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Comparison of the Effect of Abdominal Massage and Hugo Point Acupressure on Infantile Colic Symptoms

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Abstract

Background: Infantile colic is observed in healthy infants less than three months of age. Excessive crying in these infants leads to fatigue and maternal anxiety.

Aim: The present study aimed to compare the effect of abdominal massage and Hugo point acupressure on the symptoms of infantile colic.

Method: In this clinical trial study, 144 infants were selected via convenience sampling and randomly assigned to three groups of abdominal massage, Hugo point acupressure, and control. The infants in two groups of abdominal massage and Hugo point acupressure received the interventions three times in the evening, while the control group only underwent the routine training. The duration of colicky crying and sleep duration per 24 hours was recorded for four weeks. At the end of four weeks, the Infant Colic Scale (ICS) was completed in three groups. Three groups were compared using the Wilcoxon test.

Results: The mean difference scores after the intervention in comparison with that before the intervention were obtained at -6.62 ± 4.84 , -3.55 ± 3.12 , and -3.92 ± 4.02 in Hugo point acupressure, abdominal massage, and control groups, respectively. This difference was statistically significant ($P < .05$). The three groups of Hugo point acupressure, abdominal massage, and control significantly differ in terms of mean scores of sleep time in four weeks ($P < .001$). There was a significant difference between the mean scores of crying duration in the second, third, and fourth weeks ($P < .001$).

Implications for Practice: Hugo point acupressure had a more significant effect on the alleviation of colic pain, as compared to abdominal massage and changing position. Furthermore, acupressure shortened the duration of crying and prolonged sleep. The development of acupressure training programs for mothers is recommended as a simple method for the treatment of infantile colic.

Keywords: Acupressure, Infantile colic, Massage

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Introduction

Infantile colic, which is a behavioral syndrome that occurs in healthy infants younger than three months of age, is characterized by inconsolable crying, facial flushing, clenched fists, and knees drawn up to their tummy for no apparent reason. Based on Wessel's criteria, colic is defined as episodes of crying lasting more than 3 hours a day, more than 3 days a week for more than 3 weeks (1- 3). Other symptoms of colic include a distended abdomen, cold hands and feet, clenched fists, angry frowns, and pale lips (4). Infantile colic can lead to long-term health problems, such as migraines (5, 6). Infants' excessive crying leads to maternal fatigue, psychological stress, and anxiety, which in turn bring nutritional problems and result in frequent physician office visits (7).

The prevalence of infantile colic has been estimated at 8%-40%. Regarding the prevalence of colic, there is no difference between the two genders, breastfed and formula-fed infants, as well as preterm and term neonates (8, 9). There is still controversy over the cause of colic; nonetheless, there are various hypotheses, such as the psychosocial hypothesis, including inadequate mother-infant interaction, as well as maternal anxiety and stress (1, 10, 11). Today, researchers have turned their focus on the use of non-pharmacological methods to treat and reduce the incidence of colic pain. Behavioral interventions (e.g., lullaby, massage, and shaking infants) are among effective non-pharmacological therapies (12, 13).

One of the non-pharmacological methods that have received special attention in recent years is the use of complementary medicine which encompasses a wide range of therapies used by nurses (14-16). Massage reduces tension in digestive muscles and helps eliminate waste materials. It stimulates the body to release endorphins which encourage relaxation. In neonates and infants, sensory-motor stimulation relieves stress and improves sleep quality by reducing cortisol levels (17). Acupressure and massage are very simple, inexpensive, and safe methods in this regard (2, 18). Nursing interventions to achieve these goals include raising parents' awareness of infantile colic and pain-relieving techniques (19).

