

Effect of Infrared Radiation Therapy on Wound Healing & Pain among Post Natal Mothers Undergone Lower Segment Caesarean Section (LSCS)



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Abstract

Healing is the best way to alleviate pain, rather than masking it through the use of pain killers, light therapy especially infrared is a natural, noninvasive, nondrug modality for healing and thus relieving pain⁵. Hence, researcher adopted a quasi experimental pre & post- observation approach to assess the effect of infrared radiation therapy on wound healing process & pain on LSCS among post natal mothers at selected hospitals of Indore. Non probability purposive sampling technique was used to select 60 samples, 30 in each control group G1 & experimental G2. After that infrared radiation therapy was administered on experimental group, thrice a day for 3 days, it was followed by the post observation with the numerical pain scale for pain, during wound dressing, wound was assessed for healing with REEDA scale. Control group received only routine care. Statistical unpaired t-test was used for wound healing and Mann Whitney U test applied for comparison of pain score among control and experimental groups, comparison of pain before & after intervention was done in group 2, intergroup comparison of pain score was done in group-1 & 2. Findings of the study revealed that the wound healing status in experimental group was 6.7 with standard deviation of 1.00 and in the control group was 8.56 and standard deviation 0.50 mean difference was 1.80 and df was 58 which was found to be significant (at $t_{58}=8.760$, $p \leq 0.001$). The major findings of the study reveal, that there was significant reduction in pain at LSCS suture site just after intervention and the therapy lasted for 30 minutes after intervention and it slowly comes back near to the pre observational data.

Keywords: Infrared radiation therapy, wound healing process, lower segment caesarian section, post natal mothers.

Background

The number of women delivering by LSCS (Lower Segment Caesarian Section) is increasing. In 1994 to 1995, 15.5 per cent of all deliveries in England were by LSCS, up from 10.4% in 1985. In 2000 the National Sentinel Audit Survey reported UK LSCS rate of around 20%, with rates of 21.3% in England, 24.2 % in Wales and 23.9 % in Northern Ireland. There are ongoing debates to why this is happening and it is likely that the increase is due to a range of factors, including fear of litigation and maternal choice to opt or elective LSCS in the absence of any medical indications. The National Sentinel Audit identified the following primary indications for performing a section: presumed fetal compromise; dystocia; previous section; and breech presentation (**Bobak, I. M.,**

Margaret, D. J. 1993)¹

Danno K, Mori N, Toda K (Dec 2001)² A study was performed to investigate potential effects of a newly-developed, specific near-infrared light source on wound repair. The method used in this was, Cultured human keratinocytes, endothelial cells and fibroblasts were exposed to the light, and the production of transforming growth factor (TGF)-beta1 and matrix metalloproteinase (MMP)-2 was examined by enzyme immunoassay, zymography and reverse transcription polymerase chain reaction. Incision wounds were created in ICR and db/db diabetic mice and the effect of irradiation on wound closure was followed photographically. The results showed that the TGF-beta1 and MMP-2 content of the medium of cultured cells was significantly elevated after

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irradiation. The amount of MMP-2 mRNA extracted from irradiated fibroblasts was also up regulated. Negative results in thermal controls suggested that the action of the light was athermic in nature. In animal models, the rate of wound closure was significantly accelerated by repeated exposures. The study was concluded with the interference that the near-infrared irradiation potentially enhances the wound healing process, presumably by its biostimulatory effects.

Need of the Study & Review Literature

Post LSCS wound infection is not only a leading cause of prolonged hospital stay but a major cause of the widespread aversion to caesarean delivery in developing countries. Immediate management is essential to decrease the chance of infection, length of the hospital stay and to return for normal function. Infra red radiation is one of the modalities to treat the pain.

A study Infrared irradiation on wound healing after cesarean section observation and nursing care, aimed to observe the infrared radiation treatment on the impact of wound healing after cesarean section. Methods: 2400 cases of cesarean section were randomly divided into irradiated group (A = 1200) and the control group (B = 1200), observed two groups of patients with wound healing. The results of irradiation swelling incision infection significantly lower than the control group, the difference was statistically significant. Conclusion: Infrared irradiation on wound infection after cesarean section has obviously a preventive role. (Jane g.Ma Yongxing, Chou Zhijun 1998)³.

