

Effectiveness of Soya Bean Intake on Reducing Menopausal Symptoms Among the Menopause Women

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Abstract

Background: Menopause represents a natural phase in a woman's life, signifying the end of her reproductive years and typically occurring as part of the aging process. While some women navigate this transition smoothly, others may experience challenging or severe symptoms. **Study Objective:** The purpose of this research was to assess the impact of soybean consumption in reducing menopausal symptoms. A total of 60 menopausal women from the gynecology outpatient department participated in the study. **Method:** A quasi-experimental design was utilized for the research, and participants were selected using convenience sampling. Data collection involved structured interviews to maintain uniformity and thoroughness. Both descriptive and inferential statistical methods were applied to analyze the data and meet the study's objectives. **Pre-Assessment Results:** During the initial evaluation, the mean menopausal symptom score was 17.57 in the experimental group and 17.80 in the control group, showing a minimal difference of 0.23. The t-value was 1.29, and the p-value was 0.21, indicating no statistically significant difference between the groups. Symptom severity in the experimental group at baseline showed 23.3% of participants with mild symptoms, 70% with moderate symptoms, and 6.7% with severe symptoms. Similarly, in the control group, 20% had mild symptoms, 73.3% had moderate symptoms, and 6.7% had severe symptoms, reflecting a minimal and statistically insignificant difference. Post-assessment results revealed a mean symptom score of 12.07 in the experimental group, compared to 18.73 in the control group. This difference of 6.66 was statistically significant, with a calculated t-value of 8.77 and a p-value of 0.001***. The severity of symptoms in the experimental group shifted significantly, with 70% reporting mild symptoms, 30% moderate symptoms, and no severe cases. In contrast, the control group showed 16.6% mild symptoms, Moderate symptoms were reported by 76.7% of participants, while 6.7% experienced severe symptoms, with only minor changes that lacked statistical significance. In the experimental group, soybean consumption resulted in an 18.3% reduction in symptoms, whereas the control group showed a 3.1% increase. The findings revealed a statistically significant difference between the experimental and control groups, indicating the impact of the intervention. **Conclusion:** The study concluded that soybean consumption is highly effective in reducing menopausal symptoms. A notable distinction in symptom improvement was observed between women consuming soybeans and those in the control group.

Keywords: Soya Bean, menopausal, quasi-experimental, menopause, women

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INTRODUCTION

The menopausal transition represents a critical phase in a woman's life, characterized by hormonal fluctuations that result in a range of physical and psychological effects [1]. Menopause, defined as the permanent cessation of menstrual cycles, is often accompanied by symptoms, such as hot flashes, mood disturbances, sleep disruptions, and physical discomfort. These changes can significantly affect a woman's daily routine and overall quality of life, necessitating effective strategies for symptom management and support.

Globally, there is growing recognition of menopause and its impact, highlighting the importance of adopting both medical and natural methods to address its challenges. In India, where there is a longstanding tradition of natural remedies, soybeans have gained prominence as a preferred option for managing menopausal symptoms. Soy is rich in phytoestrogens, natural plant compounds that replicate the effects of estrogen in the body, providing symptom relief while avoiding the potential risks linked to hormone replacement therapy [2, 3].

With women living longer than ever before, the need for effective strategies to manage menopause is increasingly vital. This study investigates the role of soybeans in alleviating menopausal symptoms among Indian women, providing a natural alternative to enhance their well-being and maintain a better quality of life during this transformative phase [4, 5].

MATERIALS AND METHODS

- *Study Design:* A quasi-experimental study was conducted over a period of four weeks in the gynecology outpatient department of a medical institution in Chennai.
- *Sampling:* Sixty menopausal women aged 45–56 years were selected using a convenience sampling method [6].
- *Data Collection:* Baseline data on menopausal symptoms were gathered through interviews using the modified Wiklund Menopausal Rating Scale. Symptoms evaluated included hot flashes, sleep disturbances, and joint pain, among others.
- *Intervention:* Participants in the experimental group were provided with 50 grams of cooked soybeans daily for 20 days, while the control group received no intervention.
- *Post-Test:* On the 21st day, a follow-up assessment was conducted to measure the severity of menopausal symptoms in both groups [7].
- *Ethical Considerations:* The study received formal approval from the ethics committee and hospital administration prior to its commencement.
- *Data Analysis:* The effectiveness of soybean consumption in reducing menopausal symptoms was analyzed using descriptive statistics and chi-square tests [8, 9].

DATA ANALYSIS AND INTERPRETATION

Table 1 provides an overview of the demographic characteristics of the participants in the study titled “An Assessment of the Effectiveness of Soybean in Managing Menopausal Symptoms Among Women at the Institute of Obstetrics and Gynecology, Chennai” [10, 11].

The demographic characteristics of the experimental and control groups were examined and compared to ensure both groups were comparable.

In the experimental group, most participants, totaling 25 women (83.3%), were in the age range of 46 to 50 years. Likewise, in the control group, most participants, 22 women (73.3%), also belonged to this age bracket (Figures 1 and 2).

In the experimental group, 15 participants (50.0%) were illiterate, while in the control group, 13 participants (43.3%) had no formal education (Figure 3).

In the experimental group, most participants, 25 (83.3%), practiced Hinduism, while in the control group, most participants, 27 (90.0%), also adhered to Hinduism (Figure 4).

In the experimental group, 15 participants (50.0%) were categorized as moderate workers, and the same proportion was observed in the control group, with 15 participants (50.0%) identified as moderate workers (Figure 5).

