

Effects of Pilates Exercises and Lavender Aromatherapy on Postpartum Women's Fatigue

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ABSTRACT

Background: Physical and psychological changes during the postpartum period can cause stress and fatigue in mothers that can affect the care of individuals, families, and their babies. The long-term impact of postpartum fatigue is the cessation of lactation, the development of stress, and postpartum depression. Nonpharmacological efforts in the form of pilates exercises and lavender aromatherapy are one of the efforts to reduce fatigue levels in postpartum mothers. This study aimed to determine the effect of pilates exercises and lavender aromatherapy on fatigue in postpartum mothers in the Andong Health Center work area.

Subjects and Method: This study was a quasi-experimental, control group pretest-posttest design. The sampling technique used was purposive sampling, and as many as 32 postpartum mothers who experienced fatigue were involved in this study. This study was divided into 2 groups, namely the experimental group with the provision of pilates exercises and lavender aromatherapy, and the control group without treatment as a comparison. The independent variables of this study were pilates exercises and lavender aromatherapy. The dependent variable was postpartum maternal fatigue. The data analysis used is the Wilcoxon test and the Mann-Whitney test.

Results: Analysis using the Mann-Whitney statistical test showed significant results with test results (p -value < 0.05). From these results, it was found that there was a significant difference in the respondents of the experimental posttest group and the control posttest group.

Conclusion: Pilates exercise and lavender aromatherapy have an effect on the level of fatigue reduction in postpartum mothers in the experimental pretest-posttest group in the Andong Health Center work area. This study is expected to remind all postpartum women to take better care of their physical and mental health, to be able to independently perform Pilates exercises according to the given procedures, and to independently apply the use of lavender aromatherapy.

Keywords: fatigue, postpartum mothers, pilates exercise, lavender aromatherapy.

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BACKGROUND

The postpartum period is a period that begins

a few hours after the birth of the placenta and lasts for about six weeks, during which the

reproductive organs return to their pre-pregnancy state (Sumiaty, 2017). Physical and psychological changes during the postpartum period include hormonal changes and the beginning of new and unfamiliar parenting tasks for the mother, which can cause stress and fatigue (Ashrafinia et al., 2015). Fatigue in postpartum mothers can affect individual, family and infant care. Postpartum fatigue not only has a serious impact on the mother's health, but also negatively affects the baby (Henderson et al., 2019).

Reduced stamina in postpartum women can result in a decreased ability to perform physical and mental tasks, a decreased ability to manage the needs of her baby, her responsibilities to other family members, and other tasks. In addition, reduced stamina can damage the immune, nervous and mental systems of the mother and her baby. Another undesirable and potentially serious effect of postpartum fatigue is the cessation of breastfeeding, interference with sexual relations between partners, the development of stress and mood disorders, and postpartum depression (Ashrafinia, 2015).

According to research conducted by Kilic in Turkey, it is known that 88.5% of postpartum mothers experience fatigue (Kilic, 2015). This is supported by a study conducted in Japan, where 67% of postpartum mothers experienced fatigue one month after giving birth (Iwata, 2018). Another study conducted in Jetis Health Center in Bantul Regency, Indonesia, found that 31 respondents (68.89%) experienced high fatigue, 11 respondents (24.445%) experienced moderate fatigue, and 3 respondents (6.67%) experienced low fatigue (Saragih, 2015). This shows that although there is no data on fatigue in postpartum mothers globally, in different regions and countries where research has been conducted, it shows that postpartum mothers experience fatigue.

Efforts that can be made in overcoming fatigue in postpartum women with non-pharmacological techniques are a safe choice, such as providing complementary therapy in the form of Pilates exercises and lavender aromatherapy. Pilates exercise is one of the efforts to reduce postpartum fatigue. There is some positive evidence to support the effect of Pilates exercises on the health of mothers and babies (Ashrafinia, 2014). Pilates is considered to be a good method to accelerate healing after childbirth, physical and mental health by increasing body flexibility and improving balance and muscle strength of postpartum women (Liu et al., 2022; Haruna et al., 2013).

