



Research article

Massage Therapy for Infant Temperaments: An Intervention Study

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Abstract

A form of complementary therapy, infant massage, has the potential to ameliorate difficult infant temperaments and transform them into easier ones. This study aimed to ascertain the impact of newborn massage therapy on infants' temperament. A total of 102 participants were divided into two groups for this quasi-experimental study using a pretest and posttest. Over the length of five weeks, twice each week, the experimental groups received ten-time massages in total. A generalized estimating equation (GEE) was applied to the data. This study discovered that infant massage improved the temperament in the experimental group from difficult to easy, a result that was mirrored in the control group. Infants may develop a more positive temperament through the utilization of infant massage therapy. Healthcare professionals are required to provide a thorough understanding of the physiological and psychological growth of infants, placing special attention on strategies that promote a positive temperament.

INTRODUCTION

Infant massage therapy, an alternative approach, promotes relaxation, blood circulation, and development in infants, offering stress reduction and improved metabolism.¹ Massage therapy effectively treats various physical and psychological conditions, including gastrointestinal issues, painful procedures, muscle tone disorders, and chronic illnesses like diabetes and HIV.² The welfare of infants is profoundly impacted by psychological health.³

Temperament describes infants' self-regulation, reactivity, modulation, and

emotional and arousal expressions.⁴ It was initially defined as stable, biologically based individual differences in reactivity and regulation that form the core of personality.⁵ Infants are classified into easy or difficult temperament types. Easy-temperament infants are amiable and regular, while difficult-temperament infants are more active, irritable, and irregular in behavior.⁶

According to the findings of a study, infant massage therapy influences the following developmental outcomes: duration of sleep at 6 months, weight, length, and head circumference at 6-12 months follow-up, and crying/fussing time at the median of 3

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months.⁷ Infant massage treatment has emerged as a crucial modality in promoting relaxation through the mitigation of anxiety, pain, and tension. As a result, the infant experiences improved sleep quality, a reduction in stress hormone levels, and an increase in metabolic rate.⁸

Infants who receive massage treatment see a behaviour change. Massage soothes the infant's temperaments, resulting in a transformation from a challenging to an easy temperament. The temperament of infants is influenced by massage treatment; this modality also modulates electroencephalogram (EEG) patterns in a way that is compatible with relaxed states and reduces anxiety, depression, and heart rate. Furthermore, research has linked massage to a decrease in cortisol levels and an increase in vagal activity. Functional magnetic resonance imaging (fMRI) results indicated that during massage, a number of brain areas linked with emotion regulation and stress, including the amygdala, hypothalamus, and anterior cingulate cortex, were active.⁹

The study of infant temperament and the application of infant massage techniques on normal and healthy infants are few due to the challenges associated with performing a series of massage interventions during their brief hospital stays. Additionally, this research incorporated the baby's mother into the learning and practice process of infant massage, with the ultimate goal of equipping her with the ability to perform self-administered massage techniques to foster a mother-infant interaction and mother-infant reciprocity.

This research will contribute to the psychological development of infants; additionally, this research became the first to investigate newborn temperament that involves the mother in learning infant massage therapy. It is imperative to conduct further research on the impact of complementary therapy on infant temperament, bearing in mind that baby

massage is an ancestral tradition and cultural practice in Indonesia.

Research's purposes

To determine the effect of infant massage therapy on infant temperament.

METHOD

Study design

The research design employed in this study was a quasi-experimental design consisting of a pretest and a posttest divided into two groups.¹⁰ The intervention group underwent pretesting prior to receiving the intervention; infant massage therapy was subsequently administered to the intervention group at the conclusion of the intervention. Post-testing was conducted in both groups, and infant massage was provided to the control group.

Research variables

Mother age, mother occupation, number of children, infant temperament.

Sample and population

The study population was infants aged 1-3 months from postpartum mothers with depression.

Infants aged one to three months from postpartum moms with a score of 13 or above on the Edinburgh Postnatal Depression Scale (EPDS), the ability to read, all types of delivery, full-term gestation, and healthy infants were included in this study. Infants of postpartum women with a history of depression and substance misuse, as well as those with a history of bipolar disorder and schizophrenia, are excluded.

This research uses G-power calculation to examine the number of samples needed.¹¹ Based on the G-power calculation and the assumption of a minimum medium effect size of 0.25% at a significance level of 0.05 and 80% power, an estimated sample size of 86 participants is necessary. Considering a 20 per cent attrition rate, 104 individuals

were recruited in total. By utilizing convenience sampling, this research incorporates all eligible participants. Two participants were ineligible to participate in this research due to a family-related concern.