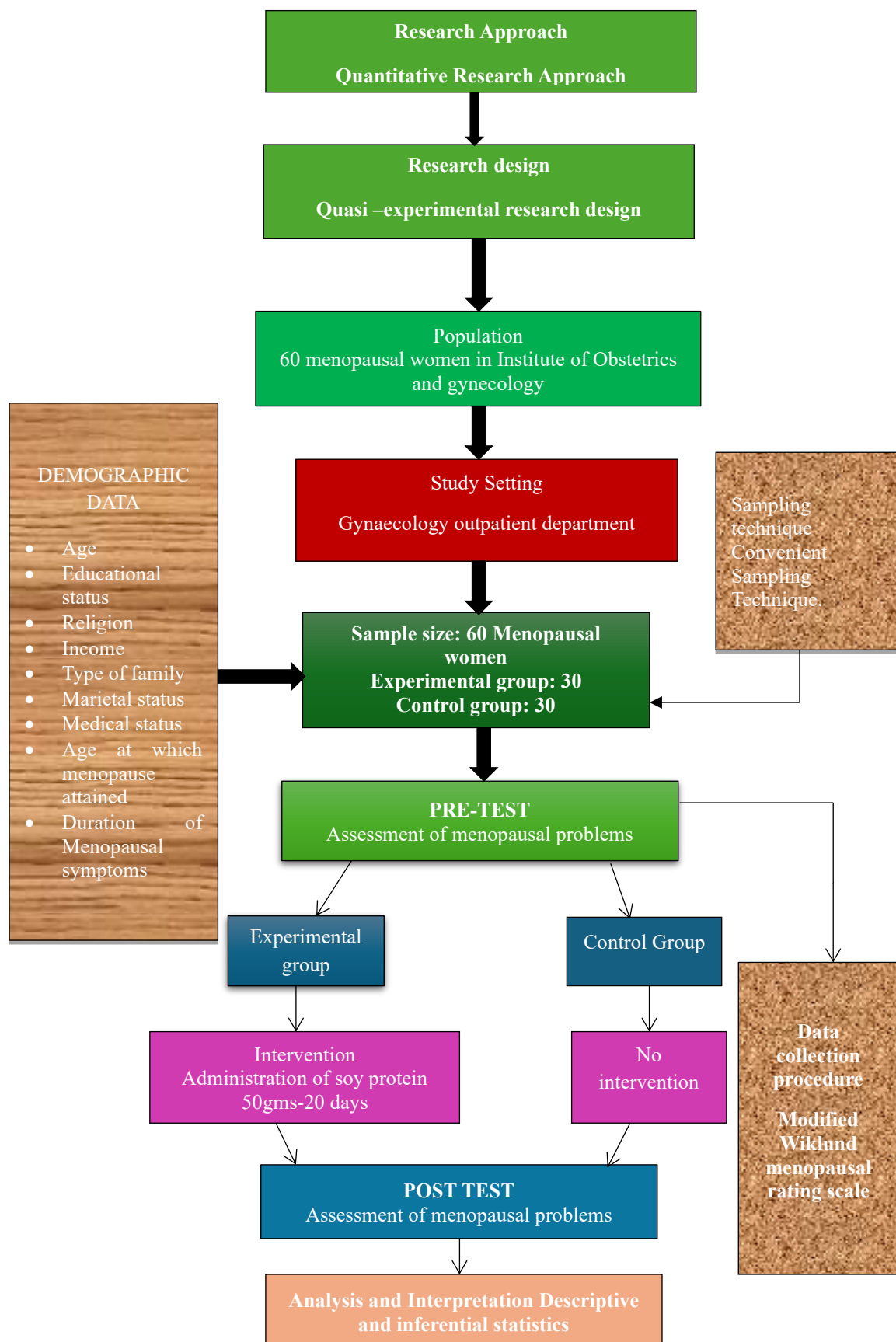


Figure 1. Schematic representation of research design.

Table 1. Distribution of demographic variables of experimental group and control group.

Demographic Variables		Group			
		<i>Experiment</i>		<i>Control</i>	
		<i>No. of Women</i>	<i>%</i>	<i>No. of Women</i>	<i>%</i>
Age	46–50 yrs	25	83.3%	22	73.3%
	51–55 yrs	5	16.7%	8	26.7%
	55–56 yrs	0	0.0%	0	0.0%
Educational Status	Illiterate	15	50.0%	13	43.3%
	Primary	11	36.7%	12	40.0%
	Middle school	4	13.3%	5	16.7%
Religion	Christian	5	16.7%	3	10.0%
	Hindu	25	83.3%	27	90.0%
Occupation	Sedentary worker	4	13.3%	4	13.3%
	Moderate worker	15	50.0%	15	50.0%
	Coolie	11	36.7%	11	36.7%
Income	Rs. 2000–3000	17	56.7%	18	60.0%
	Rs. 3000–6000	11	36.7%	11	36.7%
	>Rs. 6000	2	6.7%	1	3.3%
Marital status	Married	30	100.0%	30	100.0%
	Unmarried	0	0.0%	0	0.0%
Type of Family	Nuclear family	21	70.0%	15	50.0%
	Joint family	7	23.3%	12	40.0%
	Extended family	2	6.7%	3	10.0%
Number of children	One	2	6.7%	4	13.3%
	Two	18	60.0%	19	63.3%
	Three	7	23.3%	5	16.7%
	Above three	3	10.0%	2	6.7%
Medical Problems	Blood pressure	18	60.0%	21	70.0%
	Diabetic Mellitus	12	40.0%	9	30.0%
Treatment taken	Yes	3	10.0%	6	20.0%
	No	27	90.0%	24	80.0%
Menopause attained	40–45 yrs	3	10.0%	8	26.7%
	46–50 yrs	23	76.7%	20	66.7%
	51–56 yrs	4	13.3%	2	6.7%

In the experimental group, 17 participants (56.7%) had a monthly income of ₹2000–3000, while in the control group, 18 participants (60.0%) fell within the same income range (Figure 6).

