

Research Article

Infrared is more effective in perineum wound healing during postpartum than iodine

Vivian N. L. Dewi*, Ika F. Ayuningtyas

Department of Midwifery, Stikes Jend. A. Yani Yogyakarta, Yogyakarta, Indonesia

Received: 26 September 2015

Accepted: 13 November 2015

***Correspondence:**

Vivian N. L. Dewi,

E-mail: umivivian@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Maternal death during childbirth is usually caused by puerperal infection (11%) this happens because of a lack of care on the wound, bleeding (27%) (Due to the birth canal laceration and complications during parturition (8%). Many women feel too concerned about the perineum injury, so they afraid to do activities in the first days after delivering. It was necessary for the proper techniques in wound care, and the most important was the use of materials and the proper way, for example by using Far Infra-Red Therapy. The benefits of infrared light is able to activate the water molecules in the body, improve microcirculation, cleanse the blood, improve skin texture, so by utilizing far infrared, process of wound healing can take place more quickly.

Methods: This study used Quasi-experiment with Pre-Post-test Control Group Design with Cross-sectional approach. Intervention group was using puerperal women given far infrared and control using puerperal women given iodine. The sampling technique was purposive sampling. Samples were puerperal women who suffered lacerations in perineum at RB Amanda. Samples were of 30 people that divided into two groups.

Results: The results of independent t test p values are significant only on day 1 of 0.01, and Paired t test show a significant difference ($p = 0.00$) in the control group only at day 1 to 2 with a mean of 15. In the intervention group have a significant difference on day 1 to 2 ($p = 0.00$, mean = 31.7) and on day 2 and 3 ($p = 0.04$, mean = 5.7).

Conclusions: Infrared therapy is more effective in perineum wound healing during postpartum.

Keywords: Infrared, Perineum, Wound healing, Postpartum

INTRODUCTION

According to WHO (World Health Organization) that the Maternal Mortality Rate (MMR) in the world at 500.000 per year, and 99% occurred in developing countries.¹ Based on Demographic Health Survey of Indonesia in 2010, MMR was 263 per 100.000 live births. The direct cause was complications in pregnancy, childbirth and postpartum that was not handled properly and timely. Maternal death during childbirth is usually caused by puerperal infection (11%) this happens because of a lack of care on the wound, bleeding (27%) (Due to the birth canal laceration and complications during parturition (8%).² Inconsequence, mother need good wound care during postpartum.

Trauma of perineum can cause considerable distress and discomfort for many women following childbirth that can affects the mental, social and physical wellbeing of the woman. Some have postpartum pain and discomfort, which may persist beyond as chronic pain and painful sex. In addition, infection, wound breakdown, urinary and faecal incontinence and other spectrum of adverse effect of treatment of trauma in perineum can make the postpartum period very unpleasant. While factors like suture techniques, operator skills and suture materials may affect pain and wound healing, different strategies have been used in order to promote perineum wound healing. Severity of discomfort was frequently underestimated and many women suffered without cause, very frequently in silence.³

The midwifery practices in Indonesia are still often found that midwives apply iodine in perineum wound. Not only as antiseptic agent to kill bacteria, but also it can irritate, more toxic when entering into blood vessel, and inhibit wound healing in excessive use.^{4,5} On the other hand, there are many advanced of modern technology that provide safe alternative treatment solution to all mothers who are looking hopefully at midwives to help in bringing down the maternal morbidity rate and relieve them from suffering, pain and discomfort after child birth. Thus, it becomes the midwife's responsibility to identify the ways of preventing and reducing maternal morbidity as well as to identifying the cost effective measures in relieving pain. Postnatal mother might have painful urinating because of local bruises on the vulva, clitoris, vagina and the perineum sutured scar. Retention of urine may occur due to painful scar or the operative delivery.⁶

The most commonly used in non-pharmacologic treatment of wound healing is infrared. Research conducted Horwitz, 1998, showed a significant improvement in wound using Monochromatic Infrared therapy. This study examines the various types of wound healing from extremity by using infrared energy 890 nanometres (nm) monochromatic. Wounds were irradiated using an infrared experienced downsizing and can even be closed again after the use of monochromatic infrared energy, maybe it is associated with increased local concentrations of nitric oxide. Increased nitric oxide has previously been shown to correlate with vasodilatation and anabolic responses.^{7,8} In terms of research, nursing researches have been done on the effectiveness of infrared on wound healing, but specifically the use for perineum wounds are still very rare (has not been found by researchers). In terms of practice, based on a survey by researchers, there have been several maternal and child health clinics in Yogyakarta which organizes perineum wound care therapy using infrared.

METHODS

This study used Quasi-experiment with Pre-Post-test Control Group Design with Cross-sectional approach. Intervention group was using puerperal women given far infrared and control using puerperal women given iodine. The sampling technique was purposive sampling. Samples were puerperal women who suffered lacerations in perineum at RB Amanda. Samples were of 30 people that divided into two groups.

Inclusion: Postpartum 0-1 week, mothers with uncomplicated spontaneous parturition morbidities (diabetes, anaemia, hypertension), and spontaneous or episiotomy perineum rupture grade II.

