

The Effectiveness of Soy Milk Administration In Reducing Menopausal Symptoms Based On The Menopause Rating Scale (MRS) In Mothers In Ciseureh Village Purwakarta Regency In 2026

Aan Rosanti^{1*}, Ika Mariska², Bunga Anggita Sagia³

^{1,2,3}Lecturer of the Applied Undergraduate Midwifery Study Program, Bhakti Asih Polytechnic, Purwakarta, Indonesia

*Corresponding author:

Email: rosanti@ymail.com

Abstract.

Menopause is a physiological process in women characterized by the permanent cessation of menstruation due to decreased ovarian function. Hormonal changes that occur during menopause often cause various physical, psychological, and urogenital complaints that can reduce a woman's quality of life. One non-pharmacological approach to reducing menopausal symptoms is the administration of soy milk containing the phytoestrogen isoflavone. This study aimed to determine the effectiveness of soy milk in reducing menopausal symptoms in postmenopausal women. This study used a pre-experimental design with a one-group pretest-posttest approach. The research sample consisted of 33 respondents selected using the random sampling technique. Purposive sampling according to inclusion and exclusion criteria. Measurement of menopausal complaints was carried out using a questionnaire. Menopause Rating Scale (MRS) before and after soy milk intervention for 4 weeks. Data were analyzed using a paired t-test with a significance level of $\alpha = 0.05$. The results of the study showed that the average score of menopausal complaints before the intervention was 14.52 and after the intervention decreased to 9.52. The results of the statistical analysis using Paired t-test obtained a p-value = 0.000 ($p < 0.05$), which shows that there is a significant effect of giving soy milk on reducing menopausal complaints in menopausal women. The conclusion of this study is that soy milk is effective in reducing menopausal symptoms in postmenopausal women. Soy milk can be used as an alternative non-pharmacological therapy to help reduce menopausal symptoms and improve the quality of life of postmenopausal women.

Keywords: soy milk, menopause, menopausal complaints, phytoestrogens and Menopause Rating Scale (MRS).

I. INTRODUCTION

Menopause is a natural phase in a woman's life marked by the permanent cessation of menstruation due to a decline in ovarian function and estrogen production. This condition generally occurs between the ages of 45 and 55 and is often accompanied by various physical, psychological, and social changes. The decline in estrogen levels during menopause can lead to various symptoms such as hot flashes, sleep disturbances, fatigue, joint and muscle pain, anxiety, depression, and urogenital disorders. (Rahman et al., 2010). These complaints can affect the quality of life of menopausal women if not handled properly.

Globally, the number of menopausal women continues to increase as life expectancy increases. Menopausal women require special attention because the hormonal changes that occur impact not only reproductive health but also physical and psychological health. In Indonesia, menopausal symptoms are still often considered a natural process, resulting in many women not receiving appropriate treatment. One instrument frequently used to assess the level of menopausal symptoms is the Menopause Rating Scale (MRS), which encompasses somatic, psychological, and urogenital symptoms (Metintas et al., 2010).

Menopausal symptoms can be treated pharmacologically or non-pharmacologically. While hormone therapy is effective, long-term use can cause certain side effects, necessitating safer alternative therapies. One widely developed non-pharmacological alternative is soy milk. Soy milk contains isoflavones, a class of phytoestrogens—plant compounds with a structure similar to the hormone estrogen, which can help reduce symptoms caused by decreased estrogen during menopause (S & Latheef, 2017).

Isoflavones, or phytoestrogens, in soybeans are known to bind to estrogen receptors and provide protective effects against various menopausal symptoms. Furthermore, the antioxidant content in soybeans can help reduce oxidative stress, which increases during menopause. Several studies have shown that regular

consumption of soy milk can help reduce vasomotor symptoms, improve sleep quality, and increase comfort in menopausal women (Luan et al., 2025).

This research takes the title "The Effectiveness of Soy Milk Administration on Reducing Menopausal Symptoms Based on the Menopause Rating Scale (MRS) in Mothers in Ciseureh Village, Purwakarta Regency in 2026" aims to determine the effectiveness of giving soy milk to reduce menopausal complaints in menopausal women based on measurements using *Menopause Rating Scale* (MRS). The research results are expected to provide a safe, readily available, and economical alternative non-pharmacological intervention to help reduce menopausal symptoms and improve the quality of life of menopausal women.

