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Effect of Hoku point massage on postpartum afterpains intensity among multiparous women

Hajer I. Motakef
Assistant lecturer of Obstetric and Gynecologic Nursing, Faculty of medicine and health sciences, Hodeida University, Yemen
Corresponding author email: m.hamza.su@gmail.com

Niven R. Basyouni
Professor of Obstetrics and Gynecologic Nursing, Faculty of Nursing, Alexandria University, Egypt

Isis E. Gohar
Assistant professor of Obstetrics and Gynecologic Nursing, Faculty of Nursing, Alexandria University, Egypt

***Abstract*---**Afterpains are high prevalent complaints. They lead to neuro-hormonal stress responses. Hoku point massage is used to relieve afterpains. Objective: determine the effect of Hoku point massage on postpartum afterpains intensity among multiparous women. Material and Methods: A quasi-experimental design was conducted at El-Shatby Maternity Hospital. A purposive sample of 100 women who were meeting the inclusion criteria. The control group was receiving routine hospital care and the experimental group was receiving Hoku point massage. Results: statistically significant difference was found between the control and experimental group regarding socio-demographic and reproductive data as well as physiological stability, as evidenced by vital signs, while there was a highly statically significant difference between the control and experimental groups in the favor of Hoku point massage. Conclusions and recommendations: Hoku point massage was effective in the reduction of postpartum afterpains intensity. multiparous women who receive Hoku point massage showed observable behaviors indicating less afterpains intensity than those who do not receive it. Researchers recommended that strict protocols should be established in maternity care units for a comprehensive and routine assessment of afterpains. Further studies should be conducted to verify the findings of this study.

***Keywords*---**afterpains, Hoku point, massage, multiparous women, postpartum.

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Introduction

Postpartum afterpains are high prevalent complaints. Worldwide, approximately 50% of primiparous and 86% of multiparous mothers experience afterpains after a normal vaginal delivery (Namboothiri, 2021). They also harm the physiological and psychological well-being of postpartum well-being and their neonates(Pillitteri & Silbert-Flagg, 2018; Taffazoli & Khadem, 2014). Moreover, physiological stress induced by uterine contractions during lactation can lead to the mother's disability in breastfeeding, afterpains can impede breast breastfeeding immediately after delivery and affect the breast milk flow, as well as decrease the mother's attention to the neonate, and impair their relationship. Eventually, both women and their newborns may be deprived of the benefits of exclusive breastfeeding and forced to resort to artificial feeding as well (Fahey, 2017; Simpson & Creeham, 2014). It was well known and documented that the promotion of exclusive breastfeeding is particularly essential to reduce high rates of maternal and infant morbidity and mortality. Currently, only 38% of infants are exclusively breastfed worldwide, and suboptimal breastfeeding contributes to approximately 800,000 infant deaths annually (Katsinde, et al., 2016; Nabunya, et al., 2020).

The postpartum period was described by World Health Organization (WHO) as the most important and neglected stage in the lives of women and their families, where the majority of maternal and newborn deaths occur during this period. Generally, afterpains lead to severe consequences for mothers and their infants as well as interfere with their child care, breastfeeding, and their lifestyle (Emily, 2013; El Sayed, 2021; WHO, 2014). To date, postpartum afterpains management is focused on the use of drugs that affect the sensory awareness of pain, and may have an additional effect of impeding a woman's active participation. Furthermore, not all nurses believe in the use of complementary and alternative approaches to providing relief from postpartum afterpains (Deussen, et al., 2020 ; Fawaz & El-Sharkawy, 2016).

Management of afterpains can be divided into two categories: pharmacological and nonpharmacological measures. The pharmacological measures include edible painkillers and non-steroidal anti-inflammatory drugs to reduce the medium intensity, and severe postpartum pain. Yet, these measures have many adverse effects (ACOG, 2018). Massage, relaxation, cold therapy, and aromatherapy are examples of nonpharmacological measures that relieve pain. Meanwhile, they characterized by their ability to reduce fear, anxiety, and drug requirement as well(Mascarenhas, et al., 2019; Sehhatie-Shafaie, et al., 2013).

These measures are superior than pharmacological ones because of their ease of implementation, noninvasiveness, ability to build confidence and increase patient participation, absence of adverse effects on mothers and neonates, and leave no breastfeeding complications (Hu, et al., 2021; Salehian, et al., 2011). Acupressure is one branch of traditional medicine

and is widely used in China, where the acupressure application points are easily stimulated by the pressure of the fingers or arm. One of the main points for reducing afterpains is the Hoku point. It is associated with the energy meridian of the large intestine (LI 4) and is located on the skin curtain between the index finger and thumb(Afravi, et al., 2019; Zhang, 2020). Moreover, Hoku point (LI4) starts from the skin surface in the index finger, passes through the hand and arm, and goes to the end part of the shoulder. Then, the meridian leaves the skin surface to join the lower lung and transverse colon; next, it returns to the skin surface and the facial point next to the nostrils (Umemoto, et al., 2019; Ricci, 2016).

Hoku point massage is an alternative modality used to relieve pain by massage between the thumbs and forefingers on the palm side of the hands where the Large Intestine 4 (LI4) energy meridian acupoint is present(Fawaz & El-Sharkawy, 2016).Hoku point massage is a simple, noninvasive, secure, more easily administered, and reasonably priced method that can be implemented by a woman herself or family members, and is extensively studied for labor pain. Yet postpartum afterpains are still a neglected area of research. Hoku point massage is a non-pharmacologic relief measure that has been set up as effective for acute pain n many situations other than afterpains (Dehcheshmeh & Rafiei, 2015).