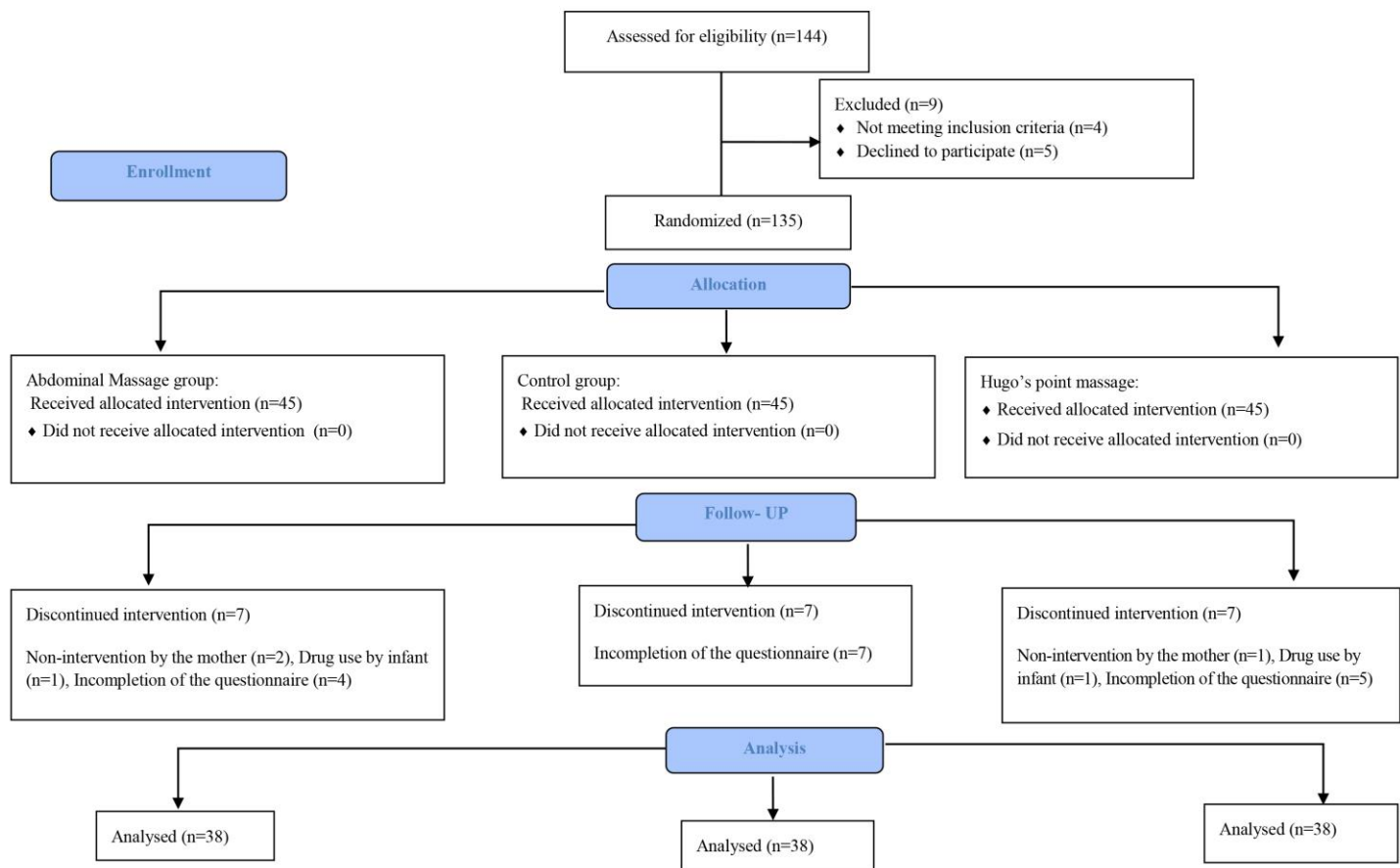
In a study conducted by Ebadi et al. (2015), massage was recognized as an effective and safe treatment for the improvement of colic symptoms, including crying intensity and sleep duration (20). In the same context, Landgren and Hallström (2017) concluded that acupuncture shortened the duration and reduced the intensity of crying in infants with colic safely (21). In previous studies, abdominal massage and acupuncture have been performed in the treatment of colic; nonetheless, no study has compared their effectiveness. Therefore, given the advantages and limitations of the two methods, the present study aimed to compare the effect of abdominal massage and Hugo point acupressure on infantile colic symptoms.