II. METHOD

This quantitative study employed a quasi-experimental design using a one-group pretest-posttest approach. This design was used to evaluate changes in menopausal complaints before and after the administration of soy milk intervention to the same group of respondents, without using a control group. Initially, all respondents were assessed for menopausal complaints using the Menopause Rating Scale (MRS) as a pretest score. Subsequently, respondents were administered the intervention, consuming soy milk at a predetermined dose throughout the study period. After the intervention was completed, the measurement was repeated using the same instrument as a posttest score.

The study was conducted on menopausal women in Ciseureh Village, Purwakarta Regency, in 2026. The study population was all menopausal women who met the study criteria. The sampling technique used purposive sampling based on predetermined inclusion and exclusion criteria. The number of samples that met the criteria and agreed to participate in the study was 33 respondents.

Inclusion criteria included women who had experienced natural menopause, were aged 45–60, were able to communicate well, were willing to participate by signing an informed consent, and were not currently undergoing hormone replacement therapy (HRT). Exclusion criteria included respondents who were allergic to soy, had a chronic disease that affected hormone metabolism, or did not complete the intervention by the end of the study.

The intervention consisted of consuming 250 mL of soy milk once daily for 14 consecutive days. Respondent compliance with the intervention was monitored using a daily monitoring sheet completed by the respondents and verified by the researchers.

The research instrument used the Menopause Rating Scale (MRS), which consists of 11 questions measuring three domains of menopausal symptoms: somatic, psychological, and urogenital. Each item is rated on a scale of 0–4, with a total score ranging from 0–44. A higher MRS score indicates more severe menopausal symptoms experienced by the respondent.

Data analysis was performed using IBM SPSS Statistics software. Univariate analysis was used to describe the characteristics of respondents, including age, education, occupation, duration of menopause, and MRS scores before and after the intervention in the form of frequency distributions, percentages, means, and standard deviations. Bivariate analysis was conducted to determine the differences in MRS scores before and after soy milk administration. Before hypothesis testing, data were tested for normality using the Shapiro-Wilk test because the sample size was less than 50 respondents. If the data were normally distributed, the Paired Sample t-test was used, while if the data were not normally distributed, the t-test was used. *Wilcoxon Signed-Rank Test*. The level of statistical significance was set at a p-value < 0.05 with a 95% confidence level.

All respondents completed a consent form after receiving an explanation of the research's purpose, benefits, and procedures, as well as the right to withdraw at any time without consequence. The confidentiality of respondents' identities and data was guaranteed throughout the research process.

III. RESULTS AND DISCUSSION

This study is entitled "Effectiveness of Giving Soy Milk on Reducing Menopausal Symptoms Based on the Menopause Rating Scale (MRS) in Mothers in Ciseureh Village, Purwakarta Regency in 2026 as a solution to the limitations of expensive hormone therapy and the risk of side effects. Model *Holisticare* The

program was developed by integrating the provision of soy milk with education on the phytoestrogen nutrition it contains, and community-based emotional support. Implementation in Ciseureuh Village is expected to be *pilot project* innovative which proves that optimizing reproductive and psychological health can be achieved through holistic empowerment of the independent potential of menopausal women (Researcher Analysis, 2026).

Univariate Analysis

Univariate analysis was conducted to provide a comprehensive overview of the distribution of study subjects' characteristics and the clinical parameters measured. This section describes the characteristics of respondents based on age and parity, as well as a description of the severity of menopausal symptoms before and after the soy milk intervention.

This study sampled menopausal women, women who had not menstruated for at least 12 months. The sample consisted of 33 menopausal women in the Ciseureuh Village area of Purwakarta who met the inclusion and exclusion criteria. This study was conducted by completing the MRS questionnaire twice: a pretest before administering soy milk and a posttest after administering soy milk. The results of the study are presented in the table below:

Table 4.1 Frequency Distribution of Characteristics (Age, Parity and Occupation) in Menopausal Women in Ciseureuh Village, Purwakarta in 2026

Characteristics	Frequency Percentage (%)	
Menopause Age		
45-55 Years	22	66,7
<45 and > 55 Years	11	33,3
Parity		
Primipara	1	3,0
Multipara	27	81,8
Grandemultipara	5	15,2
Employment history		
Work	7	21,2
Doesn't work	26	78,8
Total	33	100

Source: Primary Data (SPSS Processed, 2026)

Based on table 4.1. Frequency Distribution of Menopausal Age Characteristics, Parity and Employment History in Menopausal Mothers in Ciseureuh Village, Purwakarta in 2026, it can be seen that for Menopausal Age characteristics, most respondents experienced Normal Age menopause (45-55 years) which was 66.7%, and those who experienced Abnormal age menopause (<45 years and >55 years) were 33.3%. Parity characteristics were almost all respondents with multipara which was 81.8%, Primipara 3% and Grandemultipara 15.2% and for Employment History characteristics, the majority of respondents did not work which was 78.8% and respondents who worked were 21.2%.