Finally, effective afterpains management is also a critical part of obstetric nursing care to support postpartum recovery, it obviously reduces anxiety and helps a woman to accomplish her family functioning and to cope with her new life (Basyouni & Gohar, 2017; Gabor, et al., 2012; Xiao, et al., 2020). Inasmuch high prevalence of postpartum afterpains, and the side-effects of pharmacological analgesics on both maternal and neonatal health as well. Additionally, there are deficient researches examining the effectiveness of Hoku point massage as a noninvasive measure to relieve postpartum afterpains intensity in Egypt. Accordingly, this study was conducted to determine the effect of Hoku point massage on postpartum afterpains intensity among multiparous women.

Aim of the study

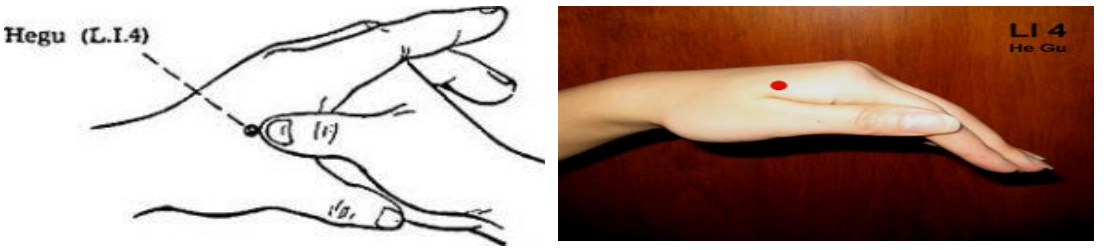
The aim of this study was to: Determine the effect of Hoku point massage on postpartum afterpains intensity among multiparous women.

Research hypothesis

multiparous women who receive Hoku point massage during the postpartum period exhibit less afterpains intensity compared to those who do not receive it. And also it was hypothesized that multiparous women who receive Hoku point massage show observable behaviors indicating less afterpains intensity than those who do not receive it.

Operational definition

In the context of this study, Hoku point massage is an alternative modality used to relieve pain by massage between the thumbs and the forefingers on the palm side of the hands where the large intestine 4 (LI4) energy meridian acupoint is present (Fawaz & El-Sharkawy, 2016)



Figure(1) :Hoku point

Materials and Method

Materials
Research Design

This is a quasi-experimental research design. Where the effect of Hoku point massage on postpartum afterpains intensity was examined.

Settings

This study was conducted at the postnatal ward of El-Shatby Maternity University Hospital. This setting was chosen because it is the only main university hospital in Alexandria Governorate that provide obstetrics and gynecology services as well as high turnover of deliveries is satisfactory for this study.

Subjects

The study groups were selected by using the non-probability sampling technique where a purposive sample of 100 postpartum multiparous women were recruited. All study groups met the specified inclusion criteria. These criteria included:

- Free from any medical or obstetric risk factors and/or conditions
- With the normal course of pregnancy, delivery, and puerperium.
- Do not receive any pharmacological pain relief measures.
- With intact hand skin and free from arthritis, phlebitis, burn, wound, injury, inflammation, and eczema.

The 100 women were assigned to one of two groups: a control group was receiving routine hospital care and an experimental group was receiving Hoku point massage. Each group comprised fifty multiparous women.

Tools

Three tools were used for data collection

Tool (I): Socio-demographic, reproductive, and clinical profile structured interview schedule

This tool was developed and used by the researcher to collect the following data:

- Socio-demographic characteristics including age, level of education, and occupation.
- Reproductive history including parity, number of abortions, mode of previous deliveries, as well as questions assessing the present pregnancy, such as gestational age.
- Clinical data including physical assessment such as: vital signs, and fundal assessment.

Tool II: Visual analog scale (VAS)

The visual analog scale was developed by Melzack and Katz (1994). It was adopted and used by the researcher. The VAS is a self-report device that consists of a horizontal line used for subjective estimation of patient's pain. It comprises 10-point numerical scale, corresponding to the degree of pain with zero representing no pain and 10 representing the worst degree of pain. In between these two opposite ends, words as mild, moderate, severe are assigned to each 3 cm distance, respectively. Women was asked to place a mark on the line at the point that represents the severity of their pain. (Kersten, et al., 2014; Alghadir, et al., 2018).

The total score was ranged from 0-10 as follows:

- No pain (0)
- Mild pain (1-3)
- Moderate pain (4-6)
- Severe pain (7-9)
- Unbearable pain (10)

Tool III: A modified version of Chamber Price pain rating scale (CPPRS)

The CPPRS was adopted and used by the researcher. It was used to measure pain intensity through observable behaviors. It included (12) items divided into four categories: postures, gross motor activity, facial expression, and verbalization. For each of these four major behavioral categories, one of the three alternative choices was elicited by the researcher. For posture, the choice was between very relaxed (0), guarded body posture (1), and tense body posture (2). For gross motor

activity, the choice was between quite (0), slightly restless (1), and very restless (2). For facial expression, the choices included no frowning (0), some frowning (1), and constant frowning or grimacing (2). Lastly, women's verbalization varied between normal or no sound (0), groans/ moans (1), and cries/sobs (2). (Deborah, 1984).

The total score ranged from 0-8. This score was translated to the corresponding pain intensity as follows:

- No pain (0)
- Mild pain (1-2)
- Moderate pain (3-4)
- Severe pain (5-6)
- Unbearable pain (7-8)

Method

- An approval from the Ethical Committee, Faculty of Nursing- Alexandria University, was obtained.
- A training program was taken by the researcher on how to conduct Hoku point massage and an accredited certificate to practice Hoku point massage was also obtained.
- An official letter was directed from the Faculty of Nursing, Alexandria University to the responsible authorities of the study settings to take their permission for data collection after explaining the purpose of the study.
- Tool (I) was developed by the researcher and reviewed for content validity by a jury of five experts in the field.
- Tool (II) was translated into the Arabic language. It was tested for content validity by a jury of five experts in the field.
- Tool (II) was tested for its reliability by appropriate tests.
- Tool's reliability was tested by Cronbach's Alpha test (internal consistency) and the results were satisfactory (0.85).
- Tool (III) was a valid and reliable tool; it was used by the researcher through observing women's behaviors.
- A pilot study was carried out on 10 women to evaluate the clarity and applicability of tools and no modifications was done
- Three days per week were specified for data collection over a period of approximately six months from beginning of August to the end of January 2022.
- Women were selected from the previously mentioned setting according to the inclusion criteria.
- Each laboring woman in the two groups was individually interviewed to collect basic data using tool
- The study sample was assigned randomly and equally as well as divided into two groups.
- The control group: included 50 postpartum women who received routine hospital postpartum care for pain relief (no hospital postpartum care was received by women), in addition to the researcher's physical presence.

