. During the pre-test, moderate pain was reported by 75.23% of mothers in the experimental group and 79.04% in the control group. Following the intervention, moderate pain in the experimental group decreased to 6.66%, while 65.71% experienced mild pain and 26.66% reported no pain; in contrast, moderate pain in the control group remained almost unchanged at 78.09%. The mean pain intensity score in the experimental group decreased significantly from 32.059 ± 2.84 during the pre-test to 14.318 ± 1.27 during the post-test ($t=24.481$, $p<0.001$), whereas the control group showed only a marginal change from 35.479 ± 2.63 to 34.983 ± 2.48 ($p=0.642$). Furthermore, the mean gain score was substantially higher in the experimental group (17.741 ± 1.57) than in the control group (0.496 ± 0.15), with a statistically significant between-group difference ($t=14.672$, $p<0.001$), thereby supporting research hypothesis H1. Association analysis further revealed that birth weight of the baby was significantly associated with pain level in both groups. Among obstetric and clinical variables, gravida, gestational age at delivery, time since caesarean section, and breastfeeding initiation after caesarean section showed significant associations with pain intensity, whereas parity, type of delivery, type of anaesthesia, and most socio-demographic characteristics showed no significant association.

Conclusion: The study concluded that foot and hand massage was an effective non-pharmacological complementary nursing intervention for reducing pain intensity among post-caesarean mothers.

Keywords: foot and hand massage; post-caesarean mothers; pain intensity; caesarean section; non-pharmacological intervention.

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INTRODUCTION

Caesarean section is one of the most commonly performed obstetric surgical procedures and is an important intervention for protecting the health and life of the mother and newborn when vaginal delivery is contraindicated or associated with increased risk.(1,2) Although advances in obstetric surgery, anaesthesia, postoperative monitoring, and maternal care have substantially improved the safety of caesarean delivery, mothers undergoing caesarean section continue to experience various physical and psychological challenges during the early postoperative period. Among these, postoperative pain is one of the most common and distressing concerns and may significantly influence maternal comfort and recovery.(3,4)

Pain following caesarean section is primarily associated with surgical injury to the skin, abdominal muscles, uterine tissues, and surrounding structures. In addition, inflammatory responses, uterine involution, abdominal muscle strain, movement, coughing, and changes in bowel function may further contribute to postoperative discomfort.(5,6) The intensity and perception of pain may vary considerably among mothers depending on individual pain threshold, previous surgical experiences, psychological status, physical condition, and other obstetric and clinical factors.(7)

Effective management of post-caesarean pain is particularly important because the early postpartum period requires the mother to recover from major abdominal surgery while simultaneously adapting to the responsibilities of motherhood. Moderate to severe pain may interfere with movement, early ambulation, breastfeeding, positioning and holding the newborn, self-care activities, sleep, and maternal–infant interaction.(5,8) Inadequately controlled pain may also contribute to fatigue, anxiety, irritability, emotional distress, and delayed recovery, thereby affecting both the mother's physical well-being and her ability to perform the maternal role effectively.(9)

Pharmacological measures, particularly analgesic medications, constitute an important component of postoperative pain management following caesarean section. However, medications alone may not always provide complete relief, and some analgesics may be associated with undesirable effects such as nausea, vomiting, drowsiness, constipation, or respiratory depression.(10) Consequently, increasing attention has been given to the use of safe and appropriate non-pharmacological interventions as complementary measures alongside conventional postoperative pain management. Such approaches are consistent with holistic nursing care because they address not only the physical component of pain but also relaxation, comfort, emotional well-being, and active participation of the mother in her recovery.(11,12)

Massage is one such non-pharmacological intervention that can be incorporated into nursing care for the management of postoperative discomfort. Massage involves systematic manipulation of soft tissues through techniques such as rubbing, stroking, kneading, and gentle pressure.(13,14) Its pain-relieving effect has been explained partly through the Gate Control Theory of Pain, whereby stimulation of larger sensory nerve fibres may inhibit or reduce the transmission of pain impulses. Massage may additionally promote peripheral circulation, reduce muscular tension, encourage relaxation, and facilitate physiological responses associated with comfort and pain relief.(15,16)

Foot and hand massage is particularly suitable for post-caesarean mothers because it can be provided without directly manipulating the abdominal surgical area. The hands and feet contain numerous sensory receptors and nerve endings that respond to tactile stimulation.(17) Gentle rhythmic rubbing, kneading, pinching, and tapping of these areas may stimulate mechanoreceptors, promote peripheral circulation, decrease muscular and psychological tension, and produce a sense of relaxation and comfort. Because the intervention can be administered while the mother remains comfortably positioned in bed, it may be especially useful during the early postoperative period when mobility is restricted.(15,18)