Postpartum period is a very crucial period caring for mother especially mother who had under gone episiotomy. It is a painful and discomfort during puerperial period. A study was conducted to assess the effectiveness of Infra red therapy for episiotomy wound healing. The objectives of the study were, to assess the condition of episiotomy wound among post natal mothers in experimental and control group. To evaluate the effectiveness of infra red lamp therapy on healing of episiotomy wound among post natal mothers by comparing experimental and control group scores. Methodology used for the study was Simple random sampling to assign the post natal mothers admitted in post

natal wards at Yadiyur maternity hospitals to control group and experimental group from KIMS hospital and research centre. Randomization was done through lottery method.

Mothers who had undergone right or left medio lateral episiotomy were included in the study. The socio demographic data were collected by conducting structure interview schedule and episiotomy wound was assessed by using observational check list 'REEDA scale'. Total 3 days infra red lamp therapy was given to experimental group and routine treatment to control group. Findings reveal that there was significant improvement in wound healing in experimental group as compared to control group. Infrared lamp therapy is an effective method of treatment on healing of episiotomy wound among post natal mothers.

While working in the postnatal ward, the researcher noticed many problems faced by the postnatal mothers such as pain ,discomfort etc. who had undergone LSCS. It was observed that most of the postnatal mothers were having common problems like headache, breast engorgement, but the main problem was the pain which acted as a barrier to exclusive breast feeding and ambulation of the mother which are unnoticed and neglected at times by health care personnel so there is an urgent need to explore it by using non-pharmacological methods of pain relief in LSCS wound. Keeping this view in mind the topic of the study was selected for research. (Nethravathi V.; N. S., Kshirsagar; Kakade, Satish V.November 2015)⁴

Problem Statement

A quasi experimental study to assess the effectiveness of infrared radiation therapy on wound healing process & pain on lower segment caesarean section among post natal mothers at selected hospitals of Indore in the year 2010-2011.

Objectives

- To assess the wound healing score of surgical site among post natal mothers undergone LSCS in control group & experimental group.
- To compare the wound healing score of surgical site between control group& experimental group on 4th

day among post natal mothers who had undergone LSCS.

- To assess the pain score at surgical site among post natal mothers undergone LSCS in control & experimental group.
- To compare the pain score at surgical site between control group & experimental group among post natal mothers who had undergone LSCS.

Hypotheses

H1: There is a significant reduction In pain intensity, when IR therapy is given at surgical wound site among post natal mothers who had undergone LSCS, at the level of $p \leq 0.05$.

H2: There is a significant enhancement in wound healing when IR therapy is given at the surgical site in post natal mothers who had undergone LSCS, at the level of $p \leq 0.05$.

Research Methodology

Research Design: Quasi experimental study- two group's pre test post test design.

Setting: The study was conducted at Choithram Hospital & Research Centre, Indore.

Population: All post natal mothers admitted in labor ward who had undergone LSCS.

Sample and sample size: Sample consisted of 60 post natal mothers admitted in labor wards and had undergone LSCS.

Sampling technique: The sample was selected using Non probability purposive sampling technique.

Tool: The tools used in this study were:

- Socio-demographic data and obstetrical history.
- Wound healing assessment tool(REEDA)
- Pain assessment tool(Numerical pain scale)

Validity & Reliability of the tool: The prepared tool along with statement, objectives, hypotheses, operational definitions and tools were given to seven experts of obstetric specialty for establishing content validity. Necessary changes were made as per the

recommendations and comments of the experts. Researcher has used standard tools:

1. Pain assessment scale (Numerical pain scale) whose reliability was $r=0.96$ (standardized tool).
2. For wound healing, REEDA wound healing assessment tool was used, whose reliability was $r = 0.80$.

Procedure for Data Collection: Written permission was obtained from the administrative authorities of the hospitals prior to the data collection. A total of 60 samples were selected for the study, who was admitted in Choithram Hospital & Research Centre, Indore city. Prior to the data collection informed consent was obtained from the respondents and confidentiality was assured. The researcher first collected the pre-observational data (O) before administering the infrared light. Infrared radiation was given for seven minutes. Then O_1 was taken i.e. post experimental data just after the infrared therapy from the experimental group then O_2 was taken after half an hour of the infrared therapy from the experimental group, the third observation was made after 1 hour of the therapy i.e. O_3 . Mean while the control group was observed for the pain with the routine care.

For healing of the sutured site, only one observation was made i.e. on 4th day during the time of dressing of the LSCS wound, for both the groups.

Findings

The data collected were organized and presented under the following sections:

Section I:(a) Socio-demographic Data

Section I:(b) Obstetrical history of postnatal mothers.

