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# THE EFFECTIVENESS OF SOYBEAN JUICE IN REDUCING INSOMNIA IN PREMENOPAUSAL MOTHERS

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***Abstract***

*Women entering premenopause will experience a decrease in the hormone estrogen. This causes problems with premenopausal syndrome, especially physical complaints such as insomnia. Insomnia is a sleep disorder that makes it difficult for a person to sleep even though they have the desire to do so. Preliminary studies show that 73.3% of premenopausal mothers complained of sleep disorders such as difficulty falling asleep, waking up too early and feeling unrefreshed when they woke up. The aim of this study is to determine the effectiveness of soybean juice in reducing insomnia in premenopausal mothers. The research design used was a pre-experimental method with a one group pre-test post-test design type. The data analysis was carried out using the Wilcoxon Signed Ranks Test statistical test. The sampling technique used was purposive sampling with a total sample of 31 premenopausal mothers. The results of the study showed that consumption of soybean juice had an effect on reducing insomnia experienced by premenopausal mothers with a significance value of 0.000 ($\rho < 0.05$). This showed that there was a significant effect before and after giving soybean juice. Isoflavones in soybean juice have biological activity similar to estrogen and bind to estrogen receptors (ERs) as agonists. Stimulated estrogen receptor ERα by isoflavones, the interaction affects the cell transcription process so that there was stimulation of neurons in the central nervous system and resulted in a reduction in insomnia*

***Keywords:*** *Soybean juice, Insomnia, Premenopause*



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## INTRODUCTION

The WHO predicts that by 2025, there will be 373 million premenopausal women in Asia, up from the current 107 million. According to data from the Republic of Indonesia's Ministry of Health, 19.187.265 women between the ages of 40 and 49 are expected to live in Indonesia in 2022 (Ministry of Health RI, 2022). According to the Central Statistics Agency, the number of women in the Yogyakarta Special Region in 2022 will be 268.948 most of whom are in the 40 – 49 years old age group (BPS, 2023). The number of female residents continues to increase in several districts of Yogyakarta, including Sleman District, with the population reaching 85.439 people aged 40 – 49 years old (Dinkes D.I.Y, 2022). This number is very high because women aged 40 – 49 years old are still in their productive period, but at this age they are also at risk of experiencing premenopause (Andini, 2021).

Premenopause is a transition period from the fertile phase to the non-fertilization phase (anovulation), where there is a decrease in reproductive hormones, namely the estrogen hormone, causing the problem of premenopausal syndrome. For most women, premenopausal symptoms usually begin to appear around the age of 40 years old and reach their peak around the age of 49 years old (Novianti & Yunita, 2019). During premenopause, mothers will experience various physical and psychological complaints due to decreased levels of the estrogen hormone. However, physical changes are the highest domain that can affect the quality of life of premenopausal mothers (Sulistyowati & Susilawati, 2021). Physical changes that occur include vaginal dryness, hot flushes, fatigue, night sweats, decreased libido, and insomnia (Setiawan et al., 2020). Insomnia occurs in around 54% of premenopausal mothers, this symptom varies from one woman to another (Anggreni et al., 2024).

Insomnia is a condition where a person has difficulty sleeping or cannot sleep restfully, often wakes up during sleep, has difficulty falling asleep and cannot sleep normally, especially in premenopausal women (Kurniawan et al., 2020). Sleep problems reach its peak in the 65 – 69 years old age group, affecting around 40% of women and 25% of men. Around 7% of women aged 40 years old, 30% aged 50 years old, and 22% aged 70 years old experience sleep problems (Setyaningsih et al., 2023; Yunita et al., 2024). Insomnia can have a negative effect on physical and mental health, in some cases it can even cause cognitive problems which, if not treated properly, can cause mood changes, decreased concentration, and physiological functions such as metabolic flexibility and insulin resistance. This lowers quality of life and raises the risk of coronary heart disease (CHD) and cardiovascular disease (CVD) (Sadiman et al., 2022).