- The control group was started with and completed before the study group in order to avoid any contamination of the sample.
- Pain status was evaluated for the control group three times each session: the first time was before receiving routine hospital care, the second time was immediately after receiving hospital care, and the third time was one hour afterward using tools II, and III.
- The study group: included 50 postpartum women who received Hoku point massage for 10 minutes for each hand. Prior to the massage, the accurate location of Hoku point was confirmed, where every postpartum woman was instructed to bring her thumb and index finger together, and the thumb is placed on the back of the hand, and index is placed on the inside of the hand, the little bulge muscle is the Hoku point. Meanwhile, they had been instructed to relax and take slow deep breaths from the nose during the massage.
- The Hoku point massage was applied through two sessions at one-hour interval after delivery(Afravi et al., 2019; Fawaz, & El-Sharkawy, 2016).
- Also pain status was evaluated for the study group three times each session: once before interventions and the second time immediately after interventions and the third time one-hour afterward. using tools II, and III.
- Comparison between the experimental and control groups was used to identify the effect of *Hoku point* massage on postpartum afterpains intensity.

Ethical considerations

- Written informed consent was obtained from women before data collection and after the explanation of the study aim.
- Witness written consent was obtained from the head nurse.
- Privacy of the study participants was asserted.
- Confidentiality of the collected data was maintained.
- The woman was informed that her participation in the study is voluntary and she can withdraw at any time and her withdrawal doesnt not affect the care she receives at the hospital.

Statistical analysis

Statistical analysis was done by the researcher after the data collection by using Statistical Package for Social Sciences (SPSS version 20) program. The collected data were categorized, coded, computerized, tabulated, and analyzed using frequency distribution tables, percentages, mean and standard deviations. The difference sample test, independent t-test, Wilcoxon test, Friedman's test, and Chi-square test. A five percent level of significance was used to find out the statistically significant difference in the results.

Results

Table (1) shows the distribution of the experimental and control groups according to their socio-demographic characteristics. Age demonstrated that more than one-half (56%, 52%) of the experimental and control groups respectively had an ideal reproductive age between 20 to 30 years. Concerning the level of education, more than one-half (58%, 56%) of the experimental and control groups, respectively,

had primary and preparatory education. Referring to occupation, it was clear that the majority (90%) of the experimental group were housewives, compared to 78% of the control group. The table also showed that the vast majority (98%, 96%) of the experimental and control groups respectively were married. In relation to current residence, it was obvious that more than one-half (58%, 62%) of the experimental and control groups respectively were urban dwellers. *No statistically significant difference* was noticed among the experimental and control groups regarding socio-demographic characteristics.

Table(1): Distribution of the study groups according to their socio-demographic characteristics

Socio-demographic characteristics	Experimental group		Control group		□□ (P)
	No	%	No	%	
Age					
- 20-30	28	56	26	52	0.161
- 31-40	22	44	24	48	(0.688)
Mean ±SD	29.04 ± 5.406		29.80 ± 4.686		
level of Education:					
- Illiterate	5	10	4	8	0.246
- Primary & preparatory	29	58	28	56	(0 .884)
- Secondary	16	32	18	36	
Occupation:					
- House wife	45	90	39	78	2.679
- Worker	5	10	11	22	(0 .102)
Marital status:					
- Married	49	98	48	96	0.344
- Divorced	1	2	2	4	(0.558)
Current residence:					
- Urban	29	58	31	62	0.167
- Rural	21	42	19	38	(0.683)

Table (2) denotes the distribution of the experimental and control groups according to their reproductive history. Regarding *gravidity*, it was obvious that 42% and 44% of the experimental and control groups respectively stated that they got pregnant four times or more. Referring to *parity,* it was observed that 42%, and 44% of the experimental and control groups respectively had delivered three times or more. Furthermore, *vaginal deliveries without episiotomy* were reported by 48% and 44% of both groups respectively. The table also elucidates that 42% of the experimental and control groups had three or more *living children. No statistically significant difference* was observed between the experimental and control group regarding the reproductive history.

Table (2): Distribution of the study groups according to their reproductive history

Reproductive history	Experimental group		Control group		□□ (P)
	No	%	No	%	
Gravidity:					0.076 (0.963)
2	10	20.0	9	18	
3	19	38	19	38	
4 or more	21	42	22	44	
Parity:					0.076 (0.963)
1	10	20	9	18	
2	19	38	19	38	
3 or more	21	42	22	44	

Table (3) demonstrates the distribution of the experimental and control groups according to their weeks of gestation. Almost one-half (48%) of the experimental group were in the 38th week of gestations. The mean of gestational weeks among the experimental and control groups respectively was almost the same (38.26 ± 0.876, 38.22 ± 0.954). *No statistically significant difference* was observed between the two groups regarding their weeks of gestation.