Methods

This clinical trial study was conducted in Sheikh, Imam Reza, and Akbar Hospitals in Mashhad, Iran, in 2019. All infants with a confirmed colic disease were invited to participate in this study after obtaining parental consent. The sample size was calculated according to the studies by Abadi et al. (Effect of massage on the severity of cries and sleep duration among infants who suffer from infantile colic: a clinical trial) (20) and Basbakkal et al. (19). In order to calculate the sample size for the variables of sleep duration, the severity of colic pain, crying duration was calculated, and the largest sample size pertained to sleep duration.

In this study, the sample size of the mean difference between the two communities (22) was calculated at 37 cases in each group considering the type I error of 0.05 and the test power of 80. The subjects were selected via convenience sampling and randomly assigned to three groups using the blocking method. In order to allocate the participants to three groups, they received the following codes: A: abdominal massage, B: Hugo point acupressure, and C: control. Four blocks of three were specified and repeated 12 times. Finally, 144 subjects were selected, 135 of whom were eligible to enter the study. They were assigned to the three groups of massage (n=46), Hugo point acupressure(n=45), and control (n=44) .

During the intervention, 20 infants were excluded from the study, and finally, 114 infants remained in the study, and the data of 38 infants in each group were statistically analyzed (flowchart 1). The inclusion criteria were as follows: the age range of 1-3 months, full-term pregnancy (38-42 weeks), no congenital anomalies, no previous medical treatment for colic, no skin problems (eczema) or any contraindications for massage, breastfed infants, non-smoker mothers, as well as maternal physical



Flowchart 1. CONSORT Flow Diagram of study

and mental health. On the other hand, the exclusion criteria entailed: parents' use of other colic treatments during the intervention, formula feeding during the intervention, inability to perform massage and acupressure properly based on researcher's assessment, suffering from a disease that requires medical treatment, and failure to complete the checklist twice a week .

In the abdominal massage group, the hands were warmed to begin the massage and the infant was placed on a soft blanket or linen cloth lying on his/her back on the examination bed. Infants' clothes, except for diapers, were put off and the room temperature was set at 23-26°C. The infant was looked into the eyes and placed in a comfortable position. The fingers and palms were used to apply strokes upwards on the surface of the right pelvic to the end of the right rib. The fingers were moved forward and the rib vault was massaged up to the same point on the left side. Thereafter, strokes were applied down up to the left pelvis and then along the base of the abdomen to the starting point of the massage. At the end of the massage, the hand pressure increased slightly. In the presence of the researcher, the mother also performed abdominal massages several times and repeated them at home for 15 min in the evening.

In the Hugo point acupressure group, the pressure was applied with a hand which was thoroughly washed and the nails were cut short to avoid scratching the skin. Full attention was paid to the infant and his/her reactions. The infant was looked into the eyes and a lullaby was sung to him/her with a smile. His/her hand was held and the point between the first and second metacarpal bones was pressed for two minutes (10 seconds of pressure and 20 seconds of rest) until the skin changed color. The mother received training in applying pressure and its exact location. She was asked to press the Hugo acupressure point several times and it was ensured that the mother will correctly carry out this at home. Hugo point acupressure was performed by mothers at home three times a day in the evening (2, 7, and 11 pm).

In the control group, mothers only received the routine colic pain training, which included changing the infant's position and maternal dietary restriction, according to the training manual provided to the three groups. Individual practical training was provided to mothers in a 45-min session and routine

training was provided on colic pain, diet modification, how to burp the baby, and proper breastfeeding. The sleep and crying checklists (duration of colic-related crying and sleep hours during 24 hours the day for 28 days) were provided to mothers in three groups and completed at home.

