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A study to evaluate the effectiveness of infrared lamp therapy on healing of episiotomy wound among postnatal mothers admitted in Adesh Hospital, Bathinda, Punjab, India

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Abstract:
Background: *Episiotomy remains a common or even routine surgical procedure at childbirth. Episiotomy care is very essential, if neglected it can lead to severe complications like infection, wound gapping etc. Infrared radiation is effective for episiotomy wound healing.*
Objectives: *To assess the condition of episiotomy wound among postnatal mothers in experimental and control group by conducting pre-test. To evaluate the effectiveness of infrared lamp therapy on healing of episiotomy wound among postnatal mothers in experimental group. To compare pre-test and post-test scores of both the experimental and control groups.*
Material and methods: *A Quasi- experimental design with an evaluative approach was used to select 30 postnatal mothers in experimental group and 30 in control group by using Non- probability convenience sampling technique. Assessment of episiotomy wound was done at 12 hours after episiotomy in both the experimental group and control groups and then infrared lamp therapy was given after 12 hours of episiotomy for 5 min for 3 times/day for 3 days. The data was collected by using standardized REEDA scale.*
Results: *There was significant improvement in wound healing in experimental group as compared to control group.*
Conclusion: *Infrared lamp therapy is an effective method of treatment on healing of episiotomy wound among postnatal mothers.*
Keywords: *Episiotomy, infrared lamp, postnatal mothers*

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I. Introduction

To become mother is a beautiful gift given by God to woman. Giving birth is a powerful and life changing event with a lasting impact on women[1]. Postpartum period is the period during which the woman adjusts, physically and psychologically post pregnancy and birth. Perineum is a very sensitive area, in which there are muscles involved in sitting, walking, bending down, squatting, urination, defecation. Any incision on the perineum causes pain and discomfort[2]. It is most commonly associated with child birth by vaginal delivery[3]. Episiotomy also known as perineotomy, is a surgical incision of the perineum and the posterior vaginal wall generally done by a midwife or obstetrician during second stage of labor to quickly enlarge the opening for the baby to pass through[4]. Episiotomy is advocated to have several advantages such as prevention of lacerations, better healing, easier to repair than a ragged tear, allows for easier and safer regression of the fetal head, and shortens the second stage of labor. Episiotomy is associated with the need of suture and healing complications in the postpartum period such as blood loss, edema, hematoma, infection, wound dehiscence and perineal pain[3]. The majority of healing takes place within the first 2 weeks, but it may take 4 to 6 months for the episiotomy to heal completely[5].Various interventions are found to aid the wound healing process which includes cleanliness, applying icepack, sitz bath, performance of Kegel's exercise and perineal care. As advancement in science took place, dry heat applications came into existence like electric heat lamps, peri lights, and infrared rays etc[6]. Infrared Rays has therapeutic effect of increasing the blood supply and relieving the pain and it increases the supply of oxygen and nutrient available to the tissues, accelerate the removal of the waste products and help to bring out the resolution of inflammation. It is also helping to achieve muscular relaxation and for the relief of the Pain. This will increase the supplymuscle spasm associated with injury or inflammation. Infrared rays also have the physiological effect on cutaneous vasodilation due to liberation of chemical vasodilators, histamine and similar substance as well as possible direct effect on the blood vessels[7]. Use the lamp five to six minutes per session, two to ten times per day. The infra-red lamp requires the voltage of 220V/250V and should be kept

50cms away from the affected area and moves the lamp around the area during the treatment. Allow the area to become as hot as one can comfortably tolerate[8]. The REEDA scale is a tool for assessing perineal healing that was primarily developed by Davidson and later reviewed by Carey[9]. It includes five items related to the healing process: Redness, edema, Ecchymosis, Discharge, and Approximation[10].Each category is assessed and a number assigned for a total REEDA score ranging from 0–15. The higher scores indicate increased tissue trauma[11]. Studies say that dry heat applications are more effective than moist heat application, as the effect of the dry heat lasts for a longer time and keeps the wound dry and hastens healing. Infra-red radiation was found effective in relieving pain and proper wound healing. This present study was planned to evaluate the effectiveness of infra-red lamp therapy on healing of episiotomy wound among post-natal mothers.

