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The relationship between consumption of soy milk and the menstrual cycle of midwifery students

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ABSTRACT

One of the reproductive health problems that can trigger infertility is ovulation disorders. The clinical manifestation of this disorder is irregular menstruation. The cause is a deficiency of the hormone estrogen. Soybeans are plants that contain high phytoestrogens which can meet the needs of estrogen in the body. This study aims to determine the relationship between soy bean consumption and the menstrual cycle. The research design used was an experiment with a pretest-posttest design. The sampling technique used purposive sampling consisting of 30 respondents who fit the inclusion criteria. Data analysis used the paired sample t-test with the Wilcoxon test. The normality test results obtained a pretest value of 0.344 and a post test value of 0.222. respondent data is normally distributed. The dependent t test results obtained a p value of 0.004 < 0.05. There is a relationship between soy milk consumption and the menstrual cycle. There is a change in the regularity of the menstrual cycle after consuming soy milk. Suggestion: women with irregular menstrual cycle problems can consume soy milk as an alternative to complementary medicine in preventing early infertility

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1. INTRODUCTION

Ovulation disorder is a condition where the ovum does not reach the optimal size to mature and is released from the ovary (Check, 2007) (Golan et al., 1989)(Kuchling & Bradshaw, 1993). The clinical manifestation of this disorder is irregular menstrual cycles (Levine et al., 2020). Generally women will experience ovulation every month with cycles of 28 days, 31 days and 35 days. However, in this condition, menstruation only occurs 8 times a year (Rizzo & 2, 2018).

One of the causes of ovulation disorders is hormonal factors (Jurczewska & Szostak-Węgierek, 2022) (Holesh et al., 2022). Excess androgen hormones in a woman's body cause low estrogen levels (Nagata et al., 2001). Estrogen is produced in the ovaries which functions to produce quality ova and is ready to be fertilized (Sarhan et al., 2017)(Patisaul & Jefferson, 2010). The primary function of estrogens is development of female secondary sexual characteristics (Ball et al., 2014) (Symmers, 1968). These includes breasts, endometrium, regulation of the menstrual cycle etc (Yusnaini, 2020) (Mutter et al., 2000). Estrogen is responsible for development of the female body and the secondary sexual characters. It helps decelerate height increase in females during puberty, accelerates burning of body fat and reduces muscle bulk (Słomczyńska, 2004). It also stimulates growth of the inner lining of the uterus

(endometrium) during the menstrual cycle, increases uterine growth, improves lubrication of the vagina, and thickens the vaginal wall while increasing blood vessels to the skin. Ovulation disorders can cause infertility (Rizzo et al., 2022).

Management of ovulation disorders is to meet the needs of estrogen in the body. Soybeans are grains that contain isoflavones (Kim, 2021) (Price & Fenwick, 1985). Isoflavones are non-steroidal compounds with a chemical structure similar to endogenous estrogens and for this reason, they are defined as phytoestrogens (Lorand et al., 2010) (Cassidy, 2003) (Petrine & Del Bianco-Borges, 2021). Phytoestrogens are compounds that resemble the hormone estrogen in the body, or it can be said that natural estrogens are obtained from plants (Handayani., 2020).

Based on Kohama's research, black soybean has the potential to improve the anovular menstrual cycle (Rizzo et al., 2022)(Heidary et al., 2022). The study was conducted by observing basal body temperature (BBT) and follicular development by ultrasound during the menstrual cycle as an index for ovulation (Renaud et al., 1980) (Barron & Fehring, 2005) (Direito et al., 2013) (Martinez et al., 1992). Improved ovulation was seen in 12 patients, four pregnant patients, and three patients experienced anovular menstruation within 3 months after starting to consume soy powder. The first ovulation period is 66 +/- 12 days. After ovulation began, all subjects menstruated and ovulated regularly, with a high BBT phase of more than 7 days. On the other hand, in group C, increased ovulation was seen in two patients, and two patients had anovular menstruation (Kohama et al., 2005).

The length of menstrual cycle may represent an indirect marker of ovarian function and reproductive health (Ireland et al., 2010) (De Caro et al., 2008) (Jayasinghe et al., 2018). Fertility is closely associated with menstrual cycle functions and a longer time to pregnancy is associated with shorter menstrual cycles (Narulita et al., 2017) (Dunson et al., 2002) (Wilcox et al., 1995). Regarding observational studies, in 2015 Andrews and colleagues conducted a prospective cohort study on 246 American women with normal menstrual cycle, aged 18–44 and with 13 % of participants of Asian ethnicity, for a follow-up of 1–2 whole menstrual cycles (Rizzo et al., 2022) (Messina et al., 2022). The authors highlighted a marginal reduction of luteal phase in the adjusted multivariable model for an increase of 10 mg/d of dietary isoflavones (aOR: 1·38, 95 % CI 0·99, 1·92, P = 0·06), identified by monitoring LH levels in urine by a fertility monitor and 4-d per cycle 24-h dietary recalls. Similar significant association was observed for peak luteal progesterone ≤10 ng/ml (aOR: 1·40, 95 % CI 1·00, 1·96, P = 0·05) (Rizzo et al., 2022).

Part of the uncertainty is due to the intricacy of soy's effects on the body. Soy is unique in that it contains a high concentration of isoflavones, a type of plant estrogen (phytoestrogen) that is similar in function to human estrogen but with much weaker effects (Saini & Morya, 2021) (Molteni et al., 1995) (Kenneth, 1998) (An et al., 2001) (Sirtori, 2001). Aside from their isoflavone content, soy foods are rich in nutrients including B vitamins, fiber, potassium, magnesium, and high-quality protein. Unlike some plant proteins, soy protein is considered a complete protein, containing all nine essential amino acids that the body cannot make which must be obtained from the diet (Messina & Erdman, 2010).