In both the experimental and control groups, all participants, 30 (100%), were married (Figure 7).

In the experimental group, 21 participants (70.0%) were from nuclear families, while in the control group, 15 participants (50.0%) belonged to nuclear families (Figure 8).

In the experimental group, 18 participants (60.0%) had two children, whereas 19 participants (63.3%) in the control group had two children (Figure 9).

In the experimental group, 18 participants (60.0%) had high blood pressure, while in the control group, 21 participants (90.0%) were diagnosed with high blood pressure (Figure 10).

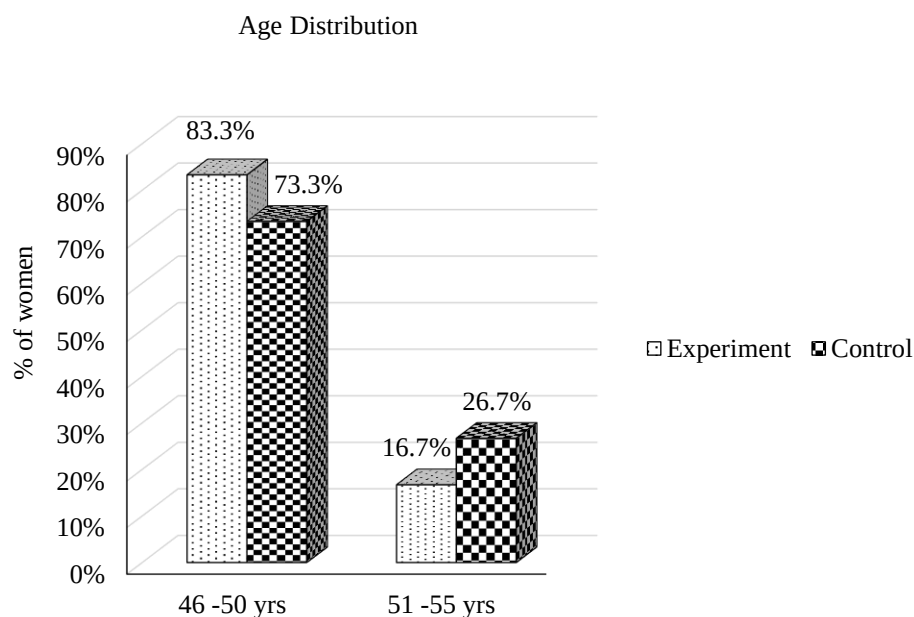


Figure 2. Graphical Depiction of the Age Distribution of Menopausal Women in the Experimental and Control Groups.

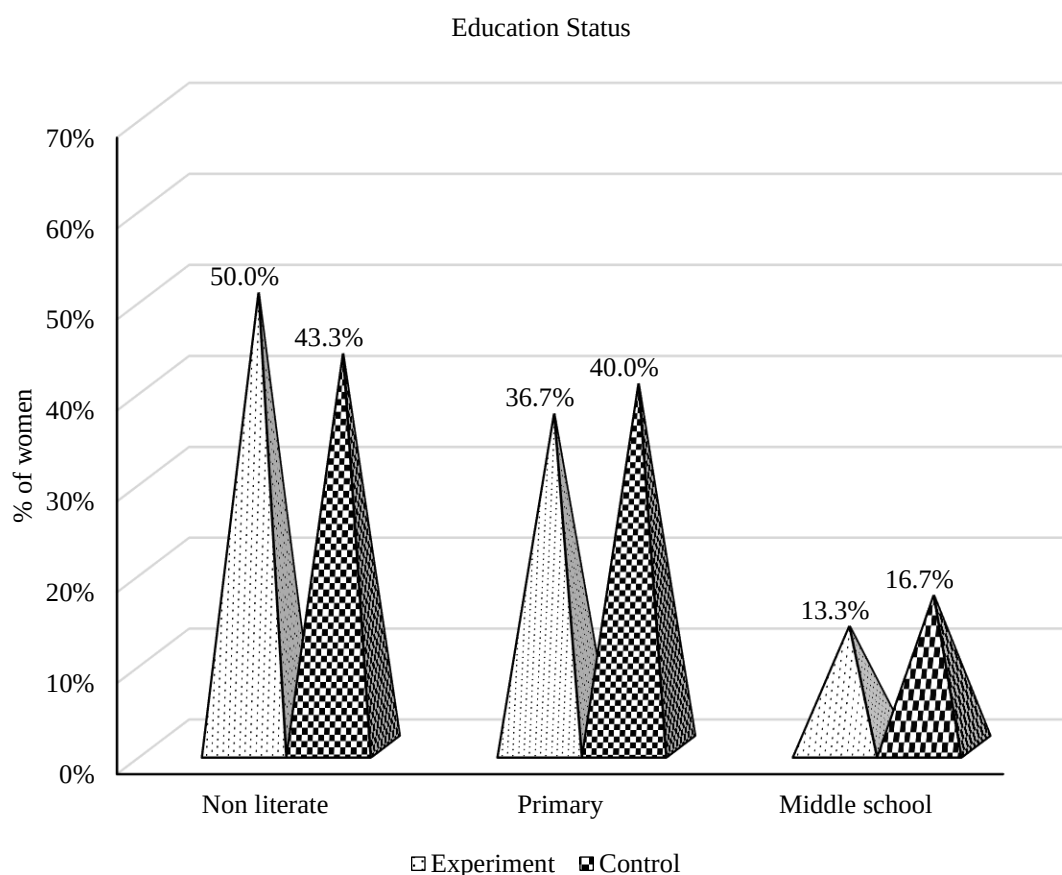


Figure 3. A Graphical Representation Illustrates the Educational Distribution of Menopausal Women in the Experimental and Control Groups, Showcasing the Levels of Education for Participants in each Group for Comparative Analysis.