Aim of the study:
To evaluate the effectiveness of Infrared lamp therapy on healing of Episiotomy wound.

Objectives:
To assess the condition of episiotomy wound among postnatal mothers in experimental and control group by conducting pre-test.
To evaluate the effectiveness of infrared lamp therapy on healing of episiotomy wound among postnatal mothers in experimental group.
To compare pre-test and post-test scores of both the experimental and control groups.
To find an association between episiotomy wound healing of postnatal mothers with their selected socio-demographic variables.

II. Materials and Methods

Research Approach: Evaluative research approach was used.
Research Design: Quasi- experimental, one group Pre-test and Post-test control group design was adopted.
Setting of the Study: The study was conducted in Adesh Hospital, Bathinda, Punjab, India.
Target Population: The target population for this study consisted of postnatal mothers who were having Medial, Right and left Medio -lateral Episiotomy wound.
Sample: The sample for the present study comprises of 60 postnatal mothers, 30 postnatal mothers in experimental group and 30 postnatal mothers in control group.
Sampling technique: Non-probability convenience sampling technique was used to select the sample for this study.

Development of tool for data collection:
The tool contains two sections:
Section A: Part-I: Socio-demographic variables of the postnatal mothers consists of Age (in years), Religion, Educational status, Area of Residence, Type of family, Occupational Status, Family monthly income (in Rupees), Nutritional status, Hb level (gm/dl), weight of the mother, weight of the baby and type of antibiotic used.
Part- II: Maternal variables consist of Parity, Type of episiotomy, Suture material used and Episiotomy length (cm).
Section B: Standardized observation scale for assessment of healing of episiotomy wound (REEDA scale)

Procedure for data collection:
Data collection was conducted in the month of March 2018; the researcher introduced themselves and explained the purpose of the study to the Head of Department of Obstetrics and Gynecology in the hospital. Assessment of episiotomy wound was done at 12 hours after the episiotomy in both the experimental group and control group and then infrared lamp therapy was given after 12 hours of episiotomy for 5 min for 3 times/day for 3 days keeping lamp 50 cm away from the episiotomy wound in experimental group. The data was collected by using standardized REEDA scale.

Analysis of data
Both descriptive and inferential statistics were used in the study. Frequency, percentage distribution, Mean and standard deviation were used to describe the socio- demographic and maternal variables. The Chi-square (X^2) analysis was used to determine the association between healing of episiotomy wound with socio-demographic variables. The paired 't' test was carried out to assess the statistical significance and to compare the pre- test and post- test healing score of episiotomy wound within the group. The unpaired 't' test was carried out to assess the statistical significance and to compare the pre- test and post- test healing score of episiotomy wound between the groups.

III. Results

Organization and presentation of the data:

The data collected were edited, tabulated, analyzed, interpreted and findings obtained were presented in the form of tables and diagrams represent under following sections:

Section I:

Frequency and percentage distribution of socio demographic variables of postnatal mothers in experimental group and control group.

Section II:

Findings related to assessment of Episiotomy wound healing among postnatal mothers.

Mean and standard deviation of pre- test healing score of Episiotomy wound among postnatal mothers in experimental group and control groups.

Section III:

Findings related to effectiveness of Infrared lamp therapy.

To compare the pre- test and post- test healing score of episiotomy wound among postnatal mothers.

REEDA scale categories of postnatal mothers in experimental group and control group.

Section- IV:

Association between episiotomy healing scores with selected socio- demographic variables.

Table 1: Frequency and percentage distribution of socio- demographic variables in experimental group and control group.