One of the ways to treat premenopausal symptoms is to apply hormone replacement therapy (TSH). However, some studies show that the use of TSH causes the growth of cancer cells. Therefore, premenopausal mothers prefer an alternative treatment method (non-pharmacological). Consuming high levels of phytoestrogens as a substitute for the hormone estrogen could be used as an alternative. Several types of food including sunflower seeds, sprouts, potatoes and soybeans contain phytoestrogens (Mayasari & Jayanti, 2023).

A previous study involved 274 women who experienced premenopausal complaints, the group given the intervention of soy isoflavones significantly helped reduce premenopausal complaints including insomnia (Chalkidou et al., 2023). Another study found that 9 premenopausal women who were given 250 ml of soybean juice twice a day for 14 days experienced a decrease in the intensity of somatic, psychological, and urogenital complaints such as hot flushes, night sweats, insomnia, anxiety, fatigue and pain during intercourse (Ritonga et al ., 2021).

Based on this background, the researchers are interested in conducting research on how soybean juice can reduce insomnia in premenopausal mothers.

## METHOD

This study used a pre-experimental design with a pre-test and post-test for a single group. There was only one treatment group in this design, and there was no comparison (control) group. 40 premenopausal moms between the ages of 40 and 49 made up the population in this study, and 31 respondents in total were chosen using purposive sampling, meaning that the subjects were selected based on specific criteria determined by the researcher.

The independent variable in this research was soybean juice. The dependent variable on the other hand was insomnia in premenopausal mothers. The data was collected directly from respondents through the use of the KSPBJ-IRS questionnaire. In this study, univariate and bivariate analyzes were carried out using the

Wilcoxon Signed Ranks Test statistical test to determine the effect of intervention in reducing insomnia in premenopausal mothers.

The analysis was presented in tabular form to determine the influence between the independent variable and the dependent variable. The results showed that consumption of soybean juice could reduce insomnia in premenopausal mothers with a significance value of 0.000 ($\rho < 0.05$), meaning that there was a significant difference in insomnia before and after consuming soybean juice. This research based on ethical permit No.3691/KEP-UNISA/V/2024.

## RESULTS AND DISCUSSION

The results of the research and data analysis are presented in table form as follows:

Table 1. Frequency Distribution of Respondent Characteristics

| No | Respondent Characteristics | n | % |
|---|---|---|---|
| **1.** | **Mother's Age** | | |
| | 40 – 44 | 10 | 32,3 |
| | 45 – 49 | 21 | 67,7 |
| **2.** | **Maternal Parity** | | |
| | ≥ 3 | 12 | 38,7 |
| | ≤ 2 | 19 | 61,3 |
| **3.** | **Fulfillment of Phytoestrogens** | | |
| | Routine | 3 | 9,7 |
| | Not Routine | 28 | 90,3 |
| **4.** | **Physical Activity (Sports)** | | |
| | Yes | 2 | 6,5 |
| | No | 29 | 93,5 |

*Source : Primary Data, 2024*

Based on table 1, the majority of respondents are between the ages of 45 - 49 years old for 21 respondents (67.7%); and looking at the parity, it can be seen that from the 31 respondents the majority (61.3%), 19 respondents have a parity of ≤ 2. Next, revealed from the fulfillment of phytoestrogen needs, the majority of 28 respondents (90.3%) did not regularly consume phytoestrogens. Finally, based on physical activity (sports), the majority of 29 respondents (93.5%) did not do physical activity (sports).

Table 2. Frequency Distribution of Insomnia Before and After Intervention

| Insomnia Category | Before (Pre-Test) | | After (Post-Test) | |
|---|---|---|---|---|
| | n | % | n | % |
| No Insomnia | 0 | 0 | 12 | 38,7 |
| Mild Insomnia | 4 | 12,9 | 7 | 22,6 |
| Moderate Insomnia | 9 | 29 | 11 | 35,5 |
| Severe Insomnia | 18 | 58,1 | 1 | 3,2 |
| Total | 31 | 100 | 31 | 100 |

Based on table 2, the research results show that before the intervention the majority of 18 respondents (58.1%) experienced severe insomnia and after the intervention the majority of respondents did not experience insomnia, namely 12 (38.7%) respondents.