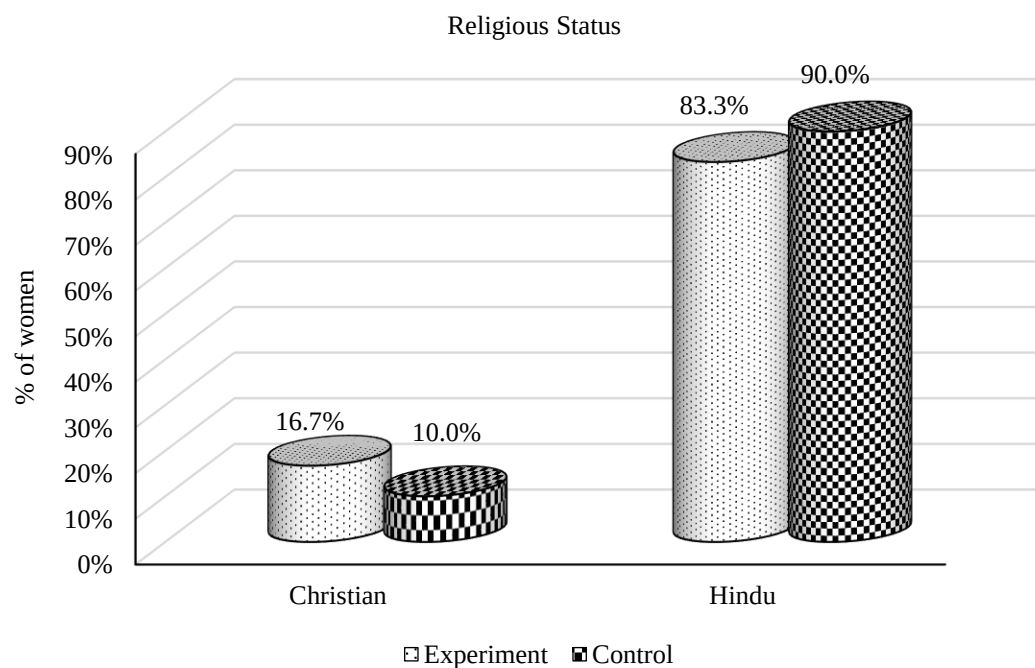


Figure 4. Graphical representation of menopausal women according to religious status in Experimental Group and Control Group.

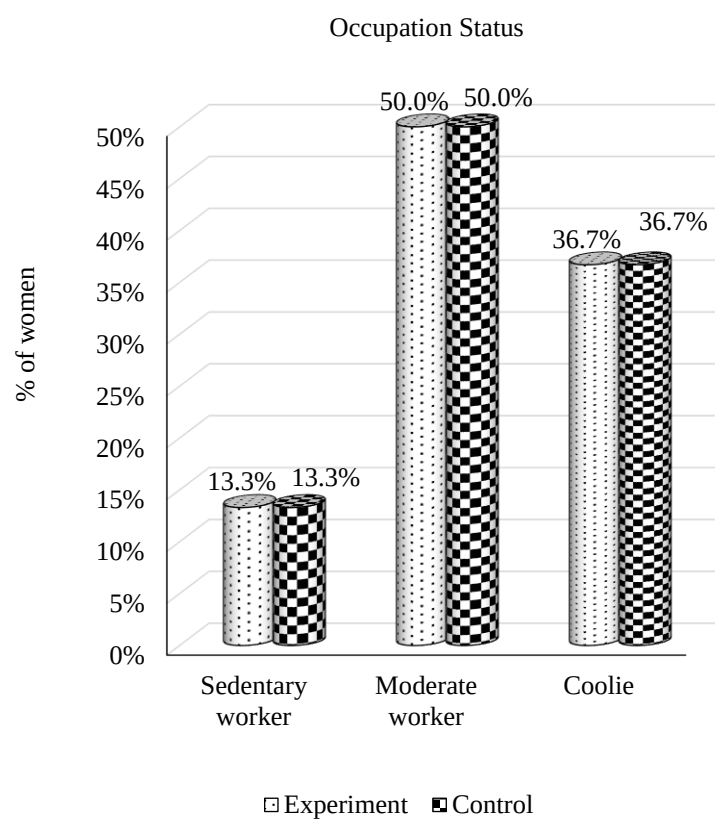


Figure 5. Graphical representation depicting the Occupational Status of Menopausal Women in the experimental and Control Groups, highlighting the proportion of participants classified as Moderate Workers in each group.