Overview of Menopausal Complaint Levels Pretest and Posttest

Result of *Menopause Rating Scale* The questionnaire contains 11 items on menopausal symptoms divided into three subscales. Somatic symptoms consist of four items; psychological symptoms consist of four items; and urogenital symptoms consist of three items. Each item can be selected according to the

condition felt by the respondent with a score of 0 (no complaints/very mild complaints), 1 (mild complaints), 2 (moderate complaints), 3 (severe complaints), and 4 (very severe complaints).

In the recapitulation of the questionnaire data, none of the respondents experienced very serious complaints, so that for score 4 all were worth 0.

Pretest of Menopause Complaint Level

Table 4.2 Distribution of Pretest Scores and Frequency of Menopausal Complaint Levels in Menopausal Women in Ciseureh Village, Purwakarta, 2026

Complaint Menopause	Complaint somatic		Complaint psychological		Complaint urogenital		Total Score complaint	
	N	%	N	%	N	%	N	%
There isn't any	3	9,1	4	12,1	0	0	0	0
Light	7	21,2	7	21,2	3	9,1	2	6,1
Currently	18	54,5	16	48,5	13	39,4	22	66,7
Weight	5	15,2	6	18,2	17	51,5	9	27,3
Score lowest	2		1		1		38	
Score highest	12		12		8		29	
Rate-rate (Standard deviation)	6,09 (2,662)		4,85 (2,884)		3,58 (1,640)		14,52 (4,466)	

Based on table 4.2 for the Pretest Distribution of Scores and Frequency of Menopausal Complaint Levels in Menopausal Women in Ciseureh Village, Purwakarta in 2026 when filling out the questionnaire *Menopause Rating Scale* The highest total score (MRS) before soy milk administration was 29, with an average of 14.52 and a standard deviation of 4.466. Based on these results, it can be concluded that the average respondent experiencing menopausal symptoms is classified as moderate, namely between 9 and 16.

Somatic complaints before giving soy milk were obtained in the highest number of moderate menopausal complaints, namely 18 people (54.5%) and the fewest symptoms were none at the level of complaints, namely 3 people (9.1%).

Psychological complaints before giving soy milk were obtained in the highest number from the moderate level of menopausal complaints, namely 16 people (48.5%) and the lowest number from the level of no complaints, namely 4 people (12.1%).

The highest number of urogenital complaints before giving soy milk was obtained from the level of severe menopausal complaints of 17 people (51.1%) and the lowest number of menopausal complaints from respondents who had no complaints was 0 people (0%).

Posttest level of menopause complaints

Table 4.3 Distribution of Posttest Scores and Frequency of Menopausal Complaint Levels in Menopausal Women in Ciseureh Village, Purwakarta, 2026

Complaint Menopause	Somatic complaints		Complaint psychological		Complaint urogenital		Total Score Complaint	
	N	%	N	%	N	%	N	%
There isn't any	6	18,2	11	33,3	3	9,1	3	9,1
Light	12	36,4	6	18,2	9	27,3	8	24,2
Currently	14	42,4	14	42,4	15	45,5	21	63,6
Weight	1	3,0	2	6,1	6	18,2	1	3,0
Lowest score	1		0		0		3	

Highest score	9	9	6	20
Rate-rate (Standard Deviation)	4,39 (1,802)	3,06 (2,193)	2,06 (1,368)	9,52 (3,420)

Based on table 4.3 for the Posttest Distribution of Scores and Frequency of Menopausal Complaint Levels in Menopausal Women in Ciseureh Village, Purwakarta in 2026 when filling out the questionnaire *Menopause Rating Scale* The highest total score (MRS) after soy milk administration was 20, with an average of 9.52 and a standard deviation of 3.420. Based on these results, it can be concluded that the average respondent experiencing menopausal symptoms is still in the moderate category, namely between 9 and 16.

Somatic complaints after giving soy milk were obtained in the highest number of respondents with moderate menopausal complaints, namely 14 people (42.4%) and the least complaints were respondents with severe menopausal complaints, namely 1 person (3.0%).