Exclusion: Mother with childbirth complication, moved her residence during the study period, and perineum rupture grade III and IV.

Infrared radiation using HP Infraphil Philips brands 3616. The instrument that used in data collection wound healing is REEDA scale. REEDA Scale was used to assess healing of the perineum. It comprised of five items related to redness, oedema, ecchymosed, discards, and approximation. The maximum score for REEDA was 15 and the minimum score was zero.

Reliability

Reliability of the REEDA Scale was established by Kappa method of inter ratter reliability and was found to be .75 (acceptable range .61-.81 COHEN)

Procedure

Administrative approval and ethical clearance was obtained from the designated authority. Written consent was obtained from the participants after explaining the nature and purpose of the study. Confidentiality and anonymity was ensured. First 15 postnatal mothers allocated to group 1 received infrared light to the perineum sutured for 10 minutes with a distance of 45 cm. Next 15 postnatal mothers allocated to group 2 received iodine once a day. Each therapy was provided once daily for seven consecutive days. Healing of wound was observed after giving the treatment using REEDA Scale. The obtained data was analyzed by using descriptive and t-test.

RESULTS

Table 1 shows that majority both of study groups were in aged 20-35 years, the last education in Senior High School, and experienced spontaneous rupture. In the intervention group the majority of parity was primipara (66.7%) and multipara for control group (60%).

Table 1: The characteristic of respondents.

The Characteristic of Respondents	Intervention (Infrared)		Control (Iodine)	
	f	%	f	%
Age				
>20 years	0	0	1	6.7
20-35 years	15	100	12	80
>35 years	0	0	2	13.3
Education				
Junior High School	0	0	3	20
Senior High School	11	73.3	11	73.3
Diploma/Bachelor	4	26.7	1	6.7
Parity				
Primipara	10	66.7	6	40
Multipara	5	33.3	9	60
Rupture				
Spontaneous	10	66.7	10	66.7
Episiotomy	5	33.3	5	33.3

Table 2 shows the control group had a minimum value of the percentage of effectiveness between 40-66.7% and a maximum one of 80%, and the intervention group had a minimum value between 0-50% and a maximum one of 80%.

In both study groups experienced an increase in the mean or average percentage of day-to-day effectiveness of

therapy. The control group increased from 50.44% to 77.78% and 30.78% of the intervention group to 73.11%. This means that in both these therapies are effective in postpartum maternal perineum wound healing.

Figure 1 shows significant mean value in the control group only at day 1 to 2 with a mean of 15 and intervention group with a mean = 31.7.

Table 2: Effectiveness percentage of wound healing using infrared and iodine therapy.

Group	Day 1 (%)			Day 2 (%)			Day 3(%)			Day 4 (%)			Day 5 (%)			Day 6 (%)		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Intervention (infrared)	0	75	30.78	25	80	62.44	25	80	68.11	50	80	71.44	50	80	73.11	50	80	73.11
Control (Iodine)	40	80	50.44	40	80	65.4	60	80	74.78	60	80	77.44	66.67	80	78.78	66.67	80	78.78

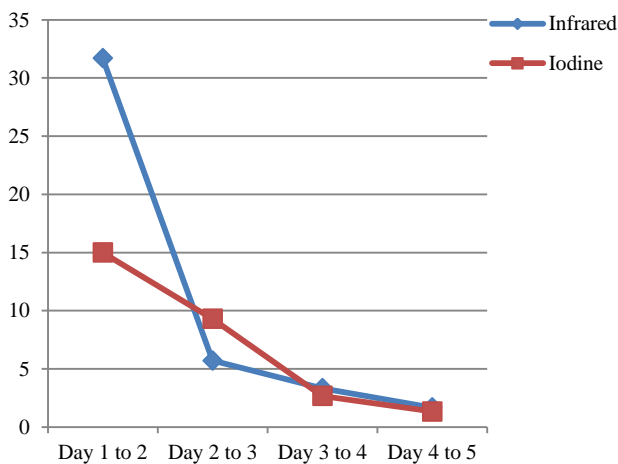


Figure 1: Mean value the effectiveness of infrared therapy and iodine for wound healing day to day.

Table 3: Different test (t) effectiveness of wound healing using infrared therapy and iodine day to day.

Group	Day 1 to day 2		Day 2 to day 3		Day 3 to day 4		Day 4 to day 5	
	t	p	T	p	t	p	t	p
Intervention (infrared)	4.63	0.00	2.24	0.04	1.47	0.10	1	0.33
Control (iodine)	4.8	0.00	2.43	0.29	1.47	0.16	1	0.33

Table 3 shows a significant difference (p = 0.00) in the control group only at day 1 to day 2 with a mean of 15. In the intervention group seen significant difference on day 1 to day 2 (p = 0.00) and on day 2 to day 3 (p = 0:04).

