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Isoflavone Supplementation Alleviates Vascular Hardness in Women in the Perimenopausal to Postmenopausal Stages: A Systematic Study

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KEYWORDS
Menopause, ovarian hormones, Menopausal Hormone Therapy, isoflavones, vascular hardness.

ABSTRACT:
Isoflavones, derived from plants with estrogenic and antioxidant properties, offer potential benefits for women during menopause. With menopause encompassing a significant period of a woman's life, addressing its discomfort as routine can be misguided. While Menopausal Hormone Therapy [MHT] effectively manages menopausal symptoms, its use is linked to heightened risks of coronary heart disease, breast cancer, and vascular events. In cases where MHT isn't viable, isoflavones serve as a viable alternative. This study investigates the potential of isoflavone supplementation in alleviating menopausal vascular stiffness in perimenopausal and postmenopausal women, emphasizing the modulation of ovarian hormones and associated parameters. The study reveals that isoflavones effectively mitigate the prevalent symptoms of vascular stiffness in perimenopausal to postmenopausal women, offering stability across several key parameters defining vascular hardness. In conclusion, isoflavones show promise in alleviating vascular stiffness symptoms among women in their perimenopausal to postmenopausal stages.

Introduction

According to the third consensus conference of an Indian Menopause Society, there are currently about 43 million postmenopausal women in India, with that figure expected to rise to 103 million by 2026. The average age of menopause in India is 47.5 years, but in recent years, there has been a significant rise in the number of Indian women going through menopause prematurely. Nearly 4% of women in the age range of 29–34 and 8% of women in the 35–39 had the disorder. Women who stopped menstruation a year earlier or who stopped having periods as a result of a hysterectomy or oophorectomy are considered post-menopausal. According to the World Health Organization, women's discomfort and worries can be reduced through early list of indicators.[1] Mr. John Dalpatbhai Solanki "In obese, largely passive midlife Gujarati women, the menopause may have differing effects on vascular stiffness and blood pressure".[2] Endothelial cell dysfunction leads to vasoconstriction, leukocyte adhesion, platelet activation, mitogenesis, pro-oxidation, thrombosis, impaired coagulation, vascular inflammation, and atherosclerosis. It is an early and important phase in plaque formation. It's important to research the molecular and cellular mechanisms underlying the pathophysiology of metabolic issues in postmenopausal women. In the post-menopausal population, obesity is put on by oestrogen loss following menopause, which causes oestrogen gain and hip fat to

Ranich et al. in 2001. Phyto-estrogens are naturally accumulate. Phytoestrogens in soy are anti-oxidants, anti-inflammatory, antidiabetic, and have anti-lipidemic and anti-oxidant characteristics. Women after menopause, especially those who have a natural tendency to the formation of metabolic syndrome components, should limit their consumption of fat-rich meals.

The goal of the research is for it to achieve Isoflavone consumption reduces vascular hardness in perimenopausal to postmenopausal women.

Literature Review

Isoflavone Effects on Menopausal Syndromes and Other Conditions In a 2007 research, HSU I.P., et al. evaluated the impact of soya germ extracts on urinary oestrogen metabolites, anti-oxidative ability, and blood lipoproteins in postmenopausal women between the ages of 45 and 56 receiving hormone treatment in Korea. The study uses 60 samples in total. For four weeks, samples received 6g of soya germ extract daily. After four weeks of soya germ extract intervention, the results show that isoflavone significantly inhibits bone resumption and stimulates bone formation. It is implied that plasma HDL/C level increased noticeably along with a significant decrease in plasma LDL-C/HDL-C ratio and LDL (- 2.03 mmol 95%, -3.20 to -0.85 mmol). Therefore, it may be said that soya germ extract was successful in raising isoflavone levels. [3]

A research on the protective benefits of eating phytoestrogens in chronic renal illness was conducted by occurring plant substances that are principally found in flaxseed and soy beans as lignans and isoflavones, respectively. Due to the structural resemblance between