Psychological complaints after giving soy milk were obtained in the highest number of respondents with moderate menopause complaints, namely 14 people (42.4%) and the fewest complaints were respondents with severe menopause complaints, namely 2 people (6.1%).

The highest number of urogenital complaints after giving soy milk was obtained from the moderate level of menopausal complaints, namely 15 people (45.56%) and the lowest number of complaints was from respondents with no menopausal complaints, namely 3 people (9.1%).

Statistical Prerequisite Test (Normality Test)

A normality test is performed to determine whether the data obtained is normally distributed or not. The rule used to test normality is the sig. value in the calculation. *Shapiro-Wilk* because the sample/respondents are less than 50. If sig > 0.05 then the data is normally distributed, however if sig < 0.05 then the data is not normally distributed. The following is a table of normality tests using *Shapiro-Wilk*

Table 4.4 Normality Test Results *Shapiro-Wilk*

Menopause Complaints Rate	Say Information
Pre Test	0,057 Normal
Post Test	0,216 Normal

Based on Table 4.6, it can be seen that the results of the Pretest and Posttest normality tests show a Sig value > 0.05. Therefore, it can be said that the data is normally distributed and the statistical test used is *Paired Sample test*.

Bivariate Analysis

Data analysis calculations are performed after the data normality test. If the data is normally distributed, a paired T-test is performed. *Paired t test*, If the distribution is not normally distributed, a Wilcoxon test is performed. This data analysis was performed using SPSS, and the results of the pretest and posttest normality tests showed a Sig value > 0.05. Therefore, the data can be said to be normally distributed, and the statistical test used is *Paired t test*.

Table 4.5 Differences in Menopausal Complaints Before and After Soy Milk Intervention in Ciseureh Village, Purwakarta Regency, West Java

Group	N	MeanSD	Difference Asym.Sig Mean
Before it is done intervention (Pretest)	33	14,52 4,4665	0,000

After done intervention (Posttest)	33	9,52	3,420
------------------------------------	----	------	-------

Uji Paired T test

Based on table 4.5, the calculation of the mean difference (average) before being given an intervention by giving soy milk was 14.52 with the mean value (average) after being given an intervention by giving soy milk was 9.52, so the difference in the mean value was 5.0.

Test Results *Paired T test* The significance value is known to be $0.00 < 0.05$, so it is concluded that H_0 is rejected and H_a is accepted. Thus, it can be concluded that there is a significant difference / there is an effect of giving soy milk on menopausal complaints in mothers in Cisereuh Village, Purwakarta Regency, West Java in 2026.

IV. Discussion

Respondent Characteristics

Based on the research results, the characteristics of menopause age were obtained, most of which occurred at normal ages (45-55 years), namely 66.7%, and those that occurred at abnormal ages (<45 years and >55 years) were 33.3%.

The age of menopause varies from woman to woman, influenced by a combination of genetic, hormonal, reproductive, lifestyle, and environmental factors. In general, natural menopause occurs between the ages of 45 and 55, but some women experience menopause earlier or later (Louwers & Visser, 2021).

Some of the main reasons for differences in menopause age between women include:

a. Genetic factors (heredity)

Genetics is the strongest factor determining the age of menopause. Women whose mothers or sisters experienced early menopause are more likely to experience it earlier as well. Research shows that approximately 44–85% of the variation in the age of menopause is influenced by hereditary factors. (Louwers & Visser, 2021)

b. Smoking habit

Smoking has been shown to accelerate the decline of ovarian function, leading to earlier menopause. Toxic substances in cigarettes can damage ovarian follicles and lower estrogen levels. Women who smoke can experience menopause about 1–2 years earlier than non-smokers. (Zhu et al., 2018)

c. Reproductive and hormonal factors

Age at menarche, use of hormonal contraception, history of breastfeeding, and reproductive health can influence the age of menopause. Women with ovarian disorders or certain diseases may experience menopause earlier. (Parazzini et al., 1992)

Physiologically, menopause occurs when the ovarian follicular reserve declines, resulting in reduced production of the hormones estrogen and progesterone. Because each woman's follicular reserve varies from birth and is influenced by many factors throughout life, the age of menopause varies from woman to woman. Nutrition, chronic stress, physical activity, chemical exposure, autoimmune diseases, and certain medical therapies (chemotherapy/radiotherapy) can also accelerate or delay menopause.

For Parity, almost all respondents were multiparous, namely 81.8%, Primiparous 3% and Grandemultiparous 15.2% and for the characteristics of work history, the majority of respondents were unemployed, namely 78.8% and respondents who worked were 21.2%.