N=60

Socio - demographic variables		**Experimental group**		**Control group**	
		Frequency (f)	**Percentage**	**Frequency (f)**	**Percentage**
Age (years)	18- 23	8	26.7%	10	33.3%
	24- 28	12	40.0%	15	50.0%
	29- 34	9	30.0%	4	13.3%
	more than 35	1	3.3%	1	3.3%
Educational Status	No formal education	3	10.0%	1	3.3%
	Primary education	10	33.3%	6	20.0%
	Secondary education	13	43.3%	9	30.0%
	Higher secondary	2	6.7%	13	43.3%
	Graduate and above	2	6.7%	1	3.3%
Religion	Sikh	15	50.0%	13	43.3%
	Hindu	13	43.3%	14	46.7%
	Muslim	2	6.7%	3	10.0%
	Christian	0	0.0%	0	0.0%
	Others	0	0.0%	0	0.0%
Area of Residence	Rural	17	56.7%	23	76.7%
	Urban	13	43.3%	7	23.3%
Type of family	Nuclear	17	56.7%	21	70.0%
	Joint	13	43.3%	9	30.0%
Occupational Status	House wife	21	70.0%	15	50.0%
	Agriculture	0	0.0%	0	0.0%
	Government Job	2	6.7%	5	16.7%
	Private job	7	23.3%	10	33.3%
Family monthly Income (Rs.)	less than 10,000	1	3.3%	5	16.7%
	10,001- 20,000	16	53.3%	12	40.0%
	20,001- 30,000	11	36.7%	9	30.0%
	more than 30,000	2	6.7%	4	13.3%
Nutritional status	Vegetarian	21	70.0%	20	66.7%
	Mixed	9	30.0%	10	33.3%
Hb level (gm/dl)	less than 7	0	0.0%	3	10.0%
	7- 9	9	30.0%	17	56.7%
	9.1- 12	19	63.3%	10	33.3%
	more than 12	2	6.7%	0	0.0%
Weight of mother (kg)	less than 60	3	10.0%	1	3.3%
	61- 70	19	63.3%	17	56.7%
	71- 80	8	26.7%	11	36.7%
	more than 80	0	0.0%	1	3.3%
Weight of the baby (gm)	1500- 2000	0	0.0%	0	0.0%
	2001- 2500	0	0.0%	0	0.0%
	2501- 3000	11	36.7%	10	33.3%
	3001- 3500	18	60.0%	17	56.7%

	3501- 4000	1	3.3%	3	10.0%
Type of Antibiotic used	Narrow spectrum	0	0.0%	0	0.0%
	Broad Spectrum	30	100.0%	30	100.0%

Table 2: Frequency and percentage distribution of maternal variables in experimental group and control group.

N= 60

Maternal Variables		**Experimental group**		**Control group**	
		Frequency (f)	**Percentage**	**Frequency (f)**	**Percentage**
Parity	Primiparous	17	56.7%	18	60.0%
	Multiparous	13	43.3%	12	40.0%
Type of episiotomy	Medial	0	0.0%	0	0.0%
	Right Medio lateral	0	0.0%	0	0.0%
	Left Medio lateral	30	100.0%	30	100.0%
Suture material used	Absorbable	30	100.0%	30	100.0%
	Non- absorbable	0	0.0%	0	0.0%
Episiotomy length (cm)	1- 2	0	0.0%	1	3.3%
	2.1- 3	7	23.3%	5	16.7%
	3.1- 4	23	76.7%	24	80.0%

Table 3: Pre- test healing score of episiotomy wound among postnatal mothers. **N=60**

Descriptive statistics	**Experimental Group**		**Control Group**	
	Mean	**S.D.**	**Mean**	**S.D.**
Redness	2.77	0.430	2.73	0.450
Edema	2.67	0.547	2.67	0.606
Ecchymosis	1.43	0.679	1.07	0.521
Discharge	0.20	0.407	0.00	0.000
Approximation	0.13	0.346	0.10	0.305
Overall	7.20	1.400	6.57	1.165