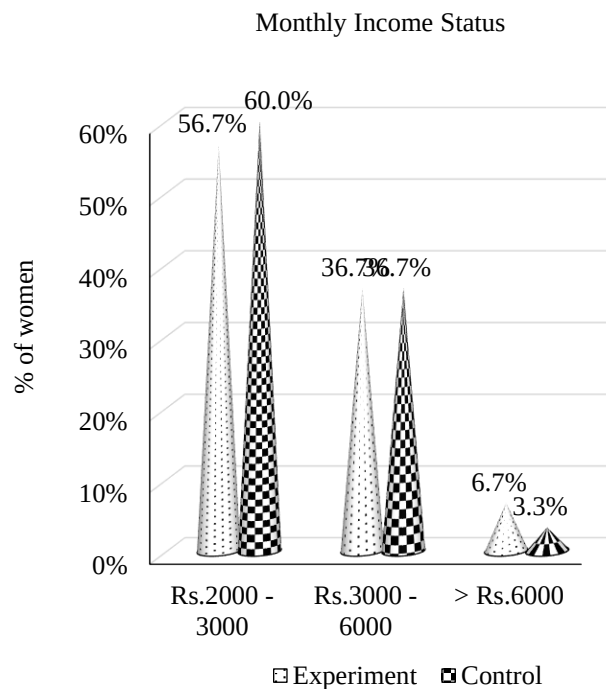


Figure 6. Graphical representation of Menopausal Women according to Monthly Income in Experimental Group and Control Group.

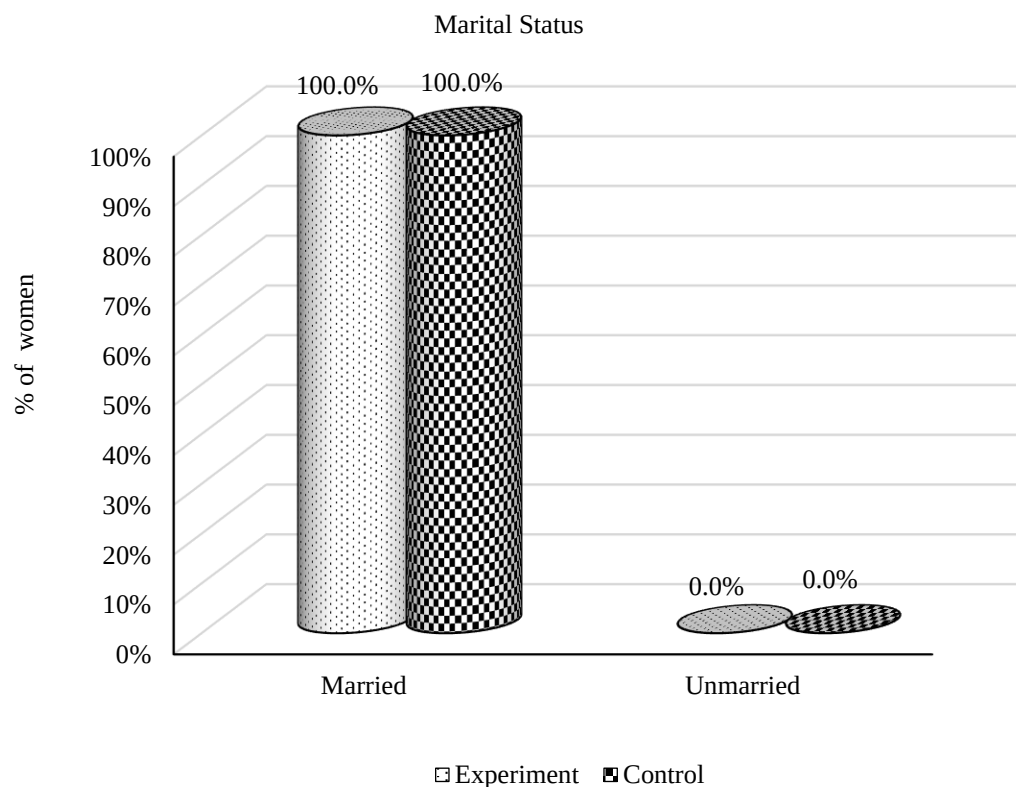


Figure 7. Graphical representation showing the marital status distribution of Menopausal Women in the Experimental and Control Groups, illustrating the proportion of participants in each group based on their Marital Status.

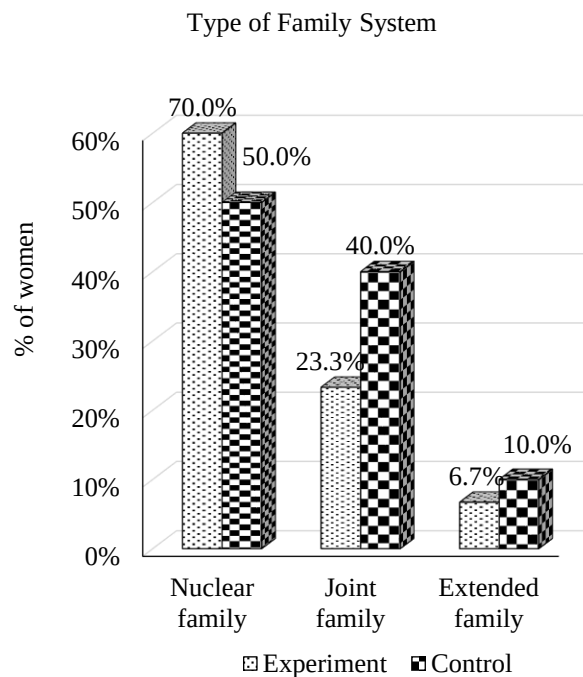


Figure 8. Graphical representation of Menopausal Women according to Type of Family System in Experimental Group and Control Group.