Another effort to reduce fatigue in postpartum women is by giving aromatherapy. One of the aroma therapies that is often used to reduce pain is aromatherapy with lavender essential oil. Studies have shown that aromatherapy with lavender has anti-inflammatory, antidepressant, hypnotic, sedative, muscle relaxant, antibacterial, and antispasmodic effects (Vaziri F, 2017). Thus, the purpose of this study was to determine the effect of pilates exercises and lavender aromatherapy on postpartum fatigue.

SUBJECTS AND METHOD

1. Study Design

This research is quasy experimental with a pretest-posttest control group design conducted in the working area of Andong Health Centre from 1 to 16 August 2024 with a period of 2 weeks.

2. Population and Sample

The population of this study were all postpartum women as many as 34 people with a sample size of 16 people in the experimental group and control group so that the total sample used was 32 people using purposive sampling technique.

3. Study Variables

The research variables used consisted of independent variables, which are pilates exercises and lavender aromatherapy and the dependent variable was postpartum fatigue.

4. Operational Definition of Variables

Pilates exercise: is an exercise movement with sleeping and standing positions performed for 25 minutes. Pilates gymnastics has a point of movement that focuses on the movement of the body as the foundation of the body. The implementation of pilates exercises was carried out by respondents 2 times a week for 2 weeks, with a time of approximately 20-25 minutes.

Giving lavender aromatherapy: are given as much as 5 drops using a diffuser tool to postpartum women during pilates exercises is also given.

Postpartum Fatigue: is a situation that occurs due to various changes experienced by postpartum mothers that cause a mother to have negative and uncomfortable feelings so that postpartum mothers will experience physical and mental decline.

5. Study Instruments

The research instruments consisted of identity forms, postpartum fatigue questionnaire (PFS), pilates exercises, and aromatherapy SOP.

6. Data analysis

Univariate Analysis to describe the frequency distribution of respondent characteristics in

this study, we used the Wilcoxon test to determine whether there is a significant difference in the level of fatigue of respondents before and after treatment in the experimental group and control group. And Mann-Whitney test to determine whether there is a significant difference between the experimental group and control group after treatment.

7. Research Ethics

This study has been approved by the Health Research Ethics Committee of Dr. Moewardi Surakarta Hospital under the number 1.376/VII/HREC/2024.

RESULTS

1. Sample Characteristics

Table 1. shows that the majority of the participants in the control group and the experimental group are the same, i.e. the highest level of education is junior high school, the majority of the respondents' mother's work is not employed, the characteristics of the husband's work are all employed, the characteristics of the majority of the respondents' parity is multiparous, the majority of the respondents' breastfeeding status is exclusive breastfeeding and the majority of the respondents do not have babysitters and the characteristics of the age of the last child, the majority of the respondents have the last child aged > 2 years.

Table 1. Frequency Distribution of Characteristics of Postpartum Mothers in the Andong Health Center Work Area

Sample Characteristics	Experimental Group (n=16)		Control group (n=16)		p
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Education					
Elementary	0	0.0	0	0.0	0.149
Junior High	10	62.5	9	56.3	
High School	4	25.0	7	43.8	
College	2	12.5	0	0.0	
Mother's Occupation					
Employed	2	12.5	0	0.0	0.151

Sample Characteristics	Experimental Group (n=16)		Control group (n=16)		p
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Husband's Occupation					
Not employed	14	87.5	16	100	1.000
Employed	16	100	16	100	
Not employed	0	0.0	0	0.0	
Parity					
Primiparous	4	25.0	5	31.3	0.699
Multiparous	12	75.0	11	68.8	
Breast Milk Status					
Breast Milk	13	81.3	14	87.5	0.632
Breast milk + formula	3	18.8	2	12.5	
Babysitter					
Available	3	18.8	4	25.0	0.674
Not available	13	81.3	12	75.0	
Age of last child					
< 2 years old	5	31.3	6	37.5	0.296
> 2 years old	11	68.8	10	62.5	