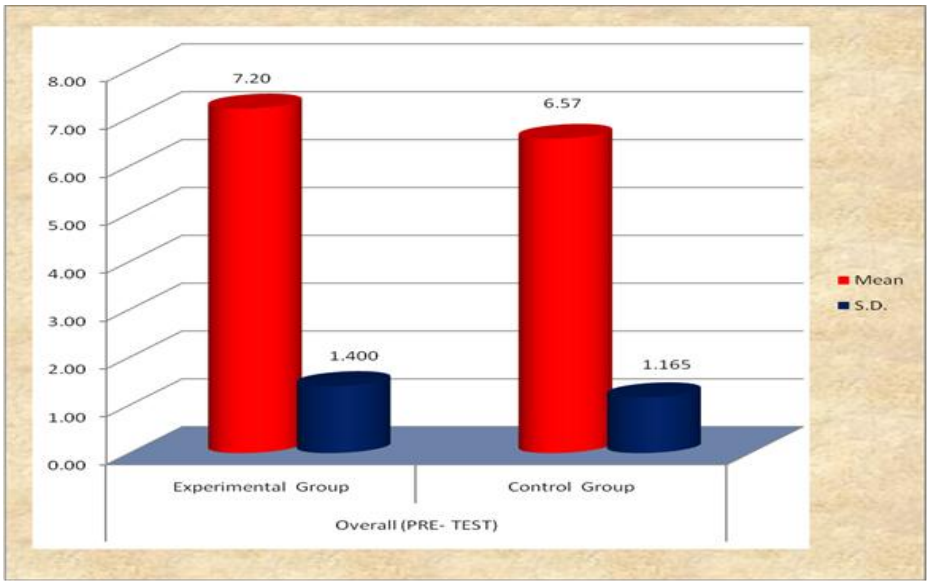

Figure 1: The clustered cylinder diagram shows Pre- test healing score of episiotomy wound among postnatal mothers in experimental and control group.

Table 4: Comparison of pre- test and post- test overall healing score of episiotomy wound in experimental group.

N=30

Experimental Group	**Mean**	**S.D.**	**Mean Difference**	**Paired 't' Test**
Pre- test	7.20	1.400	6.17	24.270 S
Post- test	1.03	1.066		

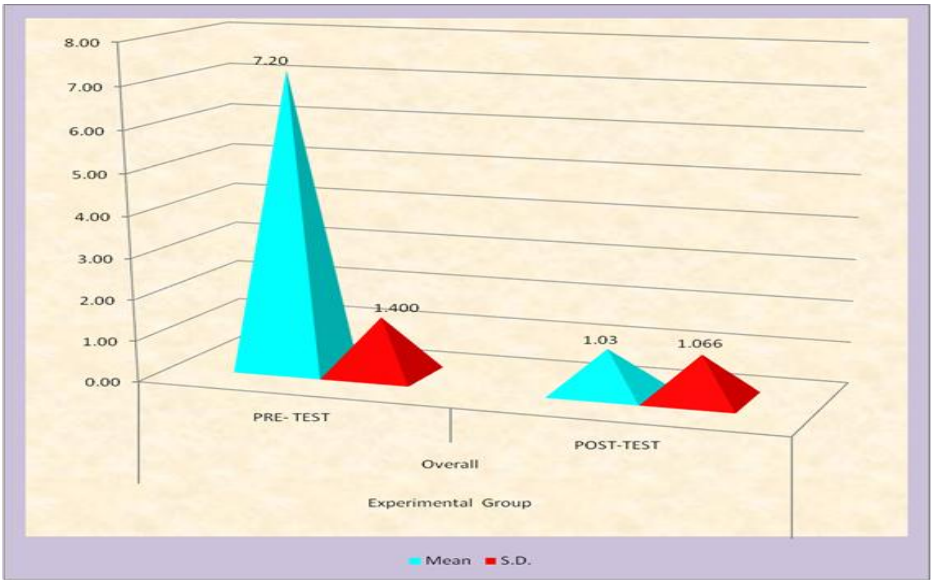

Figure 2: The Clustered pyramid diagram shows pre- test and post- test overall healing score of episiotomywound in experimental group.

Table 5: Comparison of pre- test and post- test overall healing score of episiotomy wound in control group.
N=30

Control Group	Mean	S.D.	Mean Difference	Paired 't' Test
Pre- test	6.57	1.165	0.53	1.722 NS
Post- test	6.03	1.542		