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phytoestrogens and endogenous oestrogens, phytoestrogens bind to both ER-alpha and ER-beta [but ER-beta more strongly] and have estrogen-like actions. Growing data suggests that dietary phytoestrogens are helpful in chronic renal failure. [4]

The reduction in bone mineral density [BMD], which results in osteoporosis, is another key alteration that happens after menopause. Since bone contains a lot of ER[1]

Isoflavones may be used to treat metabolic syndrome by regulating blood sugar levels without causing weight gain as a side effect. [5]

Materials and Methods:

PubMed databases should be used for the systematic search, randomised controlled trials [RCTs], are the only study types into consideration. Up until June 2022, only materials written in English are included in the search. To locate more studies, references to chosen research and review publications on the subject of the work are also looked up.

Up until June 2022, only materials written in English are included in the search. References to chosen research and review publications on the subject of the works are also looked up. The data chosen Categorical variables are expressed as frequency and proportions, whereas continuous variables are expressed as means ± standard deviations [mean±SD]. Improvements in endothelium hardness as measured by theoretical parameters, along with expectations related to the care both before and after using isoflavones. Observed vascular hardness and isolated isoflavones are among the data collected.

Inclusion criteria: Women who have self-reported menopause, which is defined as the end of menstruation for at least a year, are in their perimenopausal to postmenopausal stages. A uterus is being removed. Persons with recent diagnoses who are willing to participate in the study Patients who do not use or refuse MHT.

Exclusion criteria: women who had recently taken MHT or soy supplements, ranging in age from postmenopausal to perimenopausal. Women who have suffered a myocardial infarction or another category of cardiovascular illness. Allergy to soy products before. There is combined liver and renal dysfunction. Amenorrhea in the perimenopausal stage.

Select research and review publications

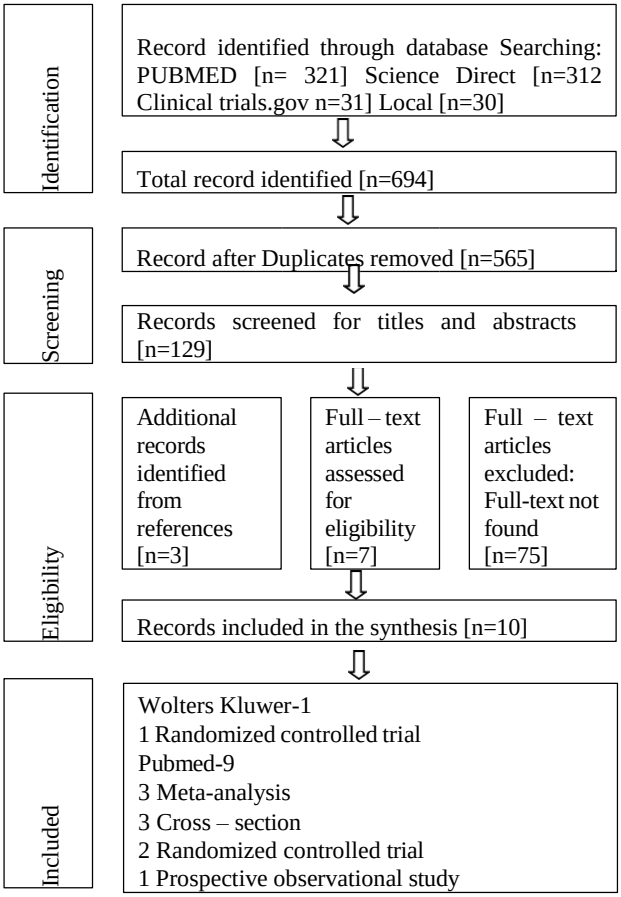

Table1 - The before-and-after measurements of various parameters in response to isoflavone supplementation among perimenopausal to postmenopausal women.