Based on Table 2, the mean age of the mothers in the intervention group was 27.63 years. The lowest mother's age in the intervention group was 23 years and the highest was 33 years. The average age of the mothers in the control group was 29 years. The lowest mother's age in the control group was 24 years, and the highest was 33 years. The mean pretest score of the experimental group

was 73.78, which was in the moderate fatigue category. after the intervention, the mean posttest score of the experimental group was 53.25, which was in the mild fatigue category. while for the control group, the mean pretest score was 71.63, which was in the medium fatigue category, then the posttest was carried out with a mean posttest score of 70, which was in the medium fatigue category.

Table 2. Sample characteristics (continous data)

Characteristic	Mean	SD	Min	Max
Age of Mother				
Experimental group	27.63	3.11	23	33
Control group	29	2.58	24	33
Pretest Score				
Experimental group	73.38	7.21	67	92
Control group	71.63	6.33	62	91
Posttest Score				
Experimental group	53.25	6.06	47	72
Control group	70	5.35	62	86

Based on Table 3, it shows that the experimental group respondents, before being given the majority treatment, had a moderate level of fatigue as many as 15 respondents, for a total percentage of 93.8%. Meanwhile, after

the treatment, only 1 respondent had a moderate level of fatigue. A total of 15 respondents had a mild level of fatigue, with a percentage of 93.8%. Then in the pretest control group, the majority had a moderate

level of fatigue as many as 15 respondents with a percentage of 93.8%. While in the posttest control group, all respondents had a

moderate level of fatigue as many as 16 respondents, a percentage of 100%.

Table 3. Frequency Distribution of Fatigue in Postpartum Women in the Experimental and Control Groups Before and After Pilates Exercise and Lavender Aromatherapy

Fatigue	Category	Experimental Group (n=16)		Control group (n=16)	
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Pretest	Mild	0	0.0	0	0.0
	Medium	15	93.8	15	93.8
	Heavy	1	6.3	1	6.3
posttest	Mild	15	93.8	0	0.0
	Medium	1	6.3	16	100
	Heavy	0	0.0	0	0.0

2. Bivariate analysis

Based on Table 4, there is a significant difference of fatigue level in experimental group, before and after pilates exercises

and lavender aroma therapy in postpartum women. While the control group, there is no significant difference in the fatigue of postpartum women in the control group.

Table 4. The effect of pilates exercises and lavender aromatherapy for fatigue in postpartum mothers

Fatigue	Experimental group			Control group		
	Mean	SD	p	Mean	SD	p
Pre intervention	2.06	0.25	<0.001	2.06	0.25	0.317
Post intervention	1.06	0.25		2.00	0.00	

Based on Table 5, the Mann-Whitney test results show that the experimental group has more mild fatigue levels than the control group with a $p < 0.001$, which means

that there is a significant difference between the post-test experimental group and the post-test control group.

Table 5. Mann-Whitney Test Results for Differences in Postpartum Mothers' Fatigue After Treatment in the Experimental and Control Groups

Fatigue level	Category	Experimental Group (n=16)		Control group (n=16)		p
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Posttest	Mild	15	93.8	0	0.0	<0.001
	Medium	1	6.3	16	100	
	Heavy	0	0.0	0	0.0	

DISCUSSION

1. Sample Characteristics

All respondents were postpartum women in the Andong Health Centre working area who

had experienced fatigue. This is consistent with previous research that postpartum fatigue is one of the most common complaints of postpartum mothers. Based on the

results of the research conducted, the characteristics of postpartum mothers who experienced fatigue in terms of education, mother's occupation, husband's occupation, parity, breastfeeding status, babysitter, and age of last child between the experimental and control groups show that the $p\text{-value} > 0.05$ means that it is relatively homogeneous or there is no significant difference in the frequency distribution due to the distribution or allocation of respondents in the experimental and control groups which are almost the same.