Section II: REEDA wound healing assessment tool

Section III : Numerical Pain Assessment Scale

Section I (a): Socio-Demographic Data of Postnatal Mothers

Age wise data reveals that, majority 24(40%) of postnatal mothers were in the age group of 21 30 years. In residence majority 43(72%) belonged to rural places. In family type 42(70%) belonged to joint family. In educational majority 30(50%) of postnatal mothers were

educated up to primary school. Majority 34 (56%) of postnatal mothers were Hindus. Majority of the subjects 21 (35%) had an income \geq 4001-6000 Rs/month and only 7 (11%) of the subjects had an average monthly income of \leq 8000 Rs./month.

Section I (b): Obstetrical History of Postnatal Mothers

32(53%) of postnatal mothers were multi gravida, regarding mode of previous delivery, 30(50%) had undergone LSCS. 25 (41%) of postnatal mothers had anemia before pregnancy, as many as 36 (60%) of subjects had developed anemia during pregnancy, 24 (40%) postnatal mothers gained weight between the range of 14-16 kg.

Section II: Comparison of wound healing status on 4th post operative day of LSCS among mothers in control group and experimental group.

Table 1: Mean SD, SE, df and t value for analysis of wound healing process: N=60

Group	N	Mean	SD	Min Diff.	SE	df	't' Value
Control Group	30	8.56	.50	1.80	.09	58	8.76***
Experimental Group	30	6.76	1.00	1.80	.18	42.68	8.76***

p=0.05* p=0.01 p=0.001*** S- Significant**

Data presented in Table no 1 shows that the mean wound healing status in experimental group is 6.7 with standard deviation of 1.00 and of the control group is 8.56 and standard deviation 0.50 mean difference is 1.80 and df is 58 which is found to be significant ($t_{58}=8.760$, $p=0.001$). Therefore the hypothesis H2 is accepted.

Section III : Comparison of pain on LSCS wound among postnatal mothers in control and experimental group.

Pre experimental, post experimental three observations (just after therapy, 30 minutes after therapy and 1 hour after the therapy) was done among post natal mothers of control group and experimental group. Data from both the groups were analyzed using Mann Whitney U test.

Table 2 (a): Comparison of pain score pre observation (Pre experimental) among group-1 & 2 on post operative day -1, 2 & 3.

(G1= control Group & G2 = Experimental group)

N=60(n1=30 & n2=30)

Groups	DAY1		DAY2		DAY3	
	G 1	G 2	G 1	G 2	G 1	G 2
Mean Rank	30.8	30.2	30.1	30.9	39.9	21.1
Sum of Rank	923.5	906.5	903.5	926.5	1196	634
Mann Whitney U	441.5		438.5		169	
Wilcoxon	906.5		903.5		634	
Z	-.13		-.18		-4.43	
Asym. Sig. (2 tailed)	.893		.856		.876	
	NS		NS		NS	

NS - Non significant

Data in table 2(a) depicts that the mean rank of group-1 is 30.78, 30.12, 39.87 at day1 ,2 & 3 that in group-2 is 32.22 at day 1, 30.88 at day 2, 21.13 at day 3. Mann Whitney U score is 441.5, 438.5 & 169, where t- value is .893, .856 and .876 .

The researcher found that statistically there was no significant difference at $p \leq 0.05$ in the pain score between the groups just before infrared light therapy (intervention). So it can be inferred that both the groups taken for the study are homogeneous & from the same universe.

Table 2 (b): Comparison of pain score pre observation (post experimental) post O, among group-1 & 2 Day-1, 2 & 3 (G1= control Group & G2 = Experimental group)

N=60(n1=30 & n2=30)

Groups	DAY1		DAY2		DAY3	
	G 1	G 2	G 1	G 2	G 1	G 2
Mean Rank	45.50	15.50	45.50	15.50	45.50	15.50
Sum of Rank	1365	465	1365	465	1365	465
Mann Whitney U	.000		.000		.000	
Wilcoxon	465.00		465.00		465.00	
Z	-6.12		-6.8s12		-6.771	
Asym. Sig. (2 tailed)	.001		.001		.001	
	*S		*S		*S	

S- Significant * p \leq .001

Data in table Table 2 (b) depicts that the mean rank of group-1 is 45.50 at day 1, 2 & 3 & that in group-2 is 15.50 at day 1, 2 & 3. Mann Whitney U score is .000 at day 1, 2 & 3, where significant value .001. (at level $p=.001$) The researcher found that statistically there is a significant difference in the pain score just after the (intervention) infrared radiation therapy (in group 2). Hence H1 is accepted.