Parity (the number of births a woman has had) can influence the age of menopause because it is related to ovarian activity and the number of ovulatory cycles throughout a woman's reproductive life. Women with higher parity generally experience menopause later than nulliparous women or those with fewer children. Research shows that multiparous women have a lower risk of early menopause than nulliparous women (Anim-Nyame, 2000).

Women who have more children tend to experience menopause later. This is thought to be because ovulation temporarily stops during pregnancy, thus preserving the ovarian follicular reserve. (Kato et al., 1998)

Parity influences the age of menopause because pregnancy and breastfeeding reduce the frequency of ovulation, maintain the ovarian follicular reserve, and provide protective hormonal effects on the ovaries. Therefore, multiparous women tend to experience menopause later than women of low parity or nulliparous women.

Employment history can influence the age of menopause and differences in menopausal symptoms among women because work is associated with stress levels, physical activity, socioeconomic status, lifestyle, exposure to the work environment, and access to health services. Working and unemployed women may have different experiences of menopause depending on their employment conditions (Hagel et al., 2005).

Employment history is often associated with educational and economic status. Women with better employment and education tend to have better access to health information, healthier diets, and the ability to effectively manage menopausal symptoms. Conversely, low economic status can increase the risk of early menopause and worsen menopausal symptoms (De Matteis et al., 2013).

Working women often have broader social networks, providing better access to emotional support and health information. Social support can aid psychological adaptation to menopausal changes and reduce anxiety or depression.

Occupational history influences menopause through its association with stress, physical activity, work environment exposure, socioeconomic status, and psychosocial support. These factors can influence ovarian hormonal function and a woman's ability to adapt to the physical and psychological changes of menopause.

Overview of Menopausal Complaint Levels

Based on the distribution table of scores and frequency of menopausal complaints, it was found that menopausal complaints before giving soy milk were classified as moderate with an average of 14.52 and after giving soy milk there was a significant decrease in scores although still in the moderate category, namely with an average of 9.52. Research in India in 2016 showed that the average results of menopausal symptoms before and after giving 200 ml of soy milk for 6 weeks in 125 menopausal women were 15.814 ± 0.403 and 14.525 ± 0.371 , respectively, which were classified as moderate. (S & Latheef, 2017)

This is different from research conducted in India in 2017 which stated that menopausal symptoms before and after administration of 100 mg of soy isoflavones for 12 weeks in 21 menopausal women were classified as severe (19.57 and 17.1) namely ≥ 17 . (Ahsan, 2017).

The results of this study are in line with the research of Chabla Mora et al. (2016) which showed that soy isoflavone supplementation was able to significantly reduce the Menopause Rating Scale (MRS) score from the severe to moderate category after the intervention. The reduction in menopausal symptoms is thought to occur due to the phytoestrogen content in soybeans, especially genistein and daidzein, which have estrogen-like activity so that they help reduce vasomotor, psychological, and somatic complaints in menopausal women. Where the results of the study were supplementation with isoflavones derived from soybeans had a positive effect on menopausal symptoms, from the initial category of severe symptoms to moderate symptoms with the total MRS points decreasing significantly from 23.0 ± 8.7 (initial) to 12.0 ± 8.7 . (Chabla Mora et al., 2016)

Based on table 4.4, the results of the Normality Test show that the data is normally distributed, so a Paired sample test was carried out.

Based on the Paired sample test which has been explained in the research results in table 4.5, the test results were obtained *Paired Sample test*. It is known that the significance value is $0.00 < 0.05$, so it is concluded that H_0 is rejected and H_a is accepted. Thus, it can be concluded that there is a significant difference / there is an effect of giving soy milk on menopausal complaints in mothers in Cisereuh Village, Purwakarta Regency, West Java in 2026. This is in line with research conducted in India which was conducted in 2016 by giving 200 ml of soy milk in the morning for 6 consecutive weeks in 125 samples

showing a significant difference ($p < 0.001$) in reducing the score *Menopause Rating Scale* (S & Latheef, 2017).