The characteristics of postpartum mother's respondents in this study are in line with previous research, which states that a low level of education can hinder mothers' attitudes to receive information and principles needed to deal with problems in the postpartum period (Khasanah et al., 2019), the presence of additional stress factors from work demands and household responsibilities contributes to fatigue (Qian et al., 2021), having a husband who has a high level of education (Qian et al., 2021). et al., 2021), having a husband who works long hours, postpartum mothers may experience increased fatigue, both physical and mental, due to the greater burden of care and household responsibilities (Shrestha et al., 2014), multiparous mothers have more complex fatigue than primiparous mothers because they have to meet all the needs of their children, do household chores, care for babies and breast-feed, which certainly requires a lot of energy (Sinaga, 2017), lack of assistance with daily tasks causes additional stress and disrupts rest time (Jane et al., 2019).

2. Fatigue in postpartum women before and after Pilates exercises and lavender aroma therapy

In this study, based on Table 2, it shows that in the experimental group, there is a decrease in the level of fatigue in postpartum mothers.

Before being treated, the majority of respondents had a moderate level of fatigue, then after being treated, the majority of respondents had a mild level of fatigue. Meanwhile, in the pre-test control group, the majority had a moderate level of fatigue, then in the post-test control group, it was found that all respondents had a moderate level of fatigue. In this study, pilates exercises were combined with lavender aromatherapy, which has many benefits, particularly in reducing pain, creating a sense of comfort and relaxation (Maryani and Himalaya, 2020).

The results of the study in the experimental group are in line with previous research which shows that postpartum women who participated in the pilates exercise programme experienced a significant decrease in fatigue levels compared to the control group (Bulguroğlu et al, 2023), regular pilates exercise causes an increase in brain serotonin, due to which it can affect the heart rhythm to improve sleep quality so that fatigue will decrease (Ashrafinia et al., 2014). And another previous study also showed that postpartum women who received lavender aromatherapy treatment experienced a significant decrease in fatigue levels compared to the control group (Vaziri et al, 2017), lavender aromatherapy can affect the limbic system in the brain, which can produce endorphin and enkephalin hormones, which have pain-relieving properties, and serotonin, which has the effect of relieving tension or stress and anxiety (Maryani and Himalaya, 2020). Meanwhile, the results of the study in the control group are consistent with research showing that most postpartum mothers experience fatigue that lasts for several months after giving birth. Factors such as sleep deprivation, caring responsibilities and lack of social support contribute to their inability to reduce fatigue (Wang et al., 2023).

3. Differences in Postpartum Fatigue in the Pre-Post Experimental Group and the Pre-Post Control Group After Receiving Pilates Exercise and Lavender Aromatherapy

In this study, based on Table 3 shows that in the experimental group, based on the results of the Wilcoxon test, the value is obtained ($p < 0.050$), which means that there is a significant difference between the pretest and posttest experimental groups. Meanwhile, in the post-test control group, based on the results of the Wilcoxon test, the value ($p > 0.050$) was obtained, which means that there is no significant difference between the pre-test and post-test control groups. This is consistent with systematic research showing that Pilates not only helps reduce physical fatigue, but also improves mental health. Mothers who practiced pilates reported improved mood and reduced anxiety (Kazeminia et al., 2022). And another study showed that the administration of lavender aromatherapy not only reduced physical fatigue, but also lowered anxiety levels, which often contribute to fatigue in postpartum mothers (Asazawa et al., 2017).

This is consistent with research showing that Pilates is considered a good method for accelerating postpartum healing, physical and mental health, and improving balance and muscle strength in postpartum women (Liu et al., 2022; Haruna et al., 2013). Regular pilates practice can cause endocrine changes in the body that may have a positive effect on brain function. Regular pilates exercises cause an increase in serotonin in the brain, which can affect the heart rhythm to improve sleep quality, so that fatigue is reduced (Ashrafinia et al., 2014). Pilates exercise is a type of physical activity that is done to improve the function of pelvic organs by regulating metabolism, water power balance, hemodynamic conditions, and blood flow as an anti-inflammatory or pain

relieving (Handayani, 2014).