At the end of each week, the researcher called the participants and emphasized the method of massage and acupressure. In this study, the duration of crying and total sleep per 24 hours were evaluated using two questionnaires of ICS and a checklist. In this checklist, the duration of colicky crying and daily sleep was recorded. The demographic information form was initially completed by the researcher. In this study, parents were reassured that all information would remain confidential and they received a training booklet containing all information related to colic treatments in an attempt to observe ethical considerations.

Infant Colic Scale (ICS): This questionnaire is used to assess infantile colic scores. The validity and reliability of this standard tool have been confirmed in various studies (23). Cronbach Alpha Coefficients of 3.75, 2.30, 1.78, 1.63, and 1.48 were obtained for five subscales of Cow's milk/soy protein allergy/intolerance, immature gastrointestinal system, 3. immature central nervous system, difficult infant temperament, and parent-infant interaction, respectively. Moreover, the total change scores were reported as 13.51%, 12.67%, 11.52%, 10.96%, and 8.95% for the five subscales of this questionnaire, respectively (19).

The questionnaire and checklist were prepared based on research objectives and benefiting from scientific sources, articles, and studies of other researchers. Thereafter, 10 faculty members of the Nursing and Midwifery Faculty participated in the face and content validation, and the proposed modifications were made to the questionnaires. To evaluate the reliability of the checklist, two methods of internal consistency and test-retest were used rendering a Cronbach's alpha coefficient of 0.89. In addition, to assess the reliability of the instrument, 10 mothers were selected and received the forms, and two weeks later, the forms were completed again by the same mothers. The test-retest reliability of the instrument was confirmed using the intraclass correlation coefficient ($P < 0.001$; $ICC = 0.85$).

Shapiro-Wilk test was used to assess the normality of data distribution. To compare the three groups in terms of normal quantitative variables, one-way analysis of variance (ANOVA) was employed, while Kruskal-Wallis and Friedman's tests were used for abnormal quantitative variables and ranking variables. Nominal variables were compared in three groups using the Chi-square test. For intra-group tests and comparison of two stages before and after the intervention, paired t-test and Wilcoxon test were employed for normal and abnormal variables, respectively. It is worth mentioning that a significance level of 0.05 was considered for all tests. Data were analyzed in SPSS software (version 21).

In terms of gender, 55.37% of infants in two experimental groups and 44.37% of cases in the control group were male. There was no significant difference in the three groups regarding gender, birth weight, weight upon admission, frequency of feeding, and breastfeeding score ($P > .05$; Table 1). The

Table 1. Characteristics and nutritional status of infants in the three groups

	Groups			P
	Control N=38	Abdominal massage N=38	Hugo's point massage N=38	
Birth weight (grams)	3189.81±220.80	3377.66±711.13	3266.22±306.43	.062*
Weight when referring (grams)	4860.52±569.63	4667.11±71.13	4752.99±681.22	.440*
Frequency of feeding the infant from 7 to 13 o'clock	4.43±1.23	4.63±1.20	4.30±1.34	.690**
Frequency of feeding the infant from 14 to 20 o'clock	4.63±1.21	4.71±1.00	4.60±1.22	.957**
Frequency of feeding the infant from 21 to 6 o'clock	4.33±1.33	4.55±1.25	4.41±1.11	.826**
Breastfeeding score before intervention	57.33±5.24	58.23±5.91	56.62±6.52	.486*
Sex				
Girl	21(55.37)	17(44.73)	17(44.73)	.570***
Boy	17(44.73)	21(55.37)	21(55.37)	

* One-way ANOVA

** Kruskal-Wallis test

*** Chi-square

infants did not differ significantly in mean colic assessment scores before the intervention ($P=0.639$). Nonetheless, after the intervention, a significant difference was observed in their mean colic assessment scores ($P<0.05$). The difference between the scores obtained before and after the intervention was significant in the three groups ($P<0.05$).