Foot and hand massage also has several practical advantages as a nursing intervention. It is simple, non-invasive, economical, requires minimal equipment, and can be administered by appropriately trained nursing personnel without disturbing the surgical incision. In addition to its potential effect on pain intensity, therapeutic touch may provide reassurance and emotional support during a period when mothers may feel physically dependent and vulnerable. These characteristics make foot and hand massage a potentially useful complementary intervention within routine post-caesarean nursing care.(17,19)

Available research has demonstrated beneficial effects of foot and hand massage on postoperative pain following caesarean section. Studies reviewed in the thesis indicate reductions in pain following massage, including improvement immediately after intervention and during subsequent assessment periods. However, despite the potential benefits of this intervention, there remains a need to generate further evidence regarding its effectiveness within different clinical and cultural settings and particularly within the Indian maternity-care context.

Therefore, considering the substantial burden of postoperative pain among post-caesarean mothers and its possible influence on mobility, breastfeeding, maternal–infant bonding, self-care, and overall recovery, there is a need to explore safe, simple, cost-effective, and nurse-administered complementary approaches to pain management. Foot and hand massage offers such an approach and can potentially be integrated with routine postoperative care without interfering with conventional treatment. However, limited evidence is available regarding its use in maternity settings in Noida, Uttar Pradesh. Hence, the researcher planned to undertake the present study to

assess the effectiveness of foot and hand massage in reducing pain intensity among post-caesarean mothers in selected maternity hospitals at Noida, Uttar Pradesh.

Materials and Methods: The present study adopted a quantitative research approach with a quasi-experimental two-group pre-test–post-test control group design. The study was conducted among post-caesarean mothers admitted to selected maternity hospitals at Noida, Uttar Pradesh. The study included a total of 210 post-caesarean mothers, with 105 participants in the experimental group and 105 participants in the control group, who fulfilled the predetermined eligibility criteria. The sample size was calculated by using G-power software for power analysis. These samples were recruited by using non-probability purposive sampling techniques and their allocation was done by using simple random sampling among experimental and control group.

The research instruments consisted of a socio-demographic and obstetrical variable questionnaire to collect relevant background information and a standardized pain assessment scale to assess the intensity of postoperative pain among post-caesarean mothers. Pain in the present study referred to the subjective physical suffering or discomfort experienced following caesarean section and reported by the mother using a numerical pain intensity scale.

The experimental group received foot and hand massage as a non-pharmacological nursing intervention in addition to routine hospital care. The intervention involved systematic manipulation of the feet and hands using techniques such as rubbing, kneading, pinching, and tapping. The massage was administered in a comfortable position without disturbing the abdominal surgical site, with the purpose of promoting relaxation and reducing postoperative pain intensity. The control group received routine hospital care without the structured foot and hand massage intervention. The intervention used in the study is specifically defined as manipulation of the feet and hands through rubbing, pinching, kneading, or tapping.

A pre-test assessment of pain intensity was conducted among post-caesarean mothers in both the experimental and control groups before administration of the intervention. Following the pre-test, participants in the experimental group received the prescribed foot and hand massage, whereas participants in the control group continued to receive routine care. Subsequently, post-test pain intensity was assessed using the same pain assessment scale to determine the change in pain intensity and evaluate the effectiveness of foot and hand massage. The resulting pre-test and post-test pain scores of the two groups were compared to determine whether the intervention produced a significant reduction in pain intensity among post-caesarean mothers.

Results and Discussion: Obtained information were analyzed and grouped as per objectives of the study. The result reflected in tabular form as follows:

Table-1 Frequency and Percentage Distribution of Socio-Demographic Variables:

N-210

SOCIO-DEMOGRAPHIC VARIABLES	Categories	Experimental (N=105)		Control (N=105)		χ^2	p-value
		F	%	F	%		
Age in years	20–24 years	16	15.23	13	12.38	4.987	0.468
	25–28 years	62	59.04	71	67.61		
	29–32 years	21	20.00	17	16.19		
	>32 years	6	5.71	4	3.80		
Duration of marriage	<3 years	13	12.38	11	10.47	3.509	0.419
	3–7 years	67	63.80	72	68.57		
	8–10 years	19	18.09	18	17.14		
	>10 years	6	5.71	4	3.80		
Religion	Hindu	58	55.23	61	58.09	4.482	0.392
	Sikh	26	24.76	30	28.57		
	Muslim	5	4.76	3	2.85		
	Christian	16	15.23	11	10.47		
Type of family	Joint family	37	35.23	41	39.04	2.173	0.229
	Nuclear family	68	64.76	64	60.95		
Place of living	Urban	76	72.38	69	65.71	1.428	0.948
	Rural	29	27.6	3	34.3		