Table 3. Effect of Soybean Extract on Reducing Insomnia in Premenopausal Mothers

| Insomnia in Premenopausal Mothers | df | ρ value |
|---|---|---|
| Before (Pre-Test) – After (Post-Test) | 31 | 0.000 |

Based on table 3, it shows that there is an effect of giving soybean juice on reducing insomnia in premenopausal mothers with a ρ value of 0.000 ($\rho < 0.05$).

### Discussion

Table 1 shows that the majority of respondents were aged between 45 – 49 years old or 21 (67.7%) respondents. According to (Mazida & Wijaya, 2022; Utami & Dwihestie, 2022) premenopause occurs between the ages of 40 – 49 years old. During this period, premenopausal women generally experience physical complaints such as vaginal dryness, hot flushes, night sweats, fatigue, decreased libido, and insomnia. This is in line with research from (Moradi et al., 2024; Soykan Sert, 2022) which shows that the age of women entering premenopause starts between 40 – 49 years old. Decreased estrogen levels cause physical complaints such as vasomotor symptoms, heart palpitations, headaches, fatigue, mood changes, difficulty in concentration, and insomnia (Kanadys et al., 2021; Menown & Tello, 2021). Researchers assume that women enter premenopause between the ages of 40 – 49 years old, but premenopause begins at different ages for each person due to a decrease in the estrogen hormone.

It can be viewed from the parity that the number of respondents with parity ≤ 2 was the highest, namely 19 (61.3%). According to (Grasiah et al., 2022; Jumiati, 2021) the higher the parity (the more often a woman gives birth), the older or later she enters premenopause. The reason is, pregnancy and childbirth increase the reserves of follicles in the ovaries so that they can slow down the body's aging process. This study is in line with research by (Gottschalk et al., 2022; Sun et al., 2020) which shows that higher parity is associated with a longer period of premenopause. Meanwhile, nulliparous women have twice the risk of

experiencing early premenopause. Researchers hypothesized that mothers with parity ≤ 2 would be at higher risk of entering premenopause and would experience premenopausal symptoms more quickly.

The majority (90.3%) of the 28 respondents did not regularly consume phytoestrogens in their daily lives. According to (Mayasari & Jayanti, 2023; Veronica, Mukaromah, et al., 2023) regular consumption of foods or drinks containing phytoestrogens can relieve premenopausal complaints. Premenopausal women are advised to consume 80mg of phytoestrogens every day, which can be obtained from 112grams of tofu (1½ medium pieces) or 56grams of tempeh (2 medium pieces) or 250ml of soybean juice (49.75mg of isoflavones) given twice a day, so the mother receives 99.5mg of isoflavones per day. This is in line with research which shows that isoflavones are a non-pharmacological treatment because they can reduce complaints in premenopausal mothers such as insomnia (Chen & Chen, 2021). In addition, the isoflavones contained in soybeans can effectively increase bone density and improve oxidative stress, glycemia, and lipid disorders (Biniwale et al., 2022). In this study, respondents did not regularly consume phytoestrogens, thus researchers hypothesized that this caused premenopausal mothers to experience physical discomfort such as insomnia.

Physical activity (sports), the majority (93.5%) of 29 respondents did not do physical activity (sports) regularly. According to (Kusumaningrum & Hidayati, 2022) regular exercise reduces premenopausal symptoms and complaints such as insomnia; and improves the quality of life psychologically and socially. This is in line with research that shows a significant reduction in the frequency and severity of all premenopausal symptoms such as hot flushes, joint pain, and insomnia (Javadivala et al., 2020). There is a significant relationship between exercise, premenopausal symptoms, and quality of life in middle-aged women. Women who exercise regularly experience fewer physical and psychological complaints during premenopause (El Hajj et al., 2020). In that study, researchers hypothesized that premenopausal women may experience physical complaints such as insomnia due to not doing regular physical activity.