Table (3): Distribution of the study groups according to their weeks of gestation

Weeks of gestation	Experimental group		Control group		□□ (P)
	No n=50	%	No n=50	%	
37	9	18	13	26	1.715 (0.634)
38	24	48	18	36	
39	12	24	14	28	
40	5	10	5	10	
Mean ±SD	38.26 ± 0.876		38.22 ± 0.954		

Table (4) shows the mean distribution of the experimental and control groups according to their mean vital signs. The vital signs of the experimental and control groups were relatively similar, where the *pulse means* were 94.78±10.223, and 96.22±10.524 b/m respectively. *Systolic BP means* were 129.70 ±14.791, and 135.30±13.417mmHg, respectively, whereas, *the means of diastolic BP were* 85.00 ± 12.778, and 88.30±10.430 mmHg respectively. Moreover, *respiration means* were 20.10± 3.066, and 20.34± 2.379 c/m. The means of *body temperature* were 36.8260 ± 0.28126, and 36.7760± 0.27742 ^{0} C respectively. Accordingly*, no statistically significant difference* was observed between the experimental and control groups concerning their vital signs.

Table (4): Distribution of the study groups according to their mean vital signs

Mean vital signs	Experimental group	Control group	t (p)
	N=50	N=50	
	Mean ±SD	Mean ±SD	
Pulse rate	94.78±10.223	96.22±10.524	0.6940 (0.4893)
Systolic blood pressure	129.70 ±14.791	135.30±13.417	1.9829 (0.0502)
Diastolic blood pressure	85.00 ± 12.778	88.30±10.430	1.4147 (0.1603)
Respiratory rate	20.10± 3.066	20.34± 2.379	0.4373 (0.6629)
Body temperature	36.8260 ± 0.28126	36.7760± 0.27742	0.8949 (0.3730)

Table (5) sheds light upon the distribution of the experimental and control groups according to their fundal assessment. Regarding the *fundus level,* the fundus was at the umbilical level in more than one-half (60%, 52%) of the experimental and control groups respectively. On evaluating *fundus position,* it was in a central position among two-thirds (68%, and 60%) of experimental and control groups respectively. *No statistically significant difference was observed between the two groups regarding fundus level and fundus position. Moreover, fundus consistency* displayed that the fundus was firm & hard among all experimental and control groups.

Table (5): Distribution of the study groups according to their fundal assessment

Fundal assessment	Experimental group		Control group		□□ (P)
	No	%	No	%	
Fundus level:					0.649 (0.420)
- Between umbilicus & pubis	20	40	24	48	
- Umbilicus	30	60	26	52	
Fundus position:					0.694 (0.405)
- Central	34	68	30	60	
- Lateral	16	32	20	40	
Fundus consistency:					
- Firm & hard	50	100	50	100	
- soft & boggy	00	00	00	00	

Table (6) demonstrates percent distribution of the experimental and control groups according to their afterpains intensity as measured by visual analog scale (VAS) before and after intervention. *Referring to the first session, no statistically significant difference* was found between the experimental and control groups

concerning their afterpains intensity before intervention (p 0.461). while *a highly significant difference* was observed between both groups immediately after intervention (p=0.000). Furthermore, *no statistically significant difference* was noticed between the experimental and control groups in relation to their afterpains intensity one hour after intervention (p= 0.242).

Regarding the second session, no statistically significant difference was found between the experimental and control groups in relation to their afterpains intensity before intervention (p= 0.006), while *a highly significant difference* was observed between the two groups immediately after intervention (p= 0.000), and one hour after intervention (p= 0.000). In the first and second sessions, *A highly statistically significant difference* was detected among women of the experimental group to their intensity of afterpains as measured by VAS before and immediately after intervention, before and one hour after intervention, as well as immediately after and one hour after intervention, where (p = 0.000). Therefore, Hoku point massage had a significant effect in reducing the postpartum afterpains intensity among the experimental group compared to the control group.

Table (6): Percent distribution of the experimental and control group according to intensity of afterpains as measured by visual analog scale (VAS) before and after intervention

Intensity of afterpains using VAS	First session						Second session						Z(P) before/after
	Before intervention		Immediately after intervention		One hour after intervention		Before intervention		Immediately after intervention		One hour after intervention		
	Experimental group N=50	Control group N=50	Experimental group N=50	Control group N=50	Experimental group N=50	Control group N=50	Experimental group N=50	Control group N=50	Experimental group N=50	Control group N=50	Experimental group N=50	Control group N=50	
	%	%	%	%	%	%	%	%	%	%	%	%	
No pain	0	0	10	0	0	0	0	0	18	0	0	0	PE(1) = -5.717 (0.000) PC(1) = -1.000(0 .317)
Mild pain (1-3)	0	0	20	0	2	0	0	0	28	0	10	0	
Moderate (4-6)	26	34	52	34	38	26	36	18	42	18	58	14	PE(2) = -4.586(0.000) PC(2) = -3.335(0 .001)
Severe (7-9)	62	60	18	60	58	66	62	62	10	62	28	54	
Unbearable (10)	12	6	0	6	2	8	2	20	2	20	4	32	PE(3) = -5.181(0.000) PC(3) = -3.301(0 .001) PE(4)= -5.709(0.000) PC(4) = -1.000(0.317) PE(5) = -4.901(0.000) PC(5) = -3.187(.001) PE(6) = -5.188(0.000) PC(6) = -3.070 (.002)
F/X²(p)	1.550 (0.461)		31.191 (0.000)		4.183 (0. 242)		10.364 (0.006)		53.941 (.000)		33.455 (0.000)		

(p) :Chi square test & p for □□test
PE: P for the experimental group
PC: p for the control group
Statistically significant at p ≤ 0.05
P1: before)first session) and immediately after intervention
P4: before)second session) and immediately after intervention

Z:Wilcoxon test.
P2: before (first session) and one hour after intervention
P5: before (second session) and one hour after intervention
P3: immediately (first session) and one hour after intervention
P6: immediately (second session) and one hour after intervention

Figure (2) demonstrates afterpains intensity as measured by visual analog scale (VAS) across six time measures before and after intervention of the experimental group using Friedman's test. There was a difference in pain intensity across six time measures, where the pain score was 5.21 before the first session of intervention. Then it decreased to 2.28 immediately after intervention. Moreover, it then increased again to 4.26 one hour after intervention. Moreover, slight increase to 4.44 was also observed in pain intensity before the second session of intervention. Then pain intensity highly dropped to reach to the lowest level 1.65 immediately after intervention. Furthermore, it increased again to 3.16 one hour after intervention. A highly statistically significant difference was noticed among women in the experimental group before and immediately after intervention regarding pain intensity across six time measures using Friedman's test, where (P= 0.000) during the first and second sessions. That is to say afterpains intensity was remarkedly reduced immediately after intervention.