			61	6	28		
Educational status	No formal education	15	14.28	16	15.23	3.846	0.318
	Primary education	37	35.23	29	27.61		
	Secondary education	46	43.80	52	49.52		
	Graduation or above	7	6.66	8	7.61		
Occupational status	House wife	49	46.66	53	50.47	4.351	0.582
	Private job	28	26.66	32	30.47		
	Self-employed	20	19.04	16	15.23		
	Government	8	7.61	4	3.80		
Family's monthly income (₹)	<20,000	2	1.90	1	0.95	4.951	0.823
	20,001 – 30,000	7	6.66	6	5.71		
	30,001 – 40,000	24	22.85	32	30.47		
	>40,001	72	68.57	66	62.85		
Mode of admission	Planned	35	33.33	42	40.00	2.726	0.354
	Emergency	68	64.76	59	56.19		
	Referred	2	1.90	4	3.80		
Birth weight of baby (kg)	2.0–2.5 kg	29	27.61	31	29.52	3.745	0.419
	2.6–3.0 kg	56	53.33	63	60.00		
	>3.0 kg	20	19.04	11	10.47		
Gender of baby	Male	49	46.66	52	49.52	1.528	0.269
	Female	56	53.33	53	50.47		
Gravida	Primigravida	43	40.95	47	44.76	1.367	0.427
	Multigravida	62	59.04	58	55.23		
Parity	Primipara	43	40.95	47	44.76	1.367	0.427
	Multipara	62	59.04	58	55.23		
Type of delivery	Elective LSCS	21	20.00	32	30.47	1.648	0.717
	Emergency LSCS	84	80.00	73	69.52		
Type of anaesthesia	Spinal	93	88.57	97	92.38	1.361	0.942
	General	12	11.42	8	7.61		
Gestational age at time of delivery	<34 weeks	1	0.95	2	1.90	4.953	0.815
	34–36 weeks	69	65.71	72	68.57		
	37–38 weeks	33	31.42	27	25.71		
	>38 weeks	2	1.90	4	3.80		
Time since	6–12	6	5.7	9	8.5	5.1	0.8

CS	hours		1		7	63	11
	13–18 hours	29	27.61	32	30.47		
	19–24 hours	52	49.52	49	46.66		
	>24 hours	18	17.14	15	14.28		
Breastfeeding initiation after CS	Yes	12	11.42	11	10.47	1.395	0.496
	No	93	88.57	94	89.52		

Table 1 reflected that, in both the experimental and control groups, the majority of participants belonged to the 25–28 years age group (59.04% and 67.61%, respectively), had been married for 3–7 years (63.80% and 68.57%), were Hindu (55.23% and 58.09%), belonged to nuclear families (64.76% and 60.95%), and resided in urban areas (72.38% and 65.71%). Most participants had secondary education (43.80% and 49.52%), while the highest proportion were housewives (46.66% and 50.47%). Regarding family monthly income, the majority reported an income of more than ₹40,001 (68.57% and 62.85%). Most participants were admitted through emergency admission (64.76% and 56.19%), and the majority of babies had a birth weight of 2.6–3.0 kg (53.33% and 60%). Female babies constituted a slightly higher proportion in both groups, accounting for 53.33% and 50.47%, respectively.

Regarding obstetric and clinical characteristics, the majority of participants were multigravida (59.04% and 55.23%) and multipara (59.04% and 55.23%) in the experimental and control groups, respectively. Most participants underwent emergency LSCS (80% and 69.52%) and received spinal anaesthesia (88.57% and 92.38%). The majority had a gestational age of 34–36 weeks at the time of delivery (65.71% and 68.57%) and were assessed within 19–24 hours following caesarean section (49.52% and 46.66%). Breastfeeding after caesarean section had not been initiated among the majority of participants in both the experimental and control groups (88.57% and 89.52%, respectively). The obtained p-values for all socio-demographic, obstetric, and clinical variables were greater than 0.05, indicating that the experimental and control groups were homogeneous and comparable with respect to baseline characteristics.