Research setting

The research location was the Community Health Center (CHC or 'PUSKESMAS') in the Sleman District of Yogyakarta, Indonesia. CHC ('PUSKESMAS') is a health service facility that strategizes the implementation of preventive and promotive measures to provide optimal public health conditions within its operational domain while also prioritizing first-level individual health.¹² Each subdistrict is replete with CHC (PUSKESMAS). Twenty-five per cent of postpartum women suffer from depression, according to prior research at the Community Health Center in Sleman¹³. The control group for this study consisted of Pakem and Kalasan Community Health Centres, whereas the intervention groups were Ngemplak 1 and 2.

Instruments

The study instruments utilized in this study was demographic data characteristics, including (the mother's occupation, number of children, mother age), depression score as measured by the Edinburg Postpartum Depression Scale questionnaire (EPDS), and infant temperament as assessed through the part of the Postpartum Depression Predictors Inventory.

Edinburg Postpartum Depression Scale (EPDS)

The EPDS was developed to assist healthcare professionals in identifying mothers with depressive symptoms following childbirth; Cox developed it in English version. It is a 10-statement self-report questionnaire; each item has four possible answers with scores ranging from 0 to 3. Total possible scores range from 0 to 30, with higher scores showing a more elevated risk for postpartum depression; a mother figure of 13 or above may indicate

the presence of depression.¹⁴ This study used The Indonesian version translated by the researcher, the validity used content validity by expert review, the CVI result was 1.00, and the reliability obtained a Cronbach alpha of 0.869.

Infant Temperament questionnaire

The infant temperament questionnaire is part of the Postpartum Depression Predictors Inventory Revise (PDPI-R). The infant temperament questionnaire, a PDPI-R component, consists of three yes/no questions.¹⁵ Survey responses are graded from 0 to 3, with 0 indicating an easy temperament and 1 to 3 indicating a difficult temperament.¹⁶ The Beck instrument exhibited a reliability coefficient of 0.83.¹⁷ This study used an Indonesian version translated by the researchers, the validity used content validity by expert review, and the CVI result was 1.00.

Data collection procedures

Preparation stage

The researcher selected two research assistants; their prerequisites are two years of clinical experience and a master's degree in midwifery. The researcher discusses and explains the study's purpose, intervention protocol, research tool, and Covid-19 protocol. Each research assistant and data collector must have had COVID-19 vaccination or two doses of the vaccine, using a handwash or hand sanitizer and face mask. In addition, the research assistant requested to accompany the researcher and administer the informed consent and questionnaire to the participant approximately three times. Following three observations, the research assistant administered an informed consent test to the participants; those who satisfactorily demonstrated their competence pass as research assistants. The research assistant must complete daily self-report forms detailing their activities.

The researcher also appoints the infant massage therapist; for the baby massage, the researcher works with a midwife who is

certified in baby massage therapy and a physiotherapist with over two years of clinical experience. Then, the researcher and the infant massage therapist discussed and demonstrated the massage procedure for the mother and infant. The researcher also supplied the mothers with a baby doll throughout the intervention with the intention of enabling them to demonstrate baby massage to the mothers while the physiotherapists or midwives massage the infants; the mothers will then be able to perform massage independently once the intervention concludes.

Implementation stage

The researcher utilized the EPDS questionnaire to screen for depression in postpartum mothers; those with an EPDS score of 13 were selected as respondents. Then, the researcher provides the respondent with an explanation of the study's objectives and procedure. Prior to commencing the questionnaire, the respondent signs the consent form on the same day. After the respondents returned the questionnaire, the research assistant verified its completeness and requested that the respondents fill it out, indicate the respondent code, and retain it in the file holder. After both groups completed the first questionnaires during the initial meeting, the intervention group was administered ten sessions of infant massage therapy twice weekly for a duration of five weeks. The mother resubmits the questionnaires as soon as the infant massage therapy concludes. The mother then completes the final questionnaires one month later.

The researcher devised a plan for the respondent and therapist to receive massages. The time of the massage is dependent on the recipient. Then, for five weeks, the researcher devised a massage to be performed twice weekly. The schedules of respondents 1 through 30 were Monday and Thursday, while those 31 through 52 were Tuesday and Friday. Each therapist massage four to six respondents, and seven

therapists were employed. The massage schedule is from 7:00 am to 5:00 pm. There was a two-hour interval between respondents; for example, if the massage began at 7:00 am, the next respondent would have a massage from 9:00 am.