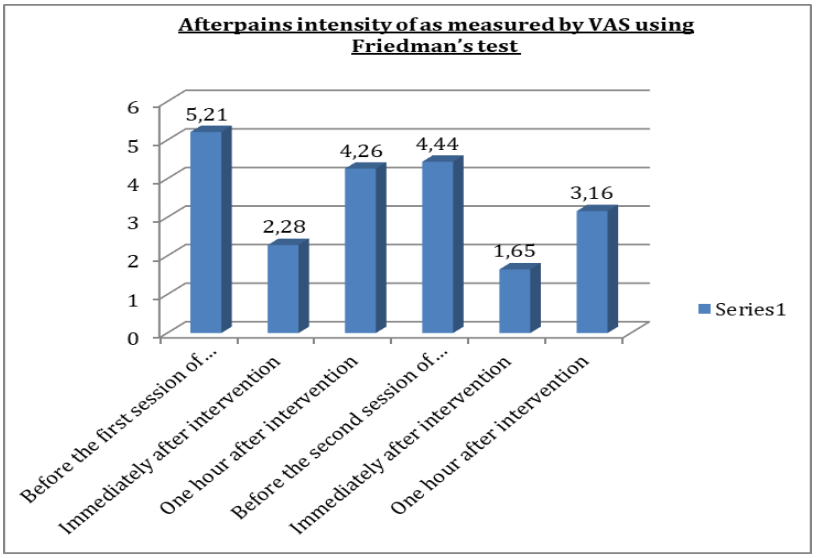


Figure (1) afterpains intensity as measured by visual analog scale (VAS) across six time measures before and after intervention of the experimental group using Friedman's test.

Table (7) clarifies the percent distribution of the experimental and control group according to their behavioral responses to afterpains as measured by modified version of Chamber Price pain rating scale (CPPRS) before and after intervention.

- *Before the first session of intervention,* concerning *posture*, tense body posture was observed among 54%, and 38% of the experimental and control

group respectively. *Immediately after intervention,* tense body posture decreased from 54%to 6% among the experimental group, and it remained the same (38%) among control group.

- *One hour after intervention,* among experimental group, the tense body posture dramatically increased from 6% to 30%, and increased from 38% to 42% among control group.
- *Before the second session of intervention*, 38%, and 52% of the experimental and control group respectively showed tense body posture. These percent decreased from 38% before intervention, to 6% immediately after intervention, and then increased again to 26% one hour after intervention among experimental group. Whereas, it remained the same (52%) before and immediately after intervention among control group, then it increased to 62% one hour after intervention.
- *Referring to gross motor activity*: *Before the first session of intervention,* 40% , and 44% of both groups respectively who were very restless.
- *Immediately after intervention,* the percent of women who were very restless dramatically decreased from 44% to 12% among the experimental group, Meanwhile slight decrease was observed among the control group from 42% to 42%.
- *One hour after intervention,* the percent of women who were very restless duplicated from 12% to 24% among the experimental group, while it remained the same (42%) among the control group.
- *Before the second session of intervention,* 30%, and 42% of the experimental and control groups respectively were very restless. This percent dramatically decreased from 30% before intervention to 10% immediately after intervention, and then it increased again to 18% one hour after intervention among experimental group. Moreover, slight increase was observed from 42% before intervention, to 44% immediately after intervention, and to 48% one hour after intervention among the experimental group.
- *Regarding facial expression: Before the first session of intervention,* 56% of the experimental and control group who were constantly frowning.
- *Immediately after intervention,* the percent of women who were constantly frowning obviously decreased from 56% to 14% among the experimental group, while it remained the same (56%) among the control group.
- *One hour after intervention,* the percent of women who were constantly frowning increased dramatically increased from 14% to 44%, and from 56% to 76% among the experimental and control groups respectively.
- *Before the second session of intervention,* constant frowning was represented by 50%, and 66% of experimental and control groups respectively. These precents dramatically decreased to 10% immediately after intervention, and then it increased again to 30% one hour after intervention among experimental group. On the other hand, these precents showed further increase from 66% to 72%, and from 72% to 84%, respectively, immediately , and one hour after intervention among control group.
- *Considering Verbalization, Before the first session of intervention:* 92%, and 82% of the experimental and control groups respectively were moaning from pain. Minority (2%, 4%) of both groups respectively were crying.

- *Immediately after intervention,* the percent of women who were moaning from pain dramatically decreased from 92% to 64% among the experimental group, while it remained same (82%) among the control group. While the percent of women who were crying slightly decreased from 2% to 0% among the experimental group, and it remained the same (4%) among the control group.
- *One hour after intervention,* among the experimental group the percent of women who were moaning from pain dramatically increased from 64% to 88%, and percent of those who are crying remained the same (0%). However, the percent of women who were moaning from pain, and those who are crying increases from 82% to 88% , and from 4% to 10% among the control group respectively.
- *Before the second session of intervention,* the percent of women who were moaning from pain remained the same (88%) among the experimental group, and decreased to 76% among the control group. While percent of those who are crying slightly increased to 2% & 12% among the experimental and control groups respectively.