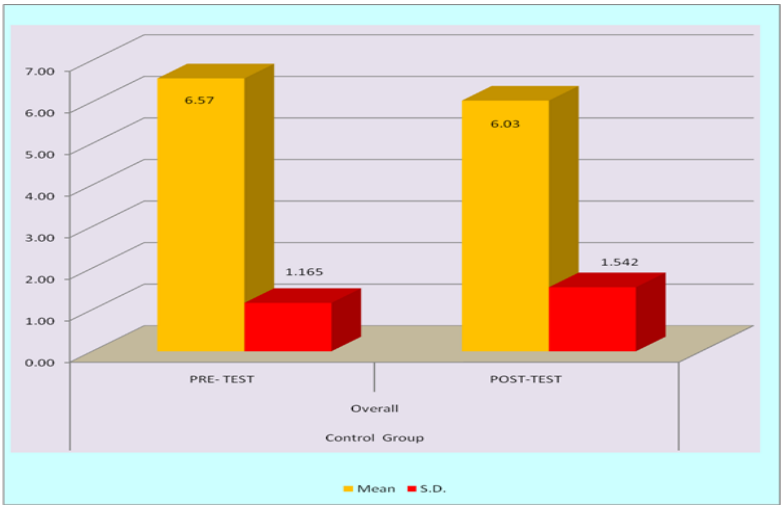

Figure 3: The 3-D Clustered column diagram shows pre- test and post- test overall healing score of episiotomy wound in control group.

Table 6: Comparison of pre- test and post- test overall healing score of episiotomy wound among experimental group and control group.

N=60

Unpaired 't' Test	Groups	Mean	S.D.	Mean difference	Unpaired 't' Test
Pre- test	Experimental	7.20	1.400	0.63	1.905 NS
	Control	6.57	1.165		
Post- test	Experimental	1.03	1.066	-5.00	14.607 S
	Control	6.03	1.542		

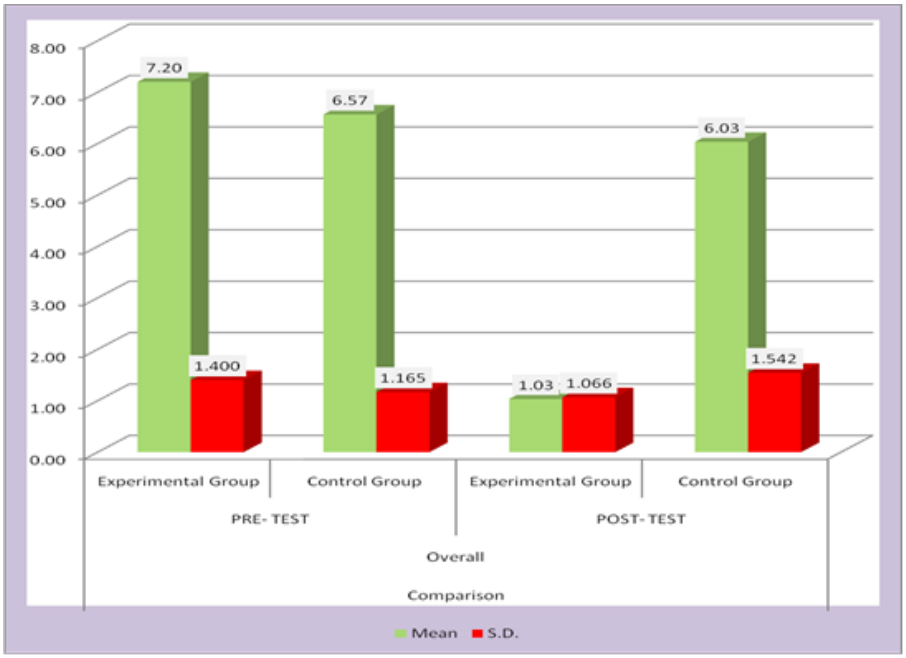

Figure 4: The 3- D Clustered column diagram shows comparison of pre- test and post- test overall healing score of episiotomy wound among experimental group and control group.

Table 7: REEDA scale categories of postnatal mothers in experimental and control group.
N=60

Condition of Episiotomy wound		**Experimental**		**Control**	
		Frequency (f)	**Percentage**	**Frequency (f)**	**Percentage**
Pre- test	Healed	0	0.0%	0	0.0%
	Moderately Healed	5	16.7%	5	16.7%
	Mildly Healed	25	83.3%	25	83.3%
	Not Healed	0	0.0%	0	0.0%
Post- test	Healed	11	36.7%	0	0.0%
	Moderately Healed	19	63.3%	9	30.0%
	Mildly Healed	0	0.0%	21	70.0%
	Not Healed	0	0.0%	0	0.0%