The control group receives standard care or routine infant care; for routine care, the CHC midwife typically measures the infant's weight and height and provides the mother with pertinent information. Additionally, the control group is administered infant massage therapy after finishing filling the posttest two.

Data analysis procedures

Once all participants in the intervention and control groups had completed the final questionnaire and had infant massage therapy, the researcher proceeded with the analysis of the collected data. After collecting and double-checking the completeness of each questionnaire, the researcher entered each variable into Excel. Then, the demographic data and infant temperament were analyzed with SPSS. The different infant temperaments between groups were analyzed using a generalized estimating equation (GEE).

Ethical considerations

The researcher received ethical approval from the RESPATI University Yogyakarta Indonesia Research Ethics Committee (registration number 107.3/FIKES/PL/VI). Confidentiality of data and respondent privacy are maintained by academic researchers. Documents are kept confidential for five years post-research and then deleted. Published materials omit respondent names and personal information. Permission for questionnaire use is granted by the original author.

Figure 1 displays the study's flowchart with 406 responses. Of these, 288 were ineligible and 14 were excluded. This left 104 eligible respondents, divided into two groups of 52 each. However, two participants in the

intervention group withdrew from the study due to familial obligations.

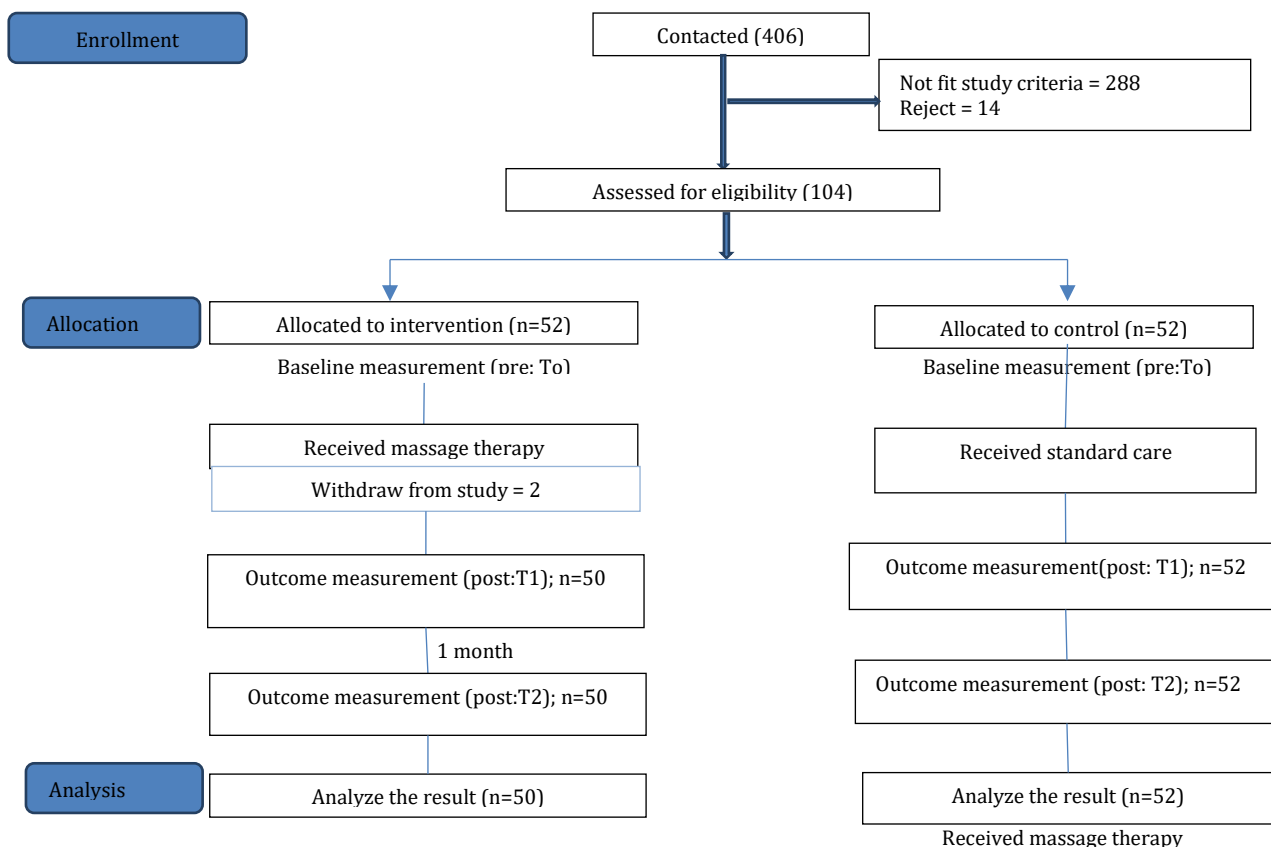


Figure 1
Study flowchart

RESULTS

The respondent demographic data are presented in Table 1. The mean age and standard deviation of the respondents were 28.47 ± 6.16 years. Among the entire sample of respondents, 53.92 percent ($n = 55$) were unemployed, while 46.08 percent ($n = 47$) were employed. 47 participants (46.08 percent) in both groups reported having one to two children, while 53.92 percent ($n = 55$) reported having three or more children.