DISCUSSION

Table 1 shows that majority both of study groups were in aged 20-35 years, the last education in Senior High School, and experienced spontaneous rupture. In the intervention group the majority of parity was primipara (66.7%) and multipara for control group (60%). No significant association was found between perineum sutured wound healing and age, education, type of family, parity. These findings are consistent with the findings reported by. Begum also reported no significant association of perineum sutured wound healing of postnatal mothers and selected variables age, education, and parity.^{9,10}

Table 2 shows the control group had a minimum value of the percentage of effectiveness between 40-66.7% and a maximum one of 80%, and the intervention group had a minimum value between 0-50% and a maximum one of 80%. In both study groups experienced an increase in the mean or average percentage of day-to-day effectiveness of therapy. The control group increased from 50.44% to 77.78% and 30.78% of the intervention group to 73.11%. This means that in both these therapies are effective in postpartum maternal perineum wound healing. As we all know that iodine has antiseptic properties or (kills germs) both gram positive and negative bacteria so they can accelerate wound healing.^{4,5}

Infrared also has benefits to improve microcirculation, increase metabolism, relaxes the blood vessels cavity, helping the development of the body's cells, increasing the body's resistance to disease, and develop a pH in the body so they can accelerate wound healing.⁶ Many studies reveals that FIR exposure induced the nuclear translocation of PLZF which up regulated PI3K to activate Akt, and then activated eNOS to induce NO generation. This NO generation combined with VEGF-induced ROS generation resulted in inhibition of VEGF-induced proliferation in HUVECs. Through a PLZF-

mediated pathway, FIR therapy is a potential therapeutic modality to maintain vascular endothelial health and function.⁶ The other study revealed that the biological activities of irradiation with FIR (Far Infrared) are highly associated with the endothelial nitric oxide (NO) synthetase (eNOS)/NO pathway. In rat models, the beneficial effects of FIR therapy on skin blood flow were suggested to be related to the L-arginine/NO pathway.¹¹

Figure 1 and table 3 shows the significant p value only on day 1 of 0.01, then H_0 is rejected, which means the 95% confidence level there is an average difference between the rate of perineum wound healing using infrared therapy with iodine. In Table 4 look both groups significantly on day 1 to day 2 with the same p value of 0:00, this means that there is influence between iodine and infrared therapy on wound healing. Results mean greater in the intervention group than in the control group is 31.7, it shows the infrared more effective in postpartum maternal perineum wound healing.

CONCLUSION

Infrared therapy is more effective in perineum wound healing during postpartum.

ACKNOWLEDGEMENTS

We wish to extend our sincere thanks to Directorate General of Higher Education Indonesia for financial support (Grant, 2014) and Amanda Maternity Hospital for material support.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Manuaba IBG. Memahami Kesehatan Reproduksi. Jakarta: Arcan. 2010:4.
2. Hernawati I. Analisis Kematian Ibu Di Indonesia Tahun 2010, 2011. Available at <http://www.kesehatanibu.depkes.go.id/archives/206>. Accessed 20 June 2014.
3. Padubidri. V. Textbook of Obstetrics. 1st edition. New Delhi: BI Publication (P) Ltd. 2006:389.
4. Ganiswara VHS. Farmakologi dan Terapi. Jakarta: Fakultas Kedokteran UI. 2007:45.
5. Iksari V. Wound Care Unit: Perawatan Luka Modern dan Terkini, 2013. Available at <http://health.liputan6.com/read/753644/saat-luka-sebaiknya-tidak-gunakan-antiseptik-bahaya?page=2>. Accessed 20 June 2014.
6. Yung-Ho H, Yen-Cheng C, Tso-Hsiao C, Yuh-Mou S, Tzu-Hurng C. Far-Infrared Therapy Induces the Nuclear Translocation of PLZF Which Inhibits VEGF-Induced Proliferation in Human Umbilical Vein Endothelial Cells: e30674. PLoS One. 2012:7.1.
7. Horwitz, Lon R. DPM, CWS. Thomas J. Burke, PhD; and Dale Carnegie, DPM. Augmentation of Wound Healing Using Monochromatic Infrared Energy 'Exploration of a New Technology for Wound Management. J Advances in wound care, 1999.
8. Gabriel JF. Fisika Kedokteran. Jakarta: EGC. 2007:131-2.
9. Poonam S, Sulakshana C, Sukhwinder K. Comparison of Infra Red Light Therapy vs. Sitz Bath on episiotomy in terms of wound healing among postnatal mothers. Asian Journal of Nursing Education and Research. 2014:4.1:70-5.
10. Begam S. An experimental study to assess effectiveness of routine hospital practices versus cold application on healing of episiotomy wound of postnatal mothers. 2006 Available at: http://119.82.96.198:8080/jspui/bitstream/123456789/1442/1/CD_NNOBG00046.pdf. Accessed 20 June 2014.
11. Yu SY, Chiu JH, Yang SD, Hsu YC, Lui WY. Biological effect of far-infrared therapy on increasing skin microcirculation in rats. Photodermatol Photoimmunol Photomed. 2006:22:78-86.

Cite this article as: Dewi VNL, Ayuningtyas IF. Infrared is more effective in perineum wound healing during postpartum than iodine. Int J Res Med Sci 2015;3(Suppl 1):S6-9.