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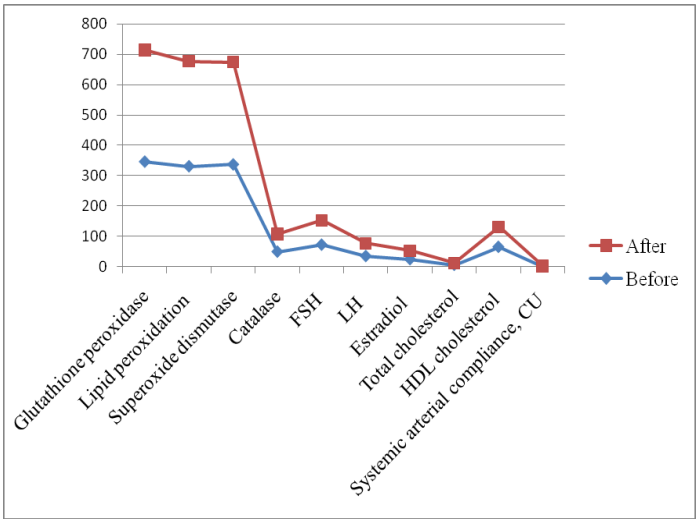
Before	After	Parameter	Dose	Study
48.2 ± 6 5.1	47.6 ± 6	Age at menopause	120 mg/day Isoflavones tablet	Perimenopausal to postmenopausal [Amenorrhea ≥12months]
34.5 ± 13.2	41.2 ± 13.7	LH		
72.0 ± 23.5	80.3 ± 32.4	FSH		
24.2 ± 21.7	27.7 ± 26.5	Estradiol		
64.7 ± 14.6	65.3±16.6	HDL cholesterol		
2.4 ± 1.4	2.2±1.2	TSH		
1.2 ± 0.2	1.1 ± 0.2	FT4		
5.54 ± 0.86	5.64 ± 1.01	Total cholesterol		
330.46±63.84	347.13±95.91	Lipid peroxidation		
48.86±23.56	58.61±18.91	Catalase		
336.61±90.9	337.79±68.02	Superoxide dismutase		
345.67±80.56	368.73±103.56	Glutathione peroxidase		
0.52± 0.02	0.57±0.02	Systemic arterial compliance, CU		
126±2	125±1	24-hour systolic blood pressure, mm Hg		
72±1	72±1	24-hour diastolic blood pressure, mm Hg		
0.81±0.24	0.81±0.18	Total Arterial stiffness [ml/mmHg]		

[1–10],[11–18], [21–30], [31–41]



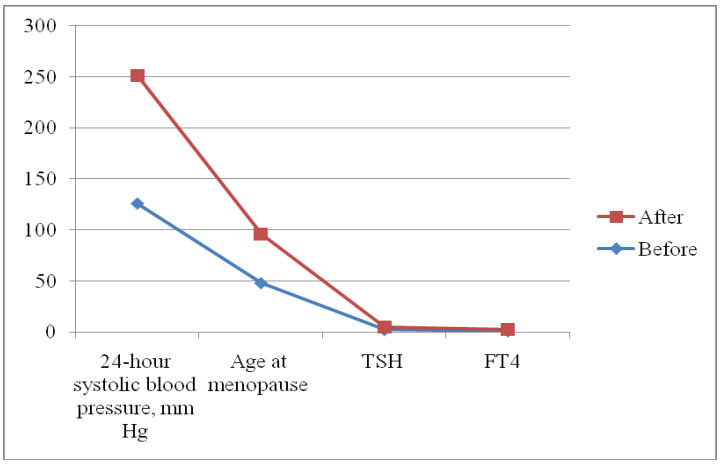


Figure.1 The isoflavones of the participants are compared after the classifier establishes that the hormone, RBC antioxidant, menopause symptom, and arterial complication parameters' levels are improved.