Figure 2 illustrates infants' temperament in the control group at each examination (pretest, posttest 1, and posttest 2). On the pretest, forty respondents said they had a difficult temperament as infants, while eight indicated that they had an easy temperament. Infant temperament was rated as easy by 34 and difficult by 16 respondents on the posttest 1. Fourteen responders have a difficult temperament,

while thirty-six have an easy infant temperament, according to Posttest 2.

Figure 3 demonstrates that of the pretest participants in the Intervention group, 44 reported a difficult temperament, whereas 10 rated it as easy. Posttest one reveals that seventeen respondents have a difficult temperament, while thirty-five have an easy temperament. Following the second posttest, it was determined that 19 infants exhibited a difficult temperament, while 33 had an easy temperament.

Figure 4 illustrates that on posttest 1, infant temperament dropped in both the intervention and control groups. In contrast, infants' temperament in the control group increased over the posttest two but decreased marginally in the intervention group.

Table 1
Demographic Data (n=102)

Indicators	f	%
Work status		
Unemployed	55	53.92
Employed	47	46.08
Number of children		
1-2	47	46.08
≥ 3	55	53.92

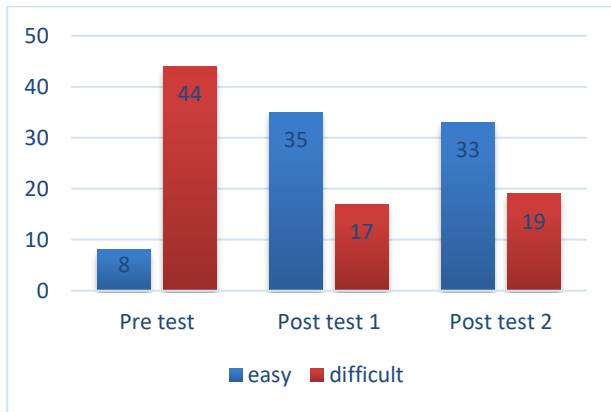


Figure 2
Pretest and Posttest measurement of infant temperament in the Control group.

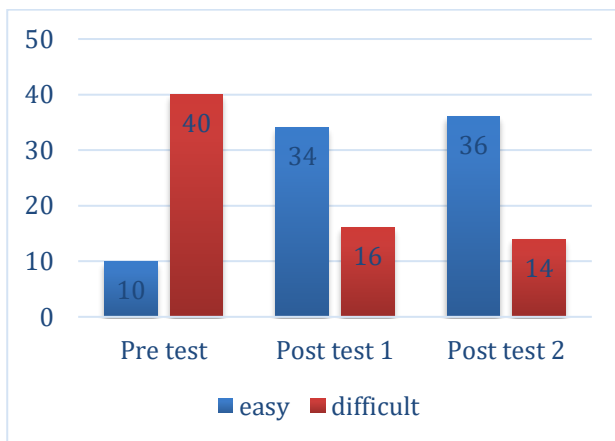


Figure 3
Pretest and posttest measurement of infant temperament in the Intervention group.

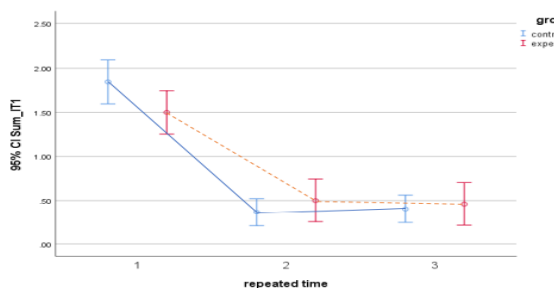


Figure 4
Differences with 95% CI of infant temperament between group

Note: infant temperament graph. IT = infant temperament. Repeated time 1 = pretest, repeated time 2 = posttest 1 and repeated time 3 = posttest 2.