In this study, pilates exercises were combined with lavender aromatherapy, which has many benefits, especially in reducing pain and creating a sense of comfort and relaxation (Maryani and Himalaya, 2020). Lavender aroma therapy can affect the limbic system in the brain, which is the center of emotions and can produce endorphin and enkephalin hormones, which have pain-relieving properties, and serotonin, which has the effect of relieving tension or stress and anxiety (Maryani and Himalaya, 2020). Lavender aromatherapy can increase alpha waves in the brain, where the function of these waves is to give a person a sense of comfort and calm. Lavender aroma also provides a sense of confidence and can reduce stress, hysteria, imbalance, to excessive anxiety (Mayangsari, 2021).

Postpartum women who experience fatigue but have not made efforts to treat their condition better will experience higher fatigue (Baattaiah et al., 2022). Another study showed that postpartum women who did not engage in regular physical activity experienced a prolonged increase in fatigue; physical inactivity contributed to a decrease in physical fitness and stamina, making them more susceptible to fatigue (Peralta et al., 2021).

4. Differences in Postpartum Mothers in the Experimental and Control Groups After Receiving Pilates Exercise and Lavender Aroma Therapy

Based on Table 4, the Mann-Whitney test results obtained a p-value < 0.050 , namely there is a significant difference between the experimental and control groups on fatigue in postpartum women. Based on the results of this study, it can be proved that the hypothesis of this study is accepted, namely that there is a difference in the fatigue of postpartum women in the experimental group and the control group after giving pilates

exercises and lavender aromatherapy in the working area of Andong Health Center, because there is a significant difference between the experimental group and the control group.

The effect of giving Pilates exercises and lavender aromatherapy which is done 4 times in 2 weeks is in line with previous research which explains that there is a significant difference in the results of the post-test which means that there is an effect of physical exercise on the psychological condition of postpartum mothers which is done 4 times in 2 weeks, 1 week is done 2 times with a duration of 25-30 minutes, where physical exercise can help postpartum mothers to be able to relax in the midst of their busy new role as mothers who care for newborns and take care of the family (Nadhiroh and Astutik, 2022). It is also supported by research showing that postpartum women who received physical activity treatment in the form of pilates exercises experienced a significant decrease in fatigue levels compared to postpartum women who did not receive treatment (Bulguroğlu et al, 2023). Another study showed that postpartum women who received treatment in the form of lavender aromatherapy experienced a significant decrease in fatigue levels compared to postpartum women who did not receive this treatment (Vaziri et al, 2017).

The physical activity of pilates exercises in this study is in line with research which shows that pilates is considered a good method for accelerating postpartum healing, physical and mental health, and improving balance and muscle strength in postpartum women (Liu et al., 2022; Haruna et al., 2013). And the lavender aromatherapy used in this study can affect the limbic system in the brain, which can produce endorphin and enkephalin hormones, which have pain-relieving properties, and serotonin, which has the effect of reducing tension or stress

and anxiety (Maryani and Himalaya, 2020). These two efforts are expected to be a renewal for midwives in their efforts to fulfil their obligations to provide maternal health services, especially to improve the wellbeing of postpartum women. This study is expected to remind all postpartum women to take better care of their physical and mental health and be able to independently perform Pilates exercises according to the procedures provided, and independently apply the use of lavender aromatherapy

AUTHOR CONTRIBUTION

Agustina Hidayatul Khasanah is the principal investigator and contributed to the funding of this study. Rufidah Maulina and Revi Gama Hatta Novika are the research supervisors. Iffah Indri Kusmawati and Noviyati Rahardjo Putri are reviewers in the research.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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