The results of the post hoc test suggested that the two groups of acupressure and abdominal massage did not significantly differ ($P=0.147$); moreover, the difference between the two groups of abdominal massage and control was not significant ($P=0.373$). Nevertheless, a significant difference was detected between acupressure and control groups ($P=0.020$; Table 2). The infants did not significantly differ in mean scores of crying duration in the first week ($P=0.796$). Nonetheless, the mean scores of crying duration were significantly different in the second, third, and fourth weeks ($P<0.001$).

The result of the post hoc test pointed to a significant difference in the fourth week between the two

Table 2. Comparison of infant colic score in three groups

	Groups			P
	Control N=38	Abdominal massage N=38	Hugo's point massage N=38	
Before intervention	59.54±8.51	57.92±6.63	59.11±7.91	.639*
After the intervention	55.53±6.62	54.30±5.81	52.32±5.12	.044**
The difference between before and after the intervention	-3.92±4.02	-3.55±3.12	-6.62±4.84	.002**
Within-group test results between intervention stages	$P<0.001$ ***	$P<0.001$ ***	$P<0.001$ ***	

* One-way ANOVA

** Kruskal-Wallis test

***Friedman

Table 3. Comparison of sleep duration and crying during 24 hours a day Infants in three groups

		Groups			P
		Control N=38	Abdominal massage N=38	Hugo's point massage N=38	
sleep duration During 24 hours a day(hour)	One week after intervention	13.61±1.91	13.11±1.55	13.55±1.60	.278*
	Two weeks after intervention	13.80±2.01	13.61±1.54	14.12±1.44	.298**
	Three weeks after intervention	13.91±1.72	14.02±1.43	14.82±2.63	.003*
	Four weeks after intervention	14.20±1.82	14.60±1.31	15.51±2.93	>.001**
	Within-group test results between intervention stages	.617***	<0.001***	<0.001***	
crying During 24 hours a day(mintes)	One week after intervention	213.01±87.32	201.82±57.00	196.59±67.93	.796**
	Two weeks after intervention	180.52±89.12	142.93±57.81	108.01±52.45	>.001*
	Three weeks after intervention	160.01±64.53	123.93±80.93	75.01±41.12	>.001**
	Four weeks after intervention	142.42±62.94	84.24±53.41	47.21±41.93	>.001**
	One week after intervention	<0.001***	<0.001***	<0.001***	

* One-way ANOVA

** Kruskal-Wallis test

***Friedman

groups of acupressure and abdominal massage ($P<0.001$), acupressure and control ($P<0.001$), as well as abdominal massage and control ($P<0.001$; Table 3). The mean scores of sleep duration in the first and second weeks were not significantly different ($P=0.278$ and $P=0.298$, respectively). Nonetheless, a significant difference was detected in the mean scores of sleep duration in the third and fourth weeks ($P<0.05$).

The result of the post hoc test demonstrated that in the fourth week, a significant difference was observed

between the two groups of acupressure and abdominal massage ($P=0.002$), as well as acupressure and control groups ($P<0.001$). Nevertheless, the difference between the two groups of abdominal massage and control was not significant ($P=0.173$). In-group comparisons showed that the difference between stages in the groups of acupressure and abdominal massage was significant ($P<0.001$ and $P<0.001$). However, this difference was not significant in the control group ($P=0.617$; Table 3).

Discussion

The present study aimed to compare sleep duration in infants aged 1-3 months in the three groups of abdominal massage, Hugo point acupressure, and control groups before and after the intervention. Based on the results, sleep duration per 24 hours did not differ in the first and second weeks; nonetheless, it increased in the third and fourth weeks. The results indicated that Hugo point acupressure had a more marked effect on sleep, as compared to massage. In their study, Abadi et al. (2015) concluded that massage as a safe treatment brought about considerable improvement in sleep duration (20). Moreover, Narenji et al. (2008) revealed that infant massage is effective on daytime and night sleep duration (24).