Table: 2 Comparison of distribution of pain intensity level among participants before and after foot and hand massage among both groups:

N=210

Pain Level	**Experimental group (N-105)**				**Control group (N-105)**			
	Pre-test		**Post-test**		**Pre-test**		**Post-test**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**
No pain	2	1.9	28	26.66	1	0.95	2	1.9
Mild pain	15	14.28	**69**	**65.71**	11	10.47	11	10.47
Moderate pain	**79**	**75.23**	7	6.66	**83**	**79.04**	**82**	**78.09**
Severe pain	9	8.57	1	0.95	10	9.52	10	9.52

Table 2 presented that at pre-test, the majority of participants in both the experimental and control groups experienced moderate pain (75.23% and 79.04%, respectively). Following the foot and hand massage, the pain intensity in the experimental group decreased markedly, with 65.71% experiencing mild pain and 26.66% reporting no pain, while only 6.66% continued to have moderate pain and 0.95% had severe pain. In contrast, the control group showed minimal change, with 78.09% continuing to experience moderate pain and 9.52% severe pain at post-test. These findings indicate a marked reduction in pain intensity among the experimental group following foot and hand massage, whereas the pain levels in the control group remained largely unchanged.

Table: 3 Effectiveness of foot and hand massage on pain intensity among post-caesarean mothers:

Groups	**Experimental group**		**Control group**	
	Pre-	**Post-**	**Pre-**	**Post-**
	test	**test**	**test**	**test**
Mean	32.059	14.318	35.479	34.983
Standard Deviation	2.84	1.27	2.63	2.48
T test	24.481		13.843	

P value	<0.001	0.642

Table 3 presented that the mean pain intensity score in the experimental group decreased substantially from 32.059 ± 2.84 in the pre-test to 14.318 ± 1.27 in the post-test, with a statistically significant difference (t = 24.481, p < 0.001). In contrast, the control group showed only a slight reduction in mean pain intensity from 35.479 ± 2.63 to 34.983 ± 2.48, which was statistically non-significant (t = 13.843, p = 0.642). These findings indicate that foot and hand massage was effective in reducing pain intensity among post-caesarean mothers in the experimental group.

Table: 4 Effectiveness of foot and hand massage on pain intensity among post-caesarean mothers by comparing among both groups:

Groups	**Mean Gain score**	**SD**	**Mean difference**	**t-value**	**p-value**
Experimental group	17.741	±1.57	17.245	14.672	<0.001
Control group	0.496	±0.15			

Table 4 stated that the experimental group demonstrated a substantially higher mean reduction in pain intensity score (17.741 ± 1.57) compared with the control group (0.496 ± 0.15), with a mean difference of 17.245. The difference between the groups was statistically significant (t = 14.672, p < 0.001), confirming the effectiveness of foot and hand massage in reducing pain intensity among post-caesarean mothers.

DISCUSSION:

The findings of the present study clearly revealed that the pain intensity among post-caesarean mothers decreased considerably in the experimental group following foot and hand massage, whereas the control group receiving routine care showed minimal change. Similar findings were reported by Zhang et al (2025) has also emphasized in their systematic review that the foot and hand massage for pain management for the mothers underwent cesarean section were significantly effective.(17) Another study by Kasim Erna et al (2025) also stated that post-cesarean mothers received hand and foot massage were found with mild to no pain then compare to other control groups.(20) Fadlalmola et al (2023) has communicated their findings in line with present findings that using massage was superior to the control groups in decreasing pain intensity either when the pain was assessed immediately after or 60-90 minutes post-massage application.(21) Findings presented by Lavina (2026) supported present findings by stating that the foot and hand massage is impactful to reduce the pain intensity among post-cesarean mothers.(22) A study by Rose S et al (2021) has favored the present study by stating that after implementing foot and hand massage among CS mothers has reduced their pain level in compare to mothers who didn't receive any intervention.(23)Another research by Thakur Neeta (2021) has stated her findings in support of present study findings and stated that after CS mothers receiving foot and hand massage were found with no or mild pain compare to mothers who did not expose to it.(24) These supporting studies are strengthening the uses of foot and hand massage to reduce the pain of post-caesarean mother.

Limitations of the study

- The quasi-experimental design limited the ability to establish a definitive causal relationship between foot and hand massage and pain reduction.
- The study was limited to 210 post-caesarean mothers from maternity hospitals in Noida, restricting the generalizability of the findings.
- The three-day intervention and follow-up period limited assessment of the long-term effects of foot and hand massage on pain.
- Pain assessment using the VAS was subjective and may have been influenced by individual differences in pain perception.

CONCLUSION:

The findings of the present study revealed that the majority of post-caesarean mothers experienced moderate pain before the intervention in both groups. Following the administration of foot and hand massage, a marked reduction in pain intensity was observed among mothers in the experimental group, whereas the control group receiving routine care showed minimal change. The significantly lower post-test pain scores and substantially greater mean reduction in pain intensity in the experimental group demonstrated the effectiveness of foot and hand massage in alleviating post-caesarean pain. Overall, the study concludes that foot and hand massage is an effective non-pharmacological nursing intervention for reducing pain intensity among post-caesarean mothers, thereby promoting maternal comfort and supporting postoperative recovery.

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