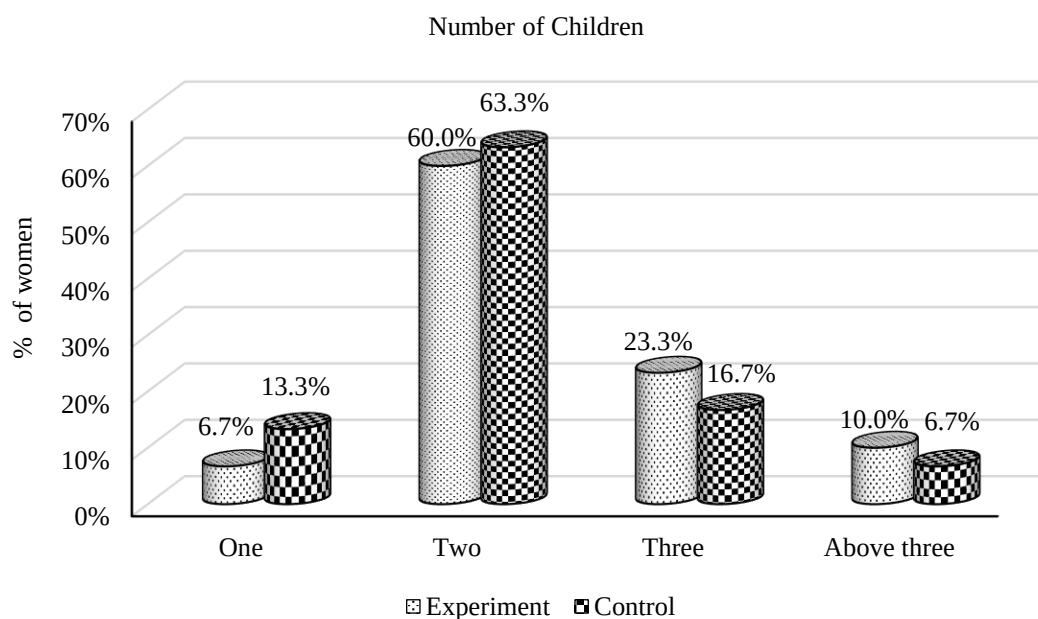


Figure 9. Graphical representation of Menopausal Women according to Number of Children in Experimental Group and Control Group.

In the experimental group, most participants, 27 (90.0%), had not received any treatment, while in the control group, 24 participants (80.0%) had not taken any treatment (Figure 11).

In the experimental group, 23 participants (76.7%) experienced menopause between the ages of 46 and 50, while in the control group, 20 participants (66.7%) reached menopause within the same age range (Figure 12).

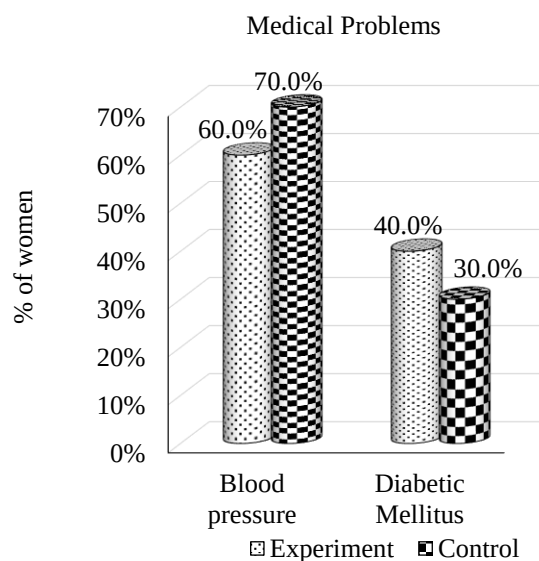


Figure 10. Graphical representation of Menopausal Women according to Medical Problems in Experimental Group and Control Group.

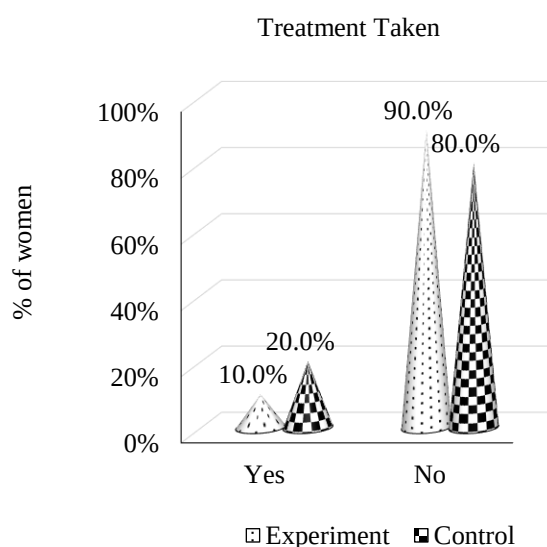


Figure 11. Graphical representation showing the Treatment Status of Menopausal Women in the Experimental and Control Groups, Illustrating the Proportion of Participants in Each Group who Received Treatment or did not receive any Treatment.

Distribution of Pre-Test Assessment and Comparison of Statistical Value of Pre-Test Level of Menopausal Symptoms Score

Table 2 displays the distribution of menopausal symptoms among women aged 45–56 years in both the control and experimental groups before soybean consumption. Statistical analysis using the student's independent t-test revealed no significant difference between the experimental and control groups [12, 13].

Table 3 compares the menopausal symptom scores between the control and experimental groups before soybean consumption. In the experimental group, the pretest menopausal symptom score was 17.57, while in the control group, it was 17.80, resulting in a small difference of 0.23. This difference was minimal and not statistically significant, as assessed using the student's independent t-test.