In a similar vein, the results of a study by McClure suggested that massage can be effective in relieving the symptoms of colic in infants (25). In agreement with the findings of the present research, Mandamir reported that massage led to an increase in sleep duration (26). Consistent with the result of the present research, in a study by Khajeh, it was shown that treatment of colic pain increased sleep duration in infants (27). Massage is effective in the treatment of infant colic, which in turn increases daytime and night sleep. Acupressure therapy is also recommended in the treatment of colic and can reduce pain attacks. In acupressure, the Hugo point, or LI 4, is a major part of the large intestine meridian placed at the back of the hand, between the first and second metacarpal bone, besides the base of the second metacarpal (28).

The stimulation of acupuncture at LI4 point inhibits the transmission of pain impulses and possibly increases endorphin levels in the blood (29). Acupressure also causes muscle relaxation, pain relief, and comfort by increasing endorphins in the brain. In so doing, it brings marked improvements in sleep quality (30). The comparison of colic scores of infants aged 1-3 months in three groups of abdominal massage, Hugo point acupressure, and control group illustrated that the colic score decreased in three groups; however, it showed the largest decrease in the acupressure group.

Although in all three groups, we will witness an improvement in colic pain due to the passage of time and development of the child's digestive system, the findings of this study suggested that the use of acupressure accelerates this healing process. This indicates that colic pain has decreased, and acupressure can be used to treat colic. The present study assessed Hugo point acupressure and abdominal massage, along with nutrition and breastfeeding training, all of which can relieve the colic pain. All three groups received routine colic drops. In this study, acupressure had a more considerable effect on the treatment of colic pain.

In accordance with the study by Khosravan et al. (2016) who investigated the effect of Hugo point massage with and without ice on vaccination-related pain in two-month-old infants, a decrease in pain score was observed among colicky infants in the current research. Hugo pressure intervention is a non-pharmacological treatment for pain relief and the results of the stated study have emphasized the positive effect of this method (31). In line with the present research, in their study on the effect of training on the reduction of pain in colicky infants, Khajeh et al. (2017) pointed to pain reduction in the intervention group and a decrease in pain score in the two groups of massage and acupressure (27).

The comparison of colic-related crying duration in infants aged 1-3 months in the three groups of abdominal massage, Hugo point acupressure, and control group demonstrated that crying duration decreased over four weeks and acupressure accelerated this process. The results of the present study are in line with those obtained by Gazrani et al. (2012) who confirmed that massage and shaking are effective in the frequency and duration of crying in colicky infants. Massage can alleviate the symptoms of colic in infants and is effective in the establishment of better mother-infant communication (32). In agreement with the present research, the stated study pointed to a decrease in crying duration for the abdominal massage group, as compared to the control group.

In addition, this result is in accordance with the finding of the research by Katinkaya and Basbakal (2012) who reported that the use of aromatherapy massage with lavender oil was effective in the reduction of colic symptoms (33). In the same context, in their study, Landgren and Halstrom (2017)

confirmed that acupuncture safely reduced crying in colicky infants (21). This finding is similar to the result of the present study in terms of the same effect on crying duration in all groups. The present study assessed the effect of interventions on the variables of the colic score, sleep duration, and crying duration in colicky infants in three groups.

The obtained results pointed out that the made interventions improved infant colic in the three groups; nonetheless, the effect was more pronounced in the Hugo point acupressure group, as compared to that in abdominal massage and control groups. Finally, it can be concluded that acupressure decreased the colic score and crying duration and increased sleep duration, pointing to a more significant effect in the group of acupressure.

Implications for Practice

As evidenced by the results of this study, considering the various factors affecting colic pain in infants, it is suggested to place a focus on interventions based on acupressure since these easy, cost-effective, and non-pharmacological methods improve sleep quality and reduce colic pain and intensity of crying in colicky infants. Furthermore, it is recommended that the staff of healthcare centers, hospitals, pediatric clinics, medical and care teams, as well as the students of related disciplines, be trained on acupressure and abdominal massage for the treatment of colic in infants. In addition, mothers should be provided with these kinds of training in breastfeeding courses.

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Conflicts of Interest

The authors declare that they have no conflict of interest regarding the publication of this article.

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