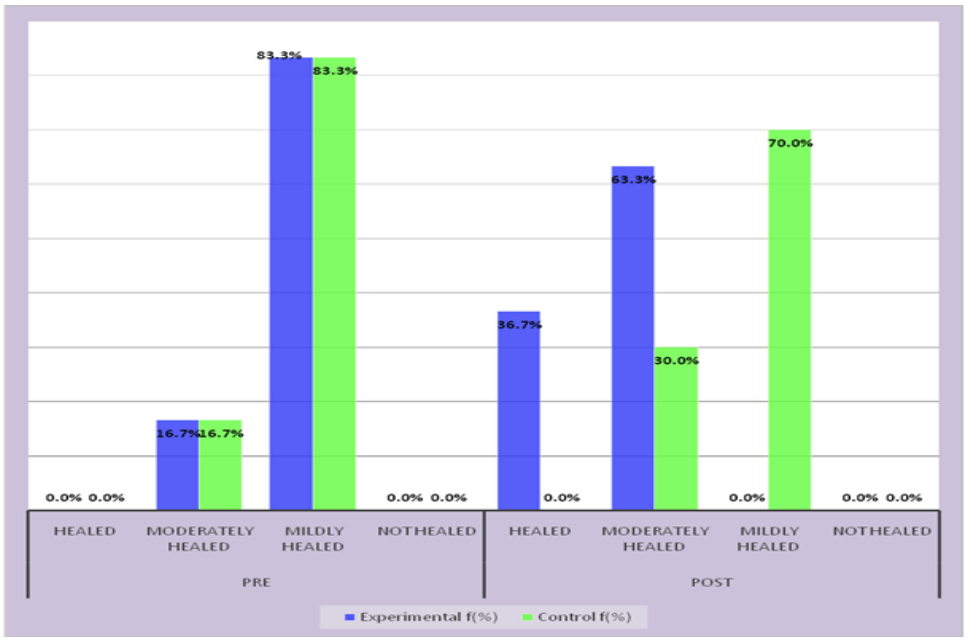

Figure 5: The Clustered column diagram shows REEDA scale categories of episiotomy wound in experimental group and control group.

Table 8: Association of condition of episiotomy wound with Socio-Demographic variables in Experimental Group.

N = 60

Socio-demographic Variables		**Association of condition of episiotomy wound with Socio-Demographic variables in Experimental Group**								
		Healed	**Moderately Healed**	**Mildly Healed**	**Not Healed**	**Mean**	**SD**	**X^2Test**	**df**	**p -Value**
Age (years)	18- 23	2	6	0	0	1.38	1.3	2.01	3	0.57 NS
	24- 28	6	6	0	0	1	1.21			
	29- 34	3	6	0	0	0.78	0.67			
	more than 35	0	1	0	0	1	0			
Educational Status	No formal education	0	3	0	0	2.33	1.53	2.738	4	0.603 NS
	Primary education	3	7	0	0	1	0.82			
	Secondary education	6	7	0	0	0.92	1.12			
	Higher secondary	1	1	0	0	0.5	0.71			
	Graduate and above	1	1	0	0	0.5	0.71			
Religion	Sikh	4	11	0	0	1.2	1.15	4.119	2	0.128 NS
	Hindu	5	8	0	0	1	1			
	Muslim	2	0	0	0	0	0			
	Christian	0	0	0	0	0.00	0.00			
	Others	0	0	0	0	0.00	0.00			
Area of Residence	Rural	7	10	0	0	0.94	0.97	0.344	1	0.558 NS
	Urban	4	9	0	0	1.15	1.21			
Type of family	Nuclear	7	10	0	0	0.94	1.03	0.344	1	0.558 NS
	Joint	4	9	0	0	1.15	1.14			
Occupational Status	House wife	8	13	0	0	1.1	1.18	0.369	2	0.831 NS
	Agriculture	0	0	0	0	0.00	0.00			
	Government Job	1	1	0	0	0.5	0.71			
	Private job	2	5	0	0	1	0.82			
Family monthly Income (Rs.)	less than 10,000	0	1	0	0	4	0.00	0.737	3	0.864 NS
	10,001- 20,000	6	10	0	0	0.88	0.81			
	20,001- 30,000	4	7	0	0	1.09	1.14			
	more than 30,000	1	1	0	0	0.5	0.71			
Nutritional status	Vegetarian	8	13	0	0	1.05	1.16	0.062	1	0.804 NS
	Mixed	3	6	0	0	1	0.87			
Hb level (gm/dl)	less than 7	0	0	0	0	0.00	0.00	1.204	2	0.548 NS
	9-Jul	2	7	0	0	1.56	1.33			
	9.1- 12	8	11	0	0	0.84	0.9			
	more than 12	1	1	0	0	0.5	0.71			
Weight of mother (kg)	less than 60	2	1	0	0	1.33	2.31	1.377	2	0.502 NS
	61- 70	6	13	0	0	1.05	0.91			
	71- 80	3	5	0	0	0.88	0.99			
	more than 80	0	0	0	0	0	0			
Weight of the baby (gm)	1500- 2000	0	0	0	0	0	0	1.814	2	0.404 NS
	2001- 2500	0	0	0	0	0	0			
	2501- 3000	4	7	0	0	1.09	1.22			
	3001- 3500	6	12	0	0	1.06	1			
	3501- 4000	1	0	0	0	0	0			
Type of Antibiotic used	Narrow spectrum	0	0	0	0	0.00	0	NA		
	Broad Spectrum	11	19	0	0	1.03	1.07			
Parity	Primiparous	6	11	0	0	1.06	1.14	0.032	1	0.858 NS
	Multiparous	5	8	0	0	1	1			
Type of episiotomy	Medial	0	0	0	0	0.00	0	NA		
	Right Medio lateral	0	0	0	0	0.00	0			
	Left medio lateral	11	19	0	0	1.03	1.07			