This can be explained by the fact that soy milk contains isoflavone phytoestrogens that can help replace the decline in estrogen hormones during menopause. Isoflavones such as genistein and daidzein have a chemical structure similar to 17- β -estradiol so they can bind to estrogen receptors (ERs), especially estrogen receptor β (ER β), and produce a natural estrogenic effect that helps reduce menopausal symptoms. (Gardiner et al., 2011) This research is supported by the explanation that soy milk contains phytoestrogens in the form of isoflavones that can help reduce menopausal symptoms because phytoestrogens are able to bind to estrogen receptors. Isoflavones in soybeans have a structure that resembles the endogenous hormone estrogen so they can provide a natural estrogenic effect in menopausal women who experience decreased estrogen levels. (Messina, 2014)

This research is supported by Handayani's 2020 study, "Processed Soy Products Can Reduce Symptoms in Menopausal Women." It explains that menopausal women experience a decrease in estrogen levels due to ovarian atrophy, leading to various symptoms. The use of natural ingredients is essential as an alternative to TSH. Soybeans are one of the plants high in isoflavones. Several studies have shown that processed soy products can reduce symptoms in menopausal women, including hot flashes, somatic symptoms, and psychological symptoms. This is because the isoflavones in soybeans can bind to estrogen receptors (Handayani et al., 2020).

Based on the discussion above, it can be seen that soy milk can reduce the severity of menopausal symptoms, especially somatic and psychological symptoms.

V. CONCLUSION

Based on the results of the analysis using the Paired Sample t-test, a significance value of significance value $P < 0.05$. The results show that there is a significant difference between the scores *Menopause Rating Scale* (MRS) before and after soy milk intervention. Thus, the alternative hypothesis (H_a) is accepted and the null hypothesis (H_0) is rejected.

This study concluded that soy milk supplementation was effective in reducing menopausal symptoms in menopausal women. The isoflavones, a phytoestrogen, in soy milk are thought to play a role in reducing menopausal symptoms through estrogen-like activity, thus improving physical, psychological, and urogenital conditions. Therefore, soy milk can be considered a simple, safe, and affordable non-pharmacological intervention to help reduce menopausal symptoms and improve the quality of life of menopausal women.

VI. ACKNOWLEDGEMENTS

We would like to thank the team involved in the research and preparation of this report. We apologize for any shortcomings. We hope this research will benefit the development of scientific knowledge in the field of reproductive health and inspire health practitioners to consistently prioritize a holistic approach in public service.

REFERENCE

- [1]. Adie MM, Krisnawati A. Biologi Tanaman Kedelai. Balai Penelit Tanam Kacang-kacangan dan Umbi-umbian, Malang. 2016:45-73
- [2]. Ahsan, M. (2017). The Effect of Soy Isoflavones on the Menopause Rating Scale Scoring in Perimenopausal and Postmenopausal Women: A Pilot Study. *Journal Of Clinical And Diagnostic Research*. <https://doi.org/10.7860/JCDR/2017/26034.10654>
- [3]. Anim-Nyame, N. (2000). A longitudinal study of maternal plasma insulin-like growth factor binding protein-1 concentrations during normal pregnancy and pregnancies complicated by pre-eclampsia. *Human Reproduction*, 15(10), 2215–2219. <https://doi.org/10.1093/humrep/15.10.2215>
- [4]. Baú, T. R., & Ida, E. I. (2015). Soymilk processing with higher isoflavone aglycone content.