Furthermore, among the experimental group, the percent of women who were moaning from pain dramatically decreased from 88% to 48% immediately after intervention, then it increased again to 86% one hour after intervention. While, percent of crying women slightly decreased to 0% immediately after intervention, and then slightly increased again to 2% one hour after intervention. Among the control group, the percent of women who were moaning from pain slightly increased to 82% immediately after intervention, and then it decreased again to 76%. Additionally, percent of crying women slightly increased to 8% immediately after intervention, and then slightly increased again to 12%. Wherefore, the experimental group who receive Hoku point massage showed observable behaviors indicating less afterpains intensity than the control group.

Table (7): Percent distribution of the experimental and control group according to their behavioral responses to afterpains as measured by a modified version of Chamber Price pain rating scale (CPPRS) before and after intervention.

Behavioral responses to afterpains	First session						Second session					
	Before intervention		Immediately after intervention		One hour after intervention		Before intervention		Immediately after intervention		One hour after intervention	
	Experimental No=50 %	Control No=50 %	Experimental No=50 %	Control No=50 %	Experimental No=50 %	Control No=50 %	Experimental No=50 %	Control No=50 %	Experimental No=50 %	Control No=50 %	Experimental No=50 %	Control No=50 %
Postures												
Relaxed body posture	0	2	34	0	4	0	4	0	34	2	10	0
Guarded body posture	46	60	60	62	66	58	58	48	60	46	64	38
Tense body posture	54	38	6	38	30	42	38	52	6	52	26	62
Gross motor activity												
Quite	0	0	20	0	0	0	2	0	32	0	8	0
Slightly restless	60	56	68	58	76	58	68	58	58	56	74	52
Very restless	40	44	12	42	24	42	30	42	10	44	18	48
Facial expression												
No frowning	2	0	16	0	2	4	4	0	22	0	4	0
Some frowning	42	44	70	44	54	20	46	34	68	28	66	16
Constant frowning /grimacing	56	56	14	56	44	76	50	66	10	72	30	84
Verbalization												
Normal or no sound	6	14	36	14	12	2	10	12	52	10	12	12
Groans/ moans	92	82	64	82	88	88	88	76	48	82	86	76
Cries/sobs	2	4	0	4	0	10	2	12	0	8	2	12

Table (8) illustrates percent distribution of the experimental and control group according to total score of their behavioral responses to afterpains intensity as measured by Chamber Price pain rating scale (CPPRS) before and after intervention

Regarding the first session, no statistically significant difference was observed between the experimental and control groups in relation to their afterpains intensity before intervention (p= 0.227). While a highly significant difference was observed between both groups immediately after intervention, and one hour after intervention where (p=0.000& p=0.003) respectively. Concerning the second session, no statistically significant difference was found between the experimental and control groups in relation to their afterpains intensity before intervention (p= 0.011). On contrast, a highly statistically significant difference was observed among women of both groups immediately after intervention (p= 0.000), and one hour after intervention (p= 0.000).

In the first and second session, A highly statistically significant difference was observed among women of experimental group in relation to their intensity of afterpains as measured by CPPRS before and immediately after intervention (p = 0.000), before and one hour after intervention (p = 0.000), as well as immediately after and one hour after intervention (p = 0.000). That is to say, Hoku point massage had a significant effect in reducing the postpartum afterpains intensity among experimental group compared to the control group.

Table (8): Percent distribution of the experimental and control group according to their behavioral responses to afterpains intensity as measured by modified version of Chamber Price pain rating scale (CPPRS) before and after intervention.

Intensity of afterpains using CPPRS	First session						Second session						Z(P) before/after
	Before intervention		Immediately after intervention		One hour after intervention		Before intervention		Immediately after intervention		One hour after intervention		
	Experimental No=50	Control No=50	Experimental No=50	Control No=50	Experimental No=50	Control No=50	Experimental No=50	Control No=50	Experimental No=50	Control No=50	Experimental No=50	Control No=50	
	%	%	%	%	%	%	%	%	%	%	%	%	
No pain	0	0	10	0	0	0	0	0	18	0	0	0	PE(1) =-5.893(0.000) PC(1) = -.447(0.655)
Mild (1-3)	0	0	20	0	2	0	0	0	32	0	14	0	PE(2) = -4.064(0.000) PC(2) = -2.872(.004)
Moderate (4-6)	24	34	52	34	40	20	34	20	38	18	46	14	PE(3) = -4.917(0.000) PC(3) = -2.691(.007)
Severe (7-9)	58	42	16	44	56	56	62	56	8	58	36	50	PE(4)= -5.729(0.000) PC(4) = .000 (1.000)
Unbearable (10)	18	24	2	22	2	24	4	24	4	24	4	36	PE(5) = -3.995 (0.000) PC(5) = -3.218(0.001)
$F/X^2(p)$	2.571 (0.277)		31.750 (0.000)		13.641 (0.003)		9.110 (0.011)		54.654 (0.000)		29.473 (0.000)		PE(6) = -5.339 (0.000) PC(6) = -3.216 (.001)

$\chi^2(p)$:Chi square test & p for χ^2 test

Statistically significant at p ≤ 0.05

Z:Wilcoxon test.

PE: P for the experimental group

P1:before(first session) and immediately after intervention
P2: before (first session) and one hour after intervention
P3: immediately (first session) and one hour after intervention

PC: p for the control group

P4: before (second session) and immediately after intervention
P5: before (second session) and one hour after intervention
P6: immediately (second session) and one hour after intervention

Figure (3) Illustrates afterpains intensity as measured by modified version of Chamber Price pain rating scale (CPPRS) across six-time measures before and after intervention of the experimental group using Friedman's test. It was clear that there was a difference in pain intensity across six-time measures. Where the pain score was 5 before the first session of intervention, and then it decreased to 2.26 immediately after intervention. Moreover, it increased again to 4.07 one hour after intervention. After that, slight increase 4.42 was also observed in pain intensity before the second session of intervention. However, pain intensity highly dropped to reach to the lowest level 1.78 immediately after intervention. Finally, it increased again to 3.47 one hour after intervention

A highly statistically significant difference was noticed among the experimental group before and after intervention regarding to intensity of pain across six-time measures using Friedman's test, where (P= 0.000). Whereas, a significant reduction in afterpains intensity was observed among the experimental group immediately after intervention.