Suture material used	Absorbable	11	19	0	0	0.00	0.00	NA		
	Non- absorbable	0	0	0	0	0.00	0.00			
Episiotomy length (cm)	2-Jan	0	0	0	0	0.00	0.00	0.151	1	0.698 NS
	2.1- 3	3	4	0	0	0.86	1.07			
	3.1- 4	8	15	0	0	1.09	1.08			

The above table 8 shows association between episiotomy wound healing scores with their selected socio- demographic variables in experimental group. In the present study there was no significant association between healing scores of episiotomy wound with their socio- demographic variables mothers such as Age (in years), Religion, Educational status, Area of Residence, Type of family, Occupational Status, Family monthly income (in Rupees), Nutritional status, Hb level (gm/dl), Weight of mother (kg), Weight of the baby (gm), Type of Antibiotic used, Parity, Type of episiotomy, Suture material used and Episiotomy length (cm).

Table 9: Association of condition of episiotomy wound with Socio-Demographic variables in Control Group. **N= 60**

Socio- Demographic Variables		**Association of condition of episiotomy wound with Socio- Demographic variables in Control Group**								
		Healed	**Moderately Healed**	**Mildly Healed**	**Not Healed**	**Mean**	**S.D.**	**X^2Test**	**df**	**p- Value**
Age (years)	18- 23	0	2	8	0	6.2	1.14	4.841	3	0.184 NS
	24- 28	0	4	11	0	6.4	1.45			
	29- 34	0	3	1	0	4	1.63			
	more than 35	0	0	1	0	7	0			
Educational Status	No formal education	0	0	1	0	6	0	4.461	4	0.347 NS
	Primary education	0	3	3	0	5.33	1.86			
	Secondary education	0	2	7	0	6.11	1.17			
	Higher secondary	0	3	10	0	6.46	1.61			
	Graduate and above	0	1	0	0	4	0			
Religion	Sikh	0	6	7	0	5.85	1.99	3.391	2	0.184 NS
	Hindu	0	3	11	0	6.21	1.25			
	Muslim	0	0	3	0	6	0			
	Christian	0	0	0	0	0	0			
	Others	0	0	0	0	0	0			
Area of Residence	Rural	0	7	16	0	5.87	1.55	0.009	1	0.925 NS
	Urban	0	2	5	0	6.57	1.51			
Type of family	Nuclear	0	8	13	0	5.86	1.65	2.184	1	0.139 NS
	Joint	0	1	8	0	6.44	1.24			
Occupational Status	House wife	0	4	11	0	6	1.41	0.317	2	0.853 NS
	Agriculture	0	0	0	0	0	0			
	Government Job	0	2	3	0	5.6	1.52			
	Private job	0	3	7	0	6.3	1.83			
Family monthly Income (Rs.)	less than 10,000	0	3	2	0	5.6	1.34	4.577	3	0.206 NS
	10,001- 20,000	0	3	9	0	6	1.6			
	20,001- 30,000	0	1	8	0	6.33	1.32			
	more than 30,000	0	2	2	0	6	2.45			
Nutritional status	Vegetarian	0	5	15	0	6.2	1.4	0.714	1	0.398 NS
	Mixed	0	4	6	0	5.7	1.83			
Hb level (gm/dl)	less than 7	0	0	3	0	6.67	0.58	1.765	2	0.414 NS
	9-Jul	0	5	12	0	6.29	1.53			
	9.1- 12	0	4	6	0	5.4	1.65			
	more than 12	0	0	0	0	0	0			
Weight of mother (kg)	less than 60	0	0	1	0	6	0	2.447	3	0.485 NS
	61- 70	0	4	13	0	6.18	1.01			
	71- 80	0	5	6	0	5.55	2.02			
	more than 80	0	0	1	0	9	0			
Weight of the baby (gm)	1500- 2000	0	0	0	0	0	0	1.513	2	0.469 NS