- [5]. Food Chemistry, 183, 161–168. <https://doi.org/10.1016/j.foodchem.2015.03.026> Chen, M., Lin, C., & Liu, C. (2015). Efficacy of phytoestrogens for menopausal symptoms: A
- [6]. meta-analysis and systematic review. *Climacteric*, 18(2), 260–269. <https://doi.org/10.3109/13697137.2014.966241>
- [7]. De Matteis, S., Consonni, D., Lubin, J. H., Tucker, M., Peters, S., Vermeulen, R. C., Kromhout, H., Bertazzi, P. A., Caporaso, N. E., Pesatori, A. C., Wacholder, S., & Landi, M. T. (2013). Impact of occupational carcinogens on lung cancer risk in a general population. *International Journal of Epidemiology*, 42(6), 1902–1902. <https://doi.org/10.1093/ije/dyt177>
- [8]. Ervina, M. S., Widjajanegara, H., & Satyaputra, D. W. (2022). Scoping Review: Pengaruh Pemberian Sediaan Kacang Kedelai terhadap Gejala Hot Flushes pada Pasien Menopause. *Bandung Conference Series: Medical Science*, 2(1). <https://doi.org/10.29313/bcsms.v2i1.945>
- [9]. Forslund LC, Hans Christer Andersson. *Phytoestrogens in Foods on the Nordic Market*. Denmark: Nordic Council of Ministers; 2017
- [10]. Gandhi, J., Chen, A., Dagur, G., Suh, Y., Smith, N., Cali, B., & Khan, S. A. (2016). Genitourinary syndrome of menopause: An overview of clinical manifestations, pathophysiology, etiology, evaluation, and management. *American Journal of Obstetrics and Gynecology*, 215(6), 704–711. <https://doi.org/10.1016/j.ajog.2016.07.045>
- [11]. Ghazanfarpour, M., Sadeghi, R., & Roudsari, R. L. (2016). The application of soy isoflavones for subjective symptoms and objective signs of vaginal atrophy in menopause: A systematic review of randomised controlled trials. *Journal of Obstetrics and Gynaecology*, 36(2), 160–171. <https://doi.org/10.3109/01443615.2015.1036409>
- [12]. Hagel, B., Pless, I. B., & Goulet, C. (2005). The Effect of Wrist Guard Use on Upper-Extremity Injuries in Snowboarders. *American Journal of Epidemiology*, 162(2), 149–156. <https://doi.org/10.1093/aje/kwi181>
- [13]. Handayani, S., Pratiwi, Y. S., & Fatmawati, N. (2020). Produk Olahan Kedelai (Glycine max (L.) Merrill) Mengurangi Gejala pada Wanita Menopause. *Jurnal Kesehatan Qamarul Huda*, 8(1), 63–67. <https://doi.org/10.37824/jkqh.v8i1.2020.183>
- [14]. Heinemann, L. A., Potthoff, P., & Schneider, H. P. (2003). [No title found]. *Health and Quality of Life Outcomes*, 1(1), 28. <https://doi.org/10.1186/1477-7525-1-28>
- [15]. Indah Mayasari, S., & Danur Jayanti, N. (2022). Terapi Komplementer Konsumsi Susu Kedelai (Glycine Max L. Merr.) Terhadap Kejadian Hot Flush
- [16]. Pada Wanita Perimenopause. *Jurnal Kebidanan Indonesia*, 14(1). <https://doi.org/10.36419/Jki.V14i1.758>
- [17]. Kato, I., Toniolo, P., Akhmedkhanov, A., Koenig, K. L., Shore, R., & Zeleniuch-Jacquotte, A. (1998). Prospective Study Of Factors Influencing The Onset Of Natural Menopause. *Journal Of Clinical Epidemiology*, 51(12), 1271–1276. [https://doi.org/10.1016/S0895-4356\(98\)00119-X](https://doi.org/10.1016/S0895-4356(98)00119-X)
- [18]. Lizcano, F., & Guzmán, G. (2014). Estrogen Deficiency and the Origin of Obesity during Menopause. *BioMed Research International*, 2014, 1–11. <https://doi.org/10.1155/2014/757461>
- [19]. Louwers, Y. V., & Visser, J. A. (2021). Shared Genetics Between Age at Menopause, Early Menopause, POI and Other Traits. *Frontiers in Genetics*, 12, 676546. <https://doi.org/10.3389/fgene.2021.676546>
- [20]. Luan, H., Liu, Q., Guo, Y., Fan, H., A., S., & Lin, J. (2025). Effects of soy isoflavones on menopausal symptoms in perimenopausal women: A systematic review and meta-analysis. *PeerJ*, 13, e19715. <https://doi.org/10.7717/peerj.19715>
- [21]. Messina, M. (2014). Soy foods, isoflavones, and the health of postmenopausal women. *The American Journal of Clinical Nutrition*, 100, 423S–430S. <https://doi.org/10.3945/ajcn.113.071464>
- [22]. Messina, M. (2016). Soy and Health Update: Evaluation of the Clinical and Epidemiologic Literature. *Nutrients*, 8(12), 754. <https://doi.org/10.3390/nu8120754>
- [23]. Metintas, S., ArÅ½kan, I., Kalyoncu, C., & Ozalp, S. (2010). Menopause Rating Scale as a screening tool in rural Turkey. *Rural and Remote Health*. <https://doi.org/10.22605/RRH1230>
- [24]. Mishra, P., Pandey, C., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1),
- [25]. 67. https://doi.org/10.4103/aca.ACA_157_18
- [26]. Nappi, R. E., & Kokot-Kierepa, M. (2012). Vaginal Health: Insights, Views & Attitudes (VIVA) – results from an international survey. *Climacteric*, 15(1), 36–44. <https://doi.org/10.3109/13697137.2011.647840>
- [27]. Nappi, R. E., Palacios, S., Particco, M., & Panay, N. (2016). The REVIVE (REal Women's Views of Treatment Options for Menopausal Vaginal ChangEs) survey in Europe: Country-specific comparisons of postmenopausal women's perceptions, experiences and needs. *Maturitas*, 91, 81–90. <https://doi.org/10.1016/j.maturitas.2016.06.010>