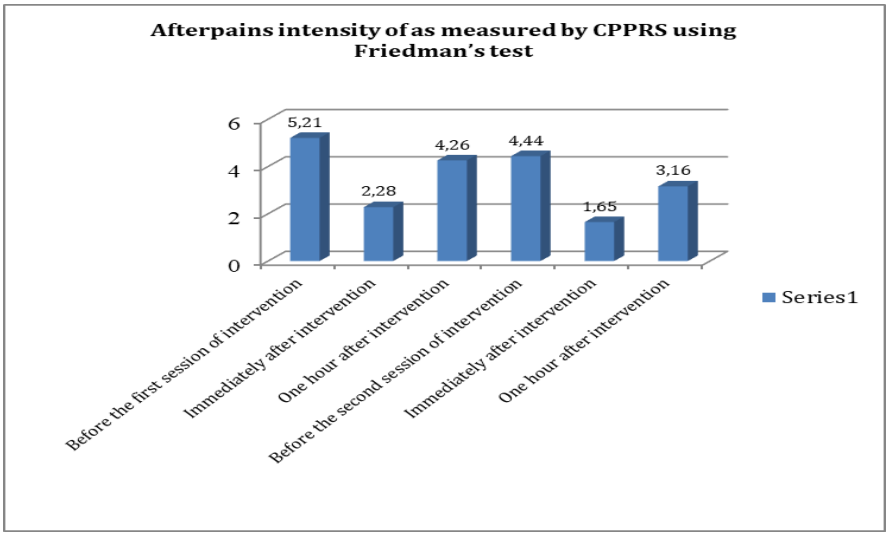


Figure (3) :Afterpains intensity as measured by modified version of Chamber Price pain rating scale (CPPRS) across six-time measures before and after intervention of the experimental group using Friedman's test

Discussion

Postpartum afterpains represent subjective experience of sensations associated with uterine contractions after the birth of the baby and placenta. There are different efforts have been made to reduce afterpains, both pharmacologically and non-pharmacologically. Pharmacological pain management is an effective method, but it is more expensive and causes adverse effects (Handayani & Cahyono, 2021). One of the non-pharmacological methods points that have been used is the Hoku point (LI4), which is found on both hands. Its stimulation appears to be effective for postpartum afterpains reduction. Meanwhile, applied massage on this point is safe, non-intrusive, non-invasive, cheap, simple, and without any adverse effects. Moreover, Hoku point massage also affects uterine contractions and can

meet the needs of breastfeeding as well (Abedi & Zarganj, 2013; Kazem Zadeh, et al., 2014).

According to the results of the current study, it can be noticed that both the experimental and control groups were matching in almost all of their socio-demographic characteristics, reproductive, present history, vital signs, and fundal assessment (Tables1,2,3,4,5). This can be interpreted in the light that most women attending El-Shatby Maternity University Hospital are more or less from the same socio-demographic class. Generally speaking, this consistency profile of the participants was useful in limiting extraneous factors, which could interfere with the effect of the intended intervention on postpartum afterpains.it also helped to understand and secure the reliability and relevance of the current study results.

In the present study, the effect of Hoku point massage on postpartum afterpains intensity was assessed by the researcher using two tools namely; VAS, and CPPRS. As expected, no significant difference was encountered before intervention concerning postpartum afterpains intensity among the control and experimental groups. However, a highly significant difference was monitored between the two groups concerning afterpains intensity immediately and one hour after the intervention during the first and second session of massage, in the favor of the intervention. where the score of afterpains sharply declined among the experimental group, unlike the control group.

These findings can be interpreted according to the gate control theory of pain. Whereas, skin stimulation by massage stimulates large fibers and transmits neural impulses to the spinal cord; whenever the stimulus is constant, it keeps the pain gates closed and eventually suppresses the sensation of pain. Additionally, neuroendocrinology theory interprets that Hoku point massage reduces pain by secretion of enkephalins such as endorphins and serotonin which represent internal opiates, thereby activating the pain inhibition mechanism. Moreover, decreased pain intensity among the experimental group may be largely due to their increased comfort and wellbeing, and a reduction of anxiety levels which are probably endorsed by the applied intervention (Hamidzadeh, et al., 2012; Handayani& Cahyono, 2021; Taherian, et al., 2020)

The current finding is in the harmony with a randomized controlled trial that was conducted by Afravi et al (2019) in Iran to investigate the effect of Hoku point pressure on postpartum pain among 62 multiparous women; where half of the sample represented a study group (Hoku point pressure), and other half represented control group (no Hugo point pressure). This study showed that the pain intensity for the study and control groups was significant ($p = 0.005$) in the first two hours after the delivery. In contrast, the difference was not significant at 4, 6, and 8 hours post-delivery, despite a pain reduction in the intervention group more than in the control group(Afravi, et al, 2019).

Contrariwise, the current study finding comes in contrast with a randomized controlled trial done by Can et al (2015) in Iran that aimed to evaluate the effects of ice massage implemented on the large intestine 4 (LI4) on postpartum pain during the active phase of labor. The study sample comprised 150 women. The

Visual Analog Scale (VAS) and The McGill (Melzack) Pain Questionnaire (MPQ) were used to determine the level of pain. The postpartum interview was conducted about 17.57 ± 6.52 hours after delivery before women discharge from the hospital. The researchers concluded that the perception of pain was tried to be minimized by applying pressure with ice balloons to LI4. However, ice massage made no difference in the pain intensity, the mothers' statements in the ice application group suggested that they felt more comfortable than did the mothers in the other groups (Can & Saruhan, 2015). This variation from the current finding may be due to different research designs, differences in massage technique, the difference in the time of performing the massage, and the difference in tools used to measure pain intensity.