DISCUSSION

This research found that the mean age was 28.47 years, with a standard deviation of 6.16 years. Previous studies suggest that a healthier pregnancy with fewer risks often occurs between the ages of 20 and 30. However, the ideal age for pregnancy varies depending on the partner's readiness.¹⁸ Older individuals may feel more mature and capable of caring for themselves and their infants. Older mothers may have an advantage in dealing with temperamentally insecure children due to their past parenting experience, as indicated by one study. The aging process may contribute to older women's increased maturity and tranquility, potentially aiding in overcoming parenting challenges.¹⁹

The study revealed that children whose mothers were full-time employed were associated with increased externalizing behavior problems and hyperactivity/inattention. In contrast, maternal employment was associated with an increase in conduct difficulties but a decrease in internalizing behavior problems and anxious/depressed behavior in children.^{1,2} Working moms reportedly struggle with time management, maternal roles and responsibilities, work-related challenges, and long work hours.²⁰

Another study revealed a correlation between the quantity of children and the temperament of infants.³ An additional investigation unveiled that there is no direct correlation between parity and infant temperament; rather, the number of children is a modifiable element that can impact infant temperament^{4,5}; marital status, feeding method, and caretaker assistance are correlated with newborn temperament.⁴

As a complementary therapy, infant massage is essential in helping the baby's physical and psychological growth. Infant

massage promotes reciprocity between mother and child; infants can perceive and identify good and negative emotions shown by others. The infant is responsive to speech and sounds, gestures, touch, and facial expressions. This will reduce the infant's frequency of crying and fussiness, as well as prevent future sleep disturbances, unpredictability, and adaptation difficulties.²¹

A temperamental shift occurs in infants who get massage therapy. The infant's temperaments are soothed through massage, changing from difficult to easy temperament. Infant massage therapy affects infant temperament; massage therapy reduces anxiety, depression, and heart rate, and massage alters electroencephalogram (EEG) patterns in a manner consistent with relaxed states. Additionally, massage has been associated with reduced cortisol levels and enhanced vagal activation. According to functional magnetic resonance imaging (fMRI) findings, various brain regions associated with stress and emotion control, such as the amygdala, hypothalamus, and anterior cingulate cortex, exhibited activity during massage.²² Infant massage therapy has become essential for fostering relaxation by alleviating anxiety, pain, and stress; consequently, the infant sleeps more soundly, stress hormone levels decline, and metabolic rate increases.²³

A prior investigation concerning the effects of massage treatment revealed alterations in stress hormones and behavior, such as a reduction in anxious behavior, pulse, and salivary cortisol levels. A decrease in urine cortisol levels observed in the massage therapy group after five weeks indicated decreased stress.²⁴ Another study revealed that massage therapy increases an infant's sleep duration and decreases fussiness and crying.²⁵

The mothers in the experimental group perceived their infants to have a less difficult temperament than those in the control group.²⁶ Suppose infants that exhibit

temperament from a young age are not appropriately cared for and supported. In that case, it can have a detrimental impact on parenting, leading to anxiety among postpartum mothers.⁶ In addition to the positive effects on newborns, mothers who utilized baby massage reported a reduction in postpartum depression symptoms, enhanced mother-infant connections, and increased self-efficacy.²⁷

The limitation of the study is that the researchers were unable to regulate whether or not the mothers in the control group massaged their infants during the intervention period, because it is due to the cultural acceptance of baby massage in Indonesia.

CONCLUSION

The implementation of infant massage has the potential to foster a positive temperament in infants. The implication of these findings underscores to guarantee that mothers need to facilitate maternal well-being during pregnancy, delivery and the postpartum period. A positive atmosphere must be fostered, particularly by family members and healthcare providers, to create mother-infant interaction and facilitate mother-infant reciprocity.

Healthcare practitioners must furnish comprehensive knowledge pertaining to the physical and psychological development of infants, with particular emphasis on strategies to foster a positive temperament.

Further investigation is warranted about the correlation between mother-infant interaction and reciprocity and infant temperament in subsequent studies.

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CONFLICTS OF INTEREST

Neither of the authors has any conflicts of interest that would bias the findings presented here.

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