The results obtained were that of the 31 premenopausal mothers who met the inclusion criteria, before consuming soybean juice, 18 (58.1%) respondents experienced severe insomnia. After consuming soybean juice, 12 respondents (38.7%) did not experience insomnia. The Wilcoxon Signed Ranks Test statistical test revealed a significant difference in insomnia before and after eating soybean juice, with a ρ value of 0.000 ($\rho < 0.05$). This means that soybean juice has been proven to help reduce insomnia in premenopausal mothers. Isoflavones have been shown to recover various premenopausal symptoms through estrogenic effects. Apart from reducing insomnia, isoflavone intake also relieves symptoms of depression in premenopausal mothers (Kazama et al., 2022; J. Sun et al., 2020).

Insomnia can be treated through natural hormone replacement therapy such as consuming foods rich in phytoestrogens which can increase the production of the estrogen hormone. Tofu, tempeh, tauco, and soybean juice are examples of foods high in phytoestrogens (Mardiyana & Arisanti, 2022). Isoflavones, one of the main components contained in soybean juice, really helps relieve various premenopausal symptoms and has a positive impact on health. It can be utilised as an alternate treatment for cardiovascular disease, osteoporosis, and hormonal problems such breast and prostate cancer (Gómez-Zorita et al., 2020).

Foods high in isoflavones include soy. Since isoflavones and oestrogen have a molecular structure, they can attach to a variety of human cell oestrogen receptors. Consuming isoflavones can help balance estrogen levels in the body and reduce premenopausal symptoms (Mirzavalievich & Abduxolikovich, 2023).

During premenopause, the estrogen hormone decreases, meaning that many estrogen receptors are not bound. Isoflavones are natural compounds that have biological activity similar to estrogen and bind to estrogen receptors (ERs) in the cell nuclear membrane which function as agonists or antagonists. This compound has a high binding affinity with ER, especially ERα and Erβ. This interaction influences the cell transcription process so that there is stimulation of neurons in the central nervous system and results in a reduction in insomnia (Kang et al., 2022).

Isoflavones in soybeans can be a safer solution during premenopause. Increased health risks during premenopause can be controlled by consuming processed soybeans (Khalid, 2020). Foods high in isoflavones include soy. Since isoflavones and oestrogen have a molecular structure, they can attach to a variety of human cell oestrogen receptors. If there is not enough estrogen in the body, isoflavones will become agonists and carry out the function of estrogen. On the other

hand, if there is an excess of estrogen in the body, isoflavones will act as antagonists. Isoflavones block estrogen receptors that bind estrogen. In particular, estrogen antagonist activity is important in the breast, endometrium, and prostate to suppress the occurrence of cancer (Kim, 2021; Radi et al., 2023).

Apart from reducing insomnia, researchers also assessed the reduction in other complaints. Resulted from 31 respondents, 29 respondents (93.5%) reported that apart from insomnia, their night sweats were also reduced. Furthermore, all respondents (100%) who experienced fatigue complaints said that the complaints they experienced had decreased.

## CONCLUSIONS

Consuming soybeans regularly along with its processed products such as soybean juice can help increase levels of the estrogen hormone in the body of premenopausal mothers, thereby reducing premenopausal symptoms that arise due to a decrease in this hormone. The benefits will be increasingly felt with a longer duration of consumption. In fact, women aged 50 years old who have never consumed soybeans can still feel the benefits of soybeans. It is hoped that with this research, midwives can provide counseling to premenopausal mothers who experience hot flushes as a promotive and preventive action regarding efforts that can minimize the symptoms of hot flushes felt by consuming soybean juice. Therefore, they can increase the readiness, health status, and quality of life of mothers as they entering the menopause phase.

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