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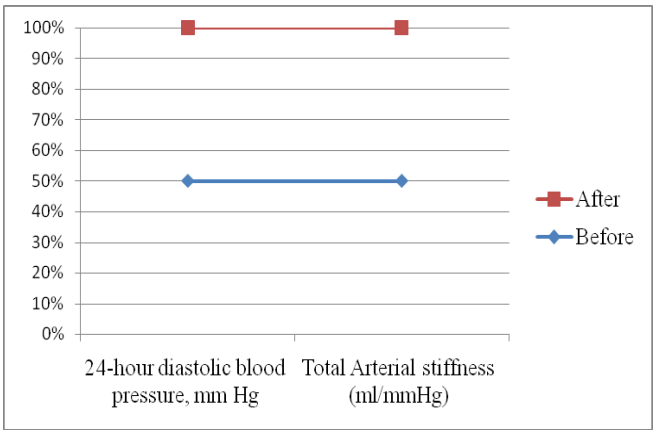

Figure.2 the isoflavones of the participants are compared after the classifier establishes that a few of the parameters' levels are similar.

Results

In perimenopausal to postmenopausal women who took isoflavone supplements, the levels of LH, FSH, and estradiol, as well as HDL cholesterol, glutathione peroxidase, lipid peroxidation, superoxide dismutase, and catalase, improved. There is a lowering in 24-hour systolic blood pressure, CU, total cholesterol, TSH, FT4, systemic arterial compliance, and mm Hg after using isoflavone supplements. When isoflavones are used by perimenopausal to postmenopausal women, there is no improvement in 24-hour diastolic blood pressure in mm Hg or total arterial stiffness. In order to determine whether isoflavones provide antioxidant activity that results in a significantly lower level of total cholesterol, as well as a significantly higher level of HDL-C, menopausal women's erythrocyte antioxidant enzyme activities, including catalase, SOD, glutathione peroxidase, and lipid peroxidation, are assessed in this study(fig 1&2).

Table 1 in the study, the effects of isoflavone supplementation are investigated in perimenopausal to postmenopausal women, assessing various parameters before and after the intervention. The results revealed notable changes in several key indicators. The average age at menopause decreased from 48.2 ± 6.5 to 47.6 ± 6 with a daily dose of 120 mg of Isoflavones tablets. Among other significant findings, the levels of LH, FSH, and estradiol exhibited noticeable variations. Similarly, HDL cholesterol levels showed a slight increase, while parameters such as TSH, FT4, total cholesterol, lipid peroxidation, catalase, superoxide dismutase, and glutathione peroxidase demonstrated distinct alterations. Moreover, assessments of systemic arterial compliance, 24-hour systolic and diastolic blood pressure, and total arterial stiffness in mm Hg/ml indicated meaningful changes after the use of isoflavone supplements.

Discussion

Arterial stiffness –menopause relationship may be explained by estrogen hypothesis, antioxidant hypothesis, sympathetic over activity, physical inactivity, obesity. Perimenopausal women get a 45% reduction in sleep disruptions while postmenopausal women experience a 30.1% reduction. Isoflavones have been linked to a number of direct and indirect vascular effects, including cardio protection. The consumption of Isoflavones by perimenopausal to post-menopausal women results in a significant decrease in RBC antioxidant parameters.

Hormonal Changes: The improvement in LH, FSH, and estradiol levels in response to isoflavone supplementation aligns with previous research. Isoflavones, as phytoestrogens, can exert estrogenic effects, helping to alleviate hormonal imbalances commonly associated with menopause. This is consistent with studies showing the estrogenic properties of isoflavones. [7]

Cardiovascular Benefits: The improvements in HDL cholesterol, glutathione peroxidase, lipid peroxidation, superoxide dismutase, and catalase suggest that isoflavone supplementation may have cardio protective effects. These findings are in line with studies demonstrating the antioxidant and anti-inflammatory properties of isoflavones, which can contribute to improved cardiovascular health. [8,9]