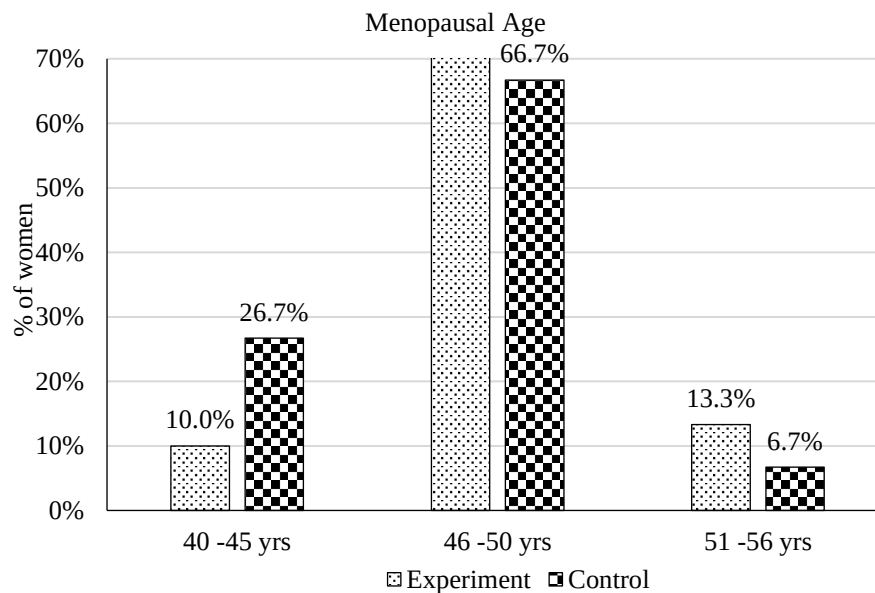


Figure 12. Graphical representation of Menopausal Women according to Menopausal age in Experimental Group and Control Group.

Table 2. Distribution of Pretest assessment of Menopausal Symptom Score (Wiklund Menopausal Scale).

Menopausal Problems	Experiment		Control		Total
Hot Flushes	2.33	.802	2.43	.935	$t = 0.44$ $P = 0.65$
Sleep Disturbances	2.50	.572	2.47	.571	$t = 0.22$ $P = 0.82$
Night sweats	2.10	.803	2.37	.814	$t = 1.43$ $P = 0.15$
Fatigue	2.31	.765	2.27	.583	$t = 0.56$ $P = 0.57$
Vaginal dryness	.67	.844	.50	.572	$t = 0.89$ $P = 0.37$
Headache	2.20	.887	2.30	.837	$t = 0.44$ $P = 0.65$
Irritability	1.43	1.223	1.03	.906	$t = 1.42$ $P = 0.16$
Joint pain	2.67	.711	2.43	.774	$t = 1.21$ $P = 0.22$
Breast tenderness	.53	.730	.90	1.029	$t = 1.59$ $P = 0.11$
Palpitation	.83	1.085	1.10	1.242	$t = 0.88$ $P = 0.37$

Table 3. Distribution of Statistical Value of Comparison of Pretest Menopausal Symptoms Score.

	Pretest		Student's Independent T-Test
	Mean	SD	
Experimental	17.57	3.08	$t = 1.29$ $P = 0.21$ not significant
Control	17.80	2.94	

Note: *Significant at $P \leq 0.05$. **highly significant at $P \leq 0.01$. ***very high significant at $P \leq 0.001$.

Table 4 compares the levels of menopausal symptoms between the experimental and control groups. In the experimental group, 23.3% of women reported mild symptoms, and 70% experienced moderate symptoms. In the control group, 20.0% of women had mild symptoms, 73.3% had moderate symptoms, and 6.7% reported severe symptoms.

Distribution of Statistical Values for the Post-Test Results and Comparison of the Post-Test Menopausal Symptom Scores

Table 5 assesses the menopausal symptoms among women aged 45–56 years in the control and experimental groups after soybean consumption. Statistical analysis using the student's independent t-

test revealed a significant difference between the experimental and control groups, except for vaginal dryness and breast tenderness.

Table 4. Distribution of Statistical Value of Pretest Level of Menopausal Symptoms.

Level of Menopausal Symptoms	Experiment		Control		Chi Square Test
	n	%	n	%	
Mild	7	23.3%	6	20.0%	$\chi^2 = 0.10$ P = 0.95 Not significant
Moderate	21	70.0%	22	73.3%	
Severe	2	6.7%	2	6.7%	

Note: *Significant at $P \leq 0.05$. ** highly significant at $P \leq 0.01$. *** very high significant at $P \leq 0.001$.

Table 5. Distribution of Statistical Value of Post-Test Assessment of Menopausal Symptoms Score.

Menopausal Problems	Experiment		Control		Total
Hot Flashes	1.60	.724	2.53	.819	t = 4.67 P = 0.001***
Sleep Disturbances	1.73	.691	2.53	.507	t = 5.11 P = 0.001***
Night sweats	1.30	.837	2.43	.774	t = 5.44 P = 0.001***
Fatigue	1.57	.711	2.30	.535	t = 3.89 P = 0.001***
Vaginal dryness	.40	0.68	.50	.572	t = 0.60 P = 0.54
Headache	1.53	.774	2.37	.718	t = 4.84 P = 0.001***
Irritability	1.10	.995	1.17	.986	t = 0.26 P = 0.79
Joint pain	1.60	.610	2.50	.731	t = 4.02 P = 0.001***
Breast tenderness	.47	1.006	1.30	1.291	t = 2.77 P = 0.01**
Palpitation	.63	1.033	1.10	1.242	t = 2.80 P = 0.001***

Note: $P \leq 0.001$.

Table 6 presents a comparison of menopausal symptom scores in both the control and experimental groups before and after soybean consumption. After the intervention, the experimental group had a post-test score of 12.07, compared to 18.73 in the control group, resulting in a significant difference of 6.66. This difference was found to be statistically significant, as evaluated using the student's independent t-test.