2. RESEARCH METHOD

This research is divided into three stages, namely proposal, research implementation and results report. At the proposal stage, a preliminary study is carried out by collecting various related articles and finding research problems and research subjects that are appropriate to the research problem. at the research implementation stage, the selection of samples according to the inclusion criteria was carried out. research and intervention of giving soy milk was carried out for 3 months or three menstrual cycles. data about the menstrual cycle were obtained through interviews (questionnaires). the third stage, the process of making a results report which includes data processing, analysis of research results, discussion and conclusions.The research design used is quantitative research using experimental research methods with a pretest-posttest one group design approach. Respondents gave questions related to the menstrual cycle. Then given the intervention of 150 ml of soy milk per day for

3 menstrual cycles. Every 1 month an evaluation of the menstrual cycle is carried out to determine changes in the menstrual cycle after consuming soy milk.

Samples were women aged 18-21 years who met the inclusion criteria, namely: irregular menstruation (≤ 8 times in one year or outside of the menstrual cycle of 21 days, 28 days and 35 days) totaling 31 people. The sampling technique used was purposive sampling. Data analysis was used, namely the normality test which aims to determine the distribution of respondents and the dependent t test (paired sample t test, Wilcoxon test) in one group before and after the intervention.

3. RESULTS AND DISCUSSIONS

The research results listed in table 1 show that there is a relationship between soy milk consumption and the menstrual cycle with a p value <0.05. The mean score before the intervention was 0.32735 and the mean score after the intervention was 3.4355. This value indicates that there is a change in the menstrual cycle after consuming soy milk.

The results of this study are in accordance with Yusnaini's research (2020), the results showed that normal menstruation occurs in secondary amenorrhea adolescents after being given soy milk which is equal to 82.4% while in adolescents who are given sweetened condensed milk only by 29,4%. Statistical tests show the results of p= 0,002. The conclusion, there is a change in secondary amenorrhea between the samples gave soy milk and those given sweetened condensed milk.

The menstrual cycle is said to be irregular if in one year it only experiences ≤ eight times. Menstruation begins with ovulation, which is the release of an ovum from the ovary. Unfertilized ovum attaches to the endometrium and is shed as menstrual blood. Normally women experience ovulation once every month. Irregular menstruation indicates an ovulation disorder (Adintyo Rahman et al., 2016).

Ovulation disorders can be caused by a lack of levels of the hormone estrogen produced in the ovaries. The main function of this hormone is related to signs of secondary sexual development in adolescents such as breast growth, and others. Another function is related to the quality of the ovum. A quality ovum has a diameter that is sufficient for ovulation. In the case of women with PCOS, the size of the ovum is identified as small on the results of a transvaginal ultrasound examination so that the ovum is unable to ovulate, settles in the ovary which triggers the appearance of small cysts. When the ovum does not ovulate, menstruation will not occur (Silvestris et al., 2019).

In Restu's research (2021) concerning the effect of soy milk on ovum size in women with PCOS, a homogeneity test was obtained for the characteristics of each group which included age, number of children they had, education and employment, showing $\alpha > 0.05$. The results of the paired sample t-test obtained t: 4.726 and a ρ value of 0.000 ($\rho < 0.05$). There is a difference in the size of the ovum before and after giving soy milk.

Soybeans contain isoflavones which contain phytoestrogens. Phytoestrogens are a substrate of plants with similar activity estrogen. Phytoestrogens are decomposition naturally found in plants has many similarities with estradiol, natural form of estrogen (Patisaul & Jefferson, 2010). Uses phytoestrogens have a more safety effect compared to synthetic estrogens or hormone replacement medications (hormonal replacement therapy/HRT) (Słomczyńska, 2004). Phytoestrogens that are regularly consumed can help the function of estrogen in the body, one of which is helping the ovum reach the optimal size for ovulation so that it can improve the menstrual cycle. Respondents' menstrual cycles in this study were evaluated three times. Respondents were given a questionnaire regarding the date and menstrual cycle to be assessed and compared with the menstrual cycle before consuming soy milk. The evaluation results showed that there were changes in the menstrual cycle for three cycles in the expected direction. The soy milk consumed by the respondent for three months or three menstrual cycles made the respondent experience three menstrual cycles, which means that soy milk has succeeded in making the menstrual cycle regular.

Table 1. Menstrual Cycle Before and After Intervention (Pretest and Posttest)

Intervention	Mean	SD	Min	Max	p value
Before	3.2375	0.410	2	4	0.001
After	3.4355	0.475	3	5	0.002

Table 1 explains that there were changes in the menstrual cycle before and after the soy milk consumption intervention for three cycles, a p value of 0.001 was obtained at the pretest and 0.002 at the posttest. this means that there is an effect of consumption of soy milk on the menstrual cycle

4. CONCLUSION

The conclusion of this study is that there is an effect of consumption of soy milk on the menstrual cycle. There is a change in the cycle in the expected direction after three months or three cycles of consuming soy milk. The findings of this study can have implications for the development of interventions that promote menstrual cycle regularity among midwifery students. The findings of this study can inform midwifery students and healthcare providers about the potential effects of soy milk consumption on menstrual cycle regularity. Furthermore, this study can contribute to the development of interventions that aim to improve menstrual cycle regularity among midwifery students.

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