	2001- 2500	0	0	0	0	0	0			
	2501- 3000	0	3	7	0	6.1	1.2			
	3001- 3500	0	6	11	0	5.71	1.65			
	3501- 4000	0	0	3	0	7.67	1.15			
Type of Antibiotic used	Narrow spectrum	0	0	0	0	0	0	NA		
	Broad Spectrum	0	9	21	0	6.03	1.54			
Parity	Primiparous	0	6	12	0	6.06	1.21	0.238	1	0.626 NS
	Multiparous	0	3	9	0	6	2			
Type of	Medial	0	0	0	0	0	0	NA		

episiotomy	Right Medio lateral	0	0	0	0	0	0			
	Left Medio lateral	0	9	21	0	6.03	1.54			
Suture material used	Absorbable	0	9	21	0	6.03	1.54	NA		
	Non- absorbable	0	0	0	0	0	0			
Episiotomy length (cm)	2-Jan	0	0	1	0	6	0	0.794	2	0.672 NS
	2.1- 3	0	1	4	0	6	1.41			
	3.1- 4	0	8	16	0	6.04	1.63			

The above table 9 shows association between episiotomy wound healing scores with their selected socio- demographic variables in control group. In the present study there was no significant association between healing scores of episiotomy wound with their socio- demographic variables mothers such as Age (in years), Religion, Educational status, Area of Residence, Type of family, Occupational Status, Family monthly income (in rupees), Nutritional status, Hb level (gm/dl), Weight of mother (kg), Weight of the baby (gm), Type of Antibiotic used, Parity, Type of episiotomy, Suture material used and Episiotomy length (cm).

IV. Conclusion

The findings revealed that there was improvement in overall healing of episiotomy wound in experimental group as compared to control group. There was a statistically significant difference between the pre-test and post- test healing score of episiotomy wound between experimental group and control group significant at=14.607($p<0.05$). Hence the research ($H_{1.1}$) hypothesis was accepted.

Recommendations for further study:

On the basis of the findings of the study the following recommendations have been made:

1. Similar study can be undertaken with a large sample to generalize the findings.
2. The study can be conducted in different settings, private hospitals and primary health care centers with similar facilities.
3. A comparative study can be conducted between primiparous women and multiparous women to assess the effectiveness of Infrared lamp therapy.

Limitations:

1. The sample size was limited to 60 postnatal mothers.
2. The study was confined to a small sample selected by non-probability convenience sampling technique.
3. Extraneous variable like natural wound healingwas not under the control of the investigator.
4. The study setting was limited to postnatal mothers who are admitted in Adesh Hospital, Bathinda.
5. Only wound healing was assessed and no attempt was made to identify other attributes like pain, perception and discomfort level.

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