Table 6. Distribution of Statistical Value of Comparison of Post-Test Menopausal Symptoms Score.

	Post Test		Students Independent t-test
	Mean	SD	
Experimental	12.07	3.19	t = 8.77 P = 0.001** significant
Control	18.73	2.89	

Note: *Significant at $P \leq 0.05$. ** highly significant at $P \leq 0.01$. *** very high significant at $P \leq 0.001$.

Table 7 compares the levels of menopausal symptoms in experimental and control groups. In the experimental group, 70.0% of women reported mild symptoms, 30% experienced moderate symptoms, and none had severe symptoms. In the control group, 16.6% of women had mild symptoms, 76.7% had moderate symptoms, and 6.7% experienced severe symptoms. The difference between the groups is small and not statistically significant, as indicated by the chi-square test (Figure 13).

Table 7. Distribution of Statistical Value of Level of Post -Test Menopausal Symptoms.

Level of Menopausal Symptoms	Experiment		Control		Chi Square Test
	n	%	n	%	
Mild	21	70.0%	5	16.6%	$\chi^2 = 0.10$ P = 0.95 Not significant
Moderate	9	30.0%	23	76.7%	
Severe	0	0.0%	2	6.7%	

Note: *Significant at $P \leq 0.05$. ** highly significant at $P \leq 0.01$. *** very high significant at $P \leq 0.001$.

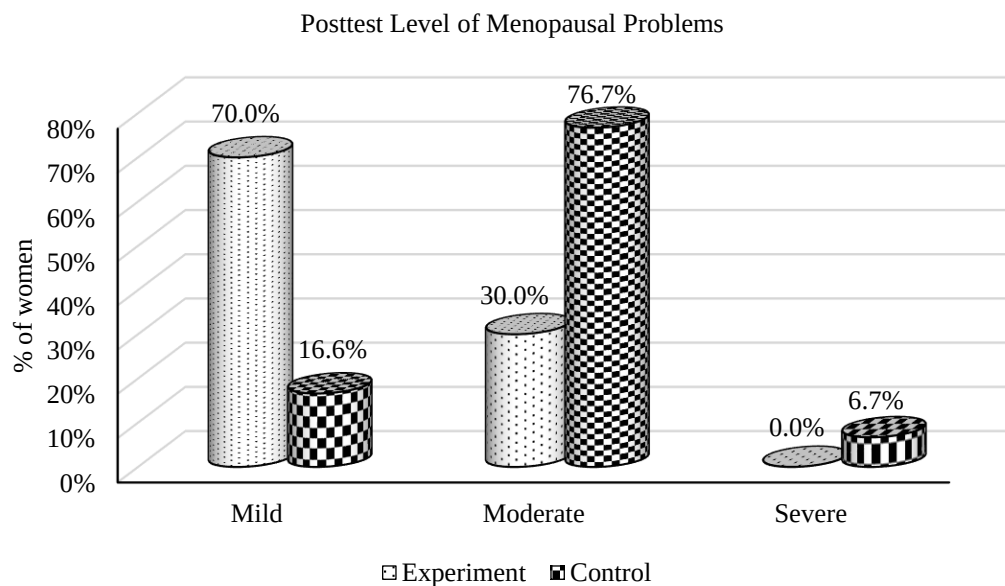


Figure 13. Graphical representation of menopausal women according to posttest level of menopausal in experimental group and control group.

Distribution of Statistical Values Measuring the Effectiveness of Soybean Consumption in Alleviating Menopausal Symptoms in the Experimental Group

Table 8 shows the comparison of the overall reduction in menopausal symptom scores between the pretest and posttest. On average, women in the experimental group experienced an 18.3% reduction in symptoms after soybean consumption, while the control group saw a 3.1% increase in symptoms. The differences between the pretest and posttest scores were analyzed using the mean difference with a 95% confidence interval (CI), proportion with a 95% CI, and mean difference with a 95% CI [14, 15].

Table 8. Distribution of Statistical Value of Effectiveness of Soya Consumption to Reduce the Menopausal Symptoms Among the Experimental Group.

		Max Score	Menopausal Problem Score	Mean Difference with 95% CI	Percentage Difference with 95% CI
Experiment	Pretest	30	17.57	5.5(4.3–6.7)	↓18.3% (14.3%–22.3%)
	Posttest	30	12.07		
Control	Pretest	30	17.80	-0.93(-2.01–0.15)	↑3.1% (-6.7%–5.0%)
	Posttest	30	18.73		

Table 9. Distribution of Statistical Value of Effectiveness of Soya Consumption.

	Reduction Score		Difference in Knowledge Gain
	Experiment	Control	
OVERALL	↓18.3%	↑-3.1%	21.4%

Note: 18.3% is the net benefit of this study.

DISCUSSION AND CONCLUSIONS

The study found that soybean consumption led to a significant reduction in menopausal symptoms in the experimental group when compared to the control group. The mean post-test score for the experimental group was 12.07, while the control group scored 18.73, demonstrating a notable difference linked to soybean intake. Women in the experimental group reported fewer hot flashes, sleep disturbances, joint pain, and other symptoms. This result supports previous research suggesting that the phytoestrogens in soy can mimic estrogen in the body, providing relief from menopausal symptoms without the risks associated with hormone replacement therapy.

The study highlights the potential of soybeans as a natural and accessible remedy for managing menopausal symptoms, especially in cultures that value traditional treatments. With an average symptom reduction of 18.3% in the experimental group, soybeans offer a promising alternative for managing menopause. Further research is recommended, exploring the use of different soy products and comparing them with other complementary therapies to improve menopausal care.

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