Table 2(c): Comparison of pain score pre observation (post experimental) post O₂ among group-1 & 2 Day-1, 2 & 3

(G1= control Group & G2 = Experimental group)

N=60(n1=30 & n2=30)

Groups	DAY1		DAY2		DAY3	
	G1	G2	G1	G2	G1	G2
Mean Rank	44.20	16.80	43.83	17.17	43.33	17.67
Sum of Rank	1326	504	1315	515	1300	530
Mann Whitney U	39		50		65	
Wilcoxon	504		515		530	
Z	-6.246	-6.050	-5.943			
Asym. Sig (2 tailed)	.001		.001		.001	
	S		S		S	

S- Significant * $p \leq .001$

Data in table 2(c) depicts that the mean rank of group-1 is 44.20, 43.83 & 43.33 at day 1, 2 & 3 & that in group-2 is 16.80, 17.17 & 17.67 at day 1, 2 & 3. Mann Whitney U score is 39.00, 50.00 & 65.000 at day 1, 2 & 3, where significant value .001. (at level $p=.001$). The researcher found that statistically there is a significant difference in the pain score between both the groups just after & 30 mins after (intervention) infrared radiation therapy (in group 2). Hence H1 is accepted

Table 2(d): Comparison of pain score pre observation (post experimental) post O₂ among group-1 & 2 Day-1, 2 & 3

(G1= control Group & G2 = Experimental group)

N=60(n1=30 & n2=30)

Groups	DAY1		DAY2		DAY3	
	G1	G2	G1	G2	G1	G2
Mean Rank	28.73	32.27	29.52	31.48	29.97	31.03
Sum of Rank	862	968	885.50	944.50	899	931
Mann Whitney U	397		420		434	
Wilcoxon	862		885.5		899	
Z	-.855		-.469		-.259	
Asym. Sig (2 tailed)	.393		.639		.796	
	NS		NS		NS	

NS - Non Significant

Data in table 2(d) depicts that the mean rank of group-1 is 28.73, 29.52, 29.97 in table at day 1, 2 & 3 & that in group-2 is 32.27, 31.48, 31.037 at day 1, 2 & 3. Mann Whitney U score is 397, 420.5, 434, at day 1, 2 & 3, where t- value is 0.393, 0.623, 0.796 (at $p=0.05$). The researcher found that statistically there was no significant difference in the pain score between both the groups after 1 hour of (intervention) infrared radiation therapy (in group 2).

Discussion

Effectiveness of infrared radiation therapy on wound healing & pain reduction in postnatal mothers who had undergone LSCS.

Findings of the study reveals that, postnatal mothers who had undergone LSCS and didn't receive infrared radiation therapy was compared with the group who had received the therapy. It was found that there was significant relief in pain after the intervention for 1 hour and this was the time for the mother which can be utilized for breast feeding or baby care etc. It was also found that on 4th day during the time of dressing check there was significant improvement in the healing of the sutured site in experimental group as compared to the control group. Hence, the researcher

found that infrared light radiation therapy helps in pain relief and wound healing as well. Hence both the hypotheses, H1 & H2 were accepted.

The present study is supported by, a study conducted at Puduchery to evaluate the effectiveness of Infrared rays on wound healing and pain level in the experimental group comparison with control group mothers. The methodology used for this study was a quantitative approach and pre- test/ post- test control group design adopted and 100 caesarean section mothers (50 experimental & 50 control group) by RCT. Pretest was done to assess the existing wound healing & pain level for both group with standard scale (Modified Southampton wound assessment scale & Numeric pain rating scale). Experimental group received infrared therapy whereas the control group received routine dressing for twice a day for 3 days. Post-test assessment of wound healing & pain level was done on 5th & 7th post operative days with the same standard scales .The finding of the study revealed that Pre& post-test mean wound healing scores in experimental group was 2.1 ± 1.446 & 1.26 ± 0.828 respectively with 't' value 4.365($p \leq 0.05$), Similarly the mean pain level scores was 3.90 ± 0.303 & 1.94 ± 0.424 with the 't' value 28.100($p \leq 0.05$) and found statistically significant. There was a positive correlation between the wound healing and pain level score $r = 0.22$. **(Dash, M. B. , & Selvi, S. 2013)⁵.**

Conclusion

The pain at suture site and the wound healing status was assessed during postnatal period. The study concluded that Infrared radiation therapy acts as a local heat

application which relieves pain and helps in vasodilatation which leads to promotion of wound healing by early granulation and it is cost effective too. So it can be used by nurses to help women after LSCS.

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