- [28]. Nurfadilah, K. (2022). The Effect Of Giving Soybean Milk On Reduction Of Hot Flush Symptoms In Climacterium Women: Pengaruh Pemberian Susu Kedelai Terhadap Gejala Hot Flush Pada Wanita Klimakterium. *Jurnal Kebidanan*, 11(2), 164–170.
- [29]. <https://doi.org/10.35890/jkdh.v11i2.199>
- [30]. Palacios, S. (2009). Managing urogenital atrophy. *Maturitas*, 63(4), 315–318. <https://doi.org/10.1016/j.maturitas.2009.04.009>
- [31]. Parazzini, F., Negri, E., & La Vecchia, C. (1992). Reproductive and general lifestyle determinants of age at menopause. *Maturitas*, 15(2), 141–149. [https://doi.org/10.1016/0378-5122\(92\)90248-3](https://doi.org/10.1016/0378-5122(92)90248-3)
- [32]. Rahman, S., Zainudin, S., & Mun, V. (2010). Assessment of menopausal symptoms using modified Menopause Rating Scale (MRS) among middle age women in Kuching, Sarawak, Malaysia. *Asia Pacific Family Medicine*, 9(1), 5. <https://doi.org/10.1186/1447-056X-9-5>
- [33]. S, P., & Latheef, F. (2017). Effects Of Soya Milk On Menopausal Symptoms Among Women Residing In Selected Rural Community,
- [34]. BENGALURU, INDIA. *International Journal of Research in Ayurveda & Pharmacy*, 7(6), 115–118. <https://doi.org/10.7897/2277-4343.076252>
- [35]. Sherwood, L. (with Cengage Learning (Firm)). (2013). Human physiology: From cells to systems (8th ed). Brooks/Cole, Cengage Learning.
- [36]. Sudoyo AW, Syam AF, Setiyohadi B, Alwi I, K. MS, Setiati S. Buku Ajar Ilmu Penyakit Dalam. Edisi VI. Jakarta: Fakultas Kedokteran Universitas Indonesia; 2014
- [37]. Sugano M. Soy in Health and Disease Prevention. 1st Editio. Boca Raton: CRC Press; 2006.
- [38]. Suparni IE, Yuli R. Menopause Masalah Dan Penanganannya. Deepublish; 2016
- [39]. Talsania, M., & Scofield, R. H. (2017). Menopause and Rheumatic Disease. *Rheumatic Disease Clinics of North America*, 43(2), 287–302. <https://doi.org/10.1016/j.rdc.2016.12.011>
- [40]. Tempfer, C. B., Froese, G., Heinze, G., Bentz, E.-K., Hefler, L. A., & Huber, J. C. (2009). Side Effects of Phytoestrogens: A Meta-analysis of Randomized Trials. *The American Journal of Medicine*, 122(10), 939–946.e9. <https://doi.org/10.1016/j.amjmed.2009.04.018>
- [41]. Welt, C. K., Pagan, Y. L., Smith, P. C., Rado, K. B., & Hall, J. E. (2003). Control of Follicle-Stimulating Hormone by Estradiol and the Inhibins: Critical Role of Estradiol at the Hypothalamus during the Luteal-Follicular Transition. *The Journal of Clinical Endocrinology & Metabolism*, 88(4), 1766–1771. <https://doi.org/10.1210/jc.2002-021516>
- [42]. Widowati S. Teknologi Pengolahan Kedelai (Teori Dan Praktek). Kim Pangan. 2016.
- [43]. Zhu, D., Chung, H.-F., Pandeya, N., Dobson, A. J., Cade, J. E., Greenwood, D. C., Crawford,
- [44]. S. L., Avis, N. E., Gold, E. B., Mitchell, E. S., Woods, N. F., Anderson, D., Brown, D.
- [45]. E., Sievert, L. L., Brunner, E. J., Kuh, D., Hardy, R., Hayashi, K., Lee, J. S., ... Mishra,
- [46]. G. D. (2018). Relationships between intensity, duration, cumulative dose, and timing of smoking with age at menopause: A pooled analysis of individual data from 17 observational studies. *PLOS Medicine*, 15(11), e1002704. <https://doi.org/10.1371/journal.pmed.1002704>.