Blood Pressure Regulation: The reduction in 24-hour systolic blood pressure, CU, total cholesterol, TSH, FT4, and improvements in systemic arterial compliance are indicative of positive cardiovascular effects attributed to isoflavone supplementation. These findings are consistent with studies reporting potential blood pressure-lowering effects of isoflavones. [10]

Total Arterial Stiffness: The lack of improvement in 24- hour diastolic blood pressure and total arterial stiffness in response to isoflavone supplementation is an interesting result. It's essential to note that the impact of isoflavones on arterial stiffness may vary, and further research is needed to elucidate these effects. [6,10]

Antioxidant Activity: The assessment of erythrocyte antioxidant enzyme activities, including catalase, SOD, glutathione peroxidase, and lipid peroxidation,

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is crucial for understanding the potential antioxidant mechanisms of isoflavones. These findings support the idea that isoflavones possess antioxidant properties that contribute to improved lipid profiles, as indicated by the lower total cholesterol and higher HDL-C levels. [8,9]

In summary, the results of this study suggest that isoflavone supplementation in perimenopausal to postmenopausal women can have beneficial effects on hormonal balance, cardiovascular parameters, and antioxidant enzyme activities. These findings are consistent with the existing literature on the potential health benefits of isoflavones in menopausal women. However, the lack of improvement in total arterial stiffness warrants further investigation. Overall, these results underscore the potential role of isoflavones in promoting women's health during the menopausal transition.

The results of this study suggest that isoflavone supplementation can have a beneficial impact on a range of parameters in perimenopausal to postmenopausal women. The improvements in hormonal levels, cardiovascular parameters, antioxidant enzyme activities, and lipid profiles indicate the potential of isoflavones in enhancing the health and well-being of women during the challenging menopausal transition.

These findings align with previous research that has explored the benefits of isoflavones in addressing menopausal symptoms, preserving bone health, and managing metabolic issues. Isoflavones, through their estrogenic properties and other mechanisms, offer a multifaceted approach to improving the overall health and quality of life of women during and after the menopausal transition.

However, it's important to note that further research is needed to comprehensively understand the mechanisms underlying these effects and to optimize the use of isoflavones in clinical practice. Additionally, individual.

CONCLUSION

Care with soy isoflavones lowers hot flashes while increasing E2 and FSH levels in perimenopausal to perimenopausal women. Due to the lack of any visible side effects in the studies, equal dosing seems to be safe to use for hot flashes. If postmenopausal women who manufacture equal in the gut take single dose of equal daily as a supplement, they may experience fewer and less severe hot flashes. Menopause affects arterial stiffness and blood pressure differently, more so in the centre than the periphery. According to a urine exam, menopause is already over. Future studies can be organized with a variety of isoflavones dosages, an active comparator group, and precise pharmacokinetic measurements.

Additionally, isoflavones improve glycaemic homeostasis and prevent the loss of bone mass density in the lumbar spine. Lower levels of total cholesterol, LDL, and TC in the blood. Lower the risk of breast cancer recurrence, colorectal cancer, ovarian cancer, endometrial cancer, and bladder cancer. Isoflavones support wellbeing and have a high safety profile.

Overall, the antioxidant effect seems to play an important role in the beneficial effects of soy and its bioactive substances on human health. More in-depth studies are needed to solve inconsistencies in the literature. There is a need for clinical trials that simultaneously evaluate the antioxidant effect of soy on the main groups of markers available (i.e., nucleic acids, proteins, fats, total antioxidant capacity, and endogenous enzymes). Larger, longer term dose–response studies would be very helpful for understanding the exact effects of equal in different populations.

Remarks and Outlooks for the Future

It is challenging to identify the true effects of soy against oxidation due to a number of variables involved. The type of food consumed and the population reference could have a major impact on the identification of a physiological effect.

Author contribution

Dr. Ruchi Kant contributed to the Select article.

Disclosure statement

No potential conflict of interest is reported by the authors

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