Due to the scarcity of articles that discuss the effect of Hoku point massage on postpartum afterpains intensity, and as postpartum afterpains are very similar to dysmenorrhea and labor pain, articles that shed light on the effect of Hoku point massage on dysmenorrhea and labor pain were exploited in this study.

As regards the effect of Hoku point massage on dysmenorrhea, a blinded clinical trial was done by Barani et al (2018) aimed to compare the effect of ice massage on the Huko point and SP6 on the severity of primary dysmenorrhea of 90 female students. They stated that the pain intensity in the two groups was significantly reduced after the intervention ($P<0.05$). Therefore, researchers concluded that ice massage on the Hugo point and spleen point 6 significantly decreased the pain intensity in the primary dysmenorrhea (Barani & Shahraki, 2018).

In this context, the current finding matches with a quasi-experimental research design conducted by Anggraini et al (2020) in Indonesia aimed to determine the differences before and after acupressure therapy in decreasing dysmenorrhea pain. In this study, the researcher gave an acupressure intervention at the point LI4, ST36, and SP6, in patients with dysmenorrhea complaints. They concluded that there is a difference before and after the administration of acupressure therapy to treat pain in dysmenorrhea (Anggraini, et al.,2020). Concerning the effect of Hoku point massage on labor, A randomized controlled trial was conducted by Salehian et al (2011) in Iran. It aimed to compare the effect of Hoku Point (LI4) acupressure and San-Yin-Jiao (SP6) acupressure on pain intensity among 90 primiparous women during the active phase of labor. They concluded that acupressure affects the intensity of labor pain and shortens the duration of the active phase of labor (Salehian, et al., 2011).

In the same context, a single-blind randomized clinical trial was performed in Iran by Hamidzadeh et al (2012) to assess the effects of LI4 acupressure on labor pain & duration, and women's satisfaction. It was conducted on a represented sample of 100 women. There were significant differences between the groups in subjective labor pain scores immediately and 20, 60, and 120 minutes after intervention ($P \leq .001$). Therefore, the researchers concluded that LI4 acupressure was an effective method for reducing the intensity and duration of labor pain. Moreover, the participants were satisfied, and no adverse effects were observed (Hamidzadeh, et al., 2012). Additionally, an experimental study by Kaviani et al (2012) studied the effects of acupressure and ice massage on LI4 for 30 minutes on labor pain intensity and patient's anxiety. The sample constituted 165 nulliparous women

who were randomly assigned to three groups. First group: acupressure, Group II: ice massage, and group III: control. the study results showed that the pain intensity had a significant decrease immediately after the intervention in the experimental group compared to the control group ($p \leq 0.001$), which is similar to the results of the present study (Kaviani, et al., 2012).

In the same context, the present findings are congruent with what was found in a randomized controlled trial done by Dabiri et al (2014) in Iran aimed to evaluate the effect of LI4 acupressure on the intensity and duration of labor pain among 149 women. The researchers reported that acupressure led to a statistically significant reduction in pain. However, it did not shorten the length of labor. Therefore, they concluded that acupressure is an effective, non-invasive, and easily applicable technique to reduce labor pain (Dabiri & Shahi, 2014). Last but not least, the effectiveness of Hoku point massage on postpartum afterpains results from its ability to open the blocks or narrowing in the vein blood vessel, stimulate nodes and affect glandular functions, and increase nitric oxide levels. Therefore, it can relax the uterine muscles, increase relaxation and reduce the pressure of smooth muscle contraction, due to changes in brain chemistry, the degree of serotonin is reduced and works to increase the body's endomorphic secretion and it can also increase the degree of Neuropeptide Y(Fareed, et al., 2014). Additionally, stimulating the nerve location in both muscles and other tissues can encourage the release of endorphins neuro-hormonal factors that lead to changes in pain processes in the brain and spinal stem, reduce the level of inflammation by increasing the smoothness of blood vessels and the release of immunomodulatory factors, therefore, the condition can finally overcome the afterpains (Hamidzadeh, et al., 2012; Taherian, et al., 2020)

Conclusion

Hoku point massage was effective in the reduction of postpartum afterpains intensity among multiparous women. Furthermore, multiparous women who receive Hoku point massage showed observable behaviors indicating less afterpains intensity than those who do not receive it. Analysis of data showed that there was a significant difference between the intervention and control groups. Therefore, Hoku point massage is the effective, simple, and non-invasive method of choice to be used for postpartum women.

Since Hoku point massage can be a cost-effective independent nursing intervention and a new useful safe method that can be used to decrease afterpains intensity which in turn will improve the quality of female experience with postpartum afterpains. therefore, it can be encouraged as an effective, simple, non-invasive, beneficial, and non-medical approach that can be used for postpartum women.

Recommendations

Based on the findings of the current study, the following recommendations are suggested:

- Postpartum afterpains represent indicators of uterine involution. however,

they are highly neglected complaints at hospitals. therefore, strict protocols should be established in maternity care units for a comprehensive and routine assessment of afterpains, and interventions to reduce pain should be achieved.

- Maternity nurses should attend periodic training programs, implemented by the responsible authorities, to improve their knowledge and skills regarding non-pharmacological techniques.
- Nurses at maternity and child health centers could provide their clients with information about the natural management of afterpains (with complementary and alternative therapies)
- Due to the simplicity, safety, and suitability of Hoku point massage as a non-pharmacological technique that is effective in alleviating postpartum afterpains, postpartum women should be educated about the importance and how to perform this technique at home.
- Further studies should be conducted with larger sample size, a longer massage duration, and multiple sessions to verify the findings of this study.

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