

Effect of Soy Bean Consumption on Quality of Life of Middle Aged Women

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Abstract
Menopause is the common and regular stage in every women life span. Menopause though a universal phenomenon has a varied presentation due to influence of different biological, environment and cultural factors like beliefs and attitudes. Many researches are done to know the hormonal changes during menopause, one of the phytochemical isoflavone is very essential to regularize the life span. In this present study, soy isoflavones are used to reduce the hyperlipidemia, blood pressure, menopausal symptoms and to know the isoflavone effect on body mass index. Finally, study shows significant effect on lipid profile, blood pressure, menopausal symptoms, body **mass index.**
Keywords: BMI, Menopause symptoms, LDL, HDL, Triglycerides, Blood Pressure, Soy Isoflavones

Introduction

Many people in their late thirties and in their forties notice a decline in endurance, during this stage of the human life cycle, adult begin to experience the first outward signs of aging. In the middle aged years, women undergo a specific changes that has a major effect on their late forties or early fifties. The ovaries slowly cease to produce estrogen and progesterone, which results in the end of menstruation. Preliminary studies suggest that the menopause transition is associated with deleterious changes in body composition and body fat distribution. Work from laboratory showed a greater increases in fat mass and the waist to hip ratio and a greater loss of fat free mass in middle aged women who became post menopausal compared to women who remained premenopausal during a 6 years follow up. Menopause related changes in body composition may be partially explained by changes in bone mineral density. The hormonal changes in during menopause, women suffer from deleterious effects of lowered estrogen levels including reduction of bone mass, menopausal symptoms, and hypercholesterolemia, and some other physiological changes, wear and tear injuries, changes in digestive system, weight gain. Research is beginning on the health and well being of women around the time of the menopause.

Phytoestrogens can potentially alleviate hypo estrogen- related deleterious effects. Isoflavones make up the most common from of phytoestrogens, and the major dietary sources of isoflavones is soy. Soy isoflavones found in soya beans, soya tofu, soy milk, soya flour and other soya based products are associated with a wide range of positive health benefits. Soy's two prominent isoflavones are genistein, daidzein. Once in the digestive tract, isoflavones are converted to the phytoestrogens composition by bacteria. While weaker than the body's oestrogen, these phytoestrogens may help to maintain health at menopause. Soy beneficial effects through diet were originally high lighted by studies showing substantial differences between high intake versus low intake of dietary soy. studies show that soy protein may help support healthy high density lipoprotein cholesterol, having a positive influence on heart health. New research demonstrated that soy isoflavones also act as antioxidants- helping to inhibit the production of free – radicals, which are associated with aging. Soy isoflavones, an important class of phytoestrogens, have been shown to decrease in vivo oxidation, stimulates nitric oxide production, improves systemic arterial compliance and favorably affect salt and water balance, all of which suggests a protective role with respect to the development of hypertension. There has been a lack of epidemiological studies on the relationship among dietary intake of soy isoflavones, menopausal symptoms, cardiovascular risk, and osteoporosis. Hence the present study aims to investigation to find the effect of soy nuts consumption(boiled soybeans) on middle aged women health that is inclusion of boiled soybeans in their daily regular diet to over come the menopause symptoms, dyslipidemia and effect of nutritional status too.

Objectives

1. To assess the nutritional status i.e height, weight, BMI of middle age women of age group 45-50year
2. To assess the effect of boiled soy beans consumption on menopausal symptoms.
3. To assess the effect of boiled soy beans consumption on blood pressure.
4. To assess the effect of boiled soy beans consumption on dyslipidemia condition.

Materials and Methods

In the present study, 75 subjects of age group 45-50years were selected. Interested individuals were given a full explanation about the study and schedule foe screening. Inclusion criteria for the study were women with irregular menstrual cycles(amenorrhea) or absence of menses for at least of 12 months and with menopausal

symptoms, dyslipidemia condition. **Exclusion criteria** for the subjects from the study were, if they are pregnant, had a history of gastro intestinal or hematologic disorder, breast / uterine cancer, uncontrolled or abnormal thyroid, cardiovascular accident related contractions. None of the subjects were taking any medications to significantly affect body fat metabolism and treatment with oral hypoglycemic agents, insulin, hormone replacement therapy, statins for lipid lowering or dieting were exclude from the study.

Selection of sample

Sample for the present study were selected with age group of 45-50years of an community by using house hold survey. Questionnaire is used to know the basic information and subjects were requited.

The methodology consists of administration of a pre-tested, self-designed, semi structured, oral interview based questionnaire to the subjects to collect information like General information, nutritional status – Height, weight, BMI, Menopause symptoms, Dietary information, clinical information – Blood Pressure, lipid profile.

1. For the assessment of nutritional status by using Anthropometric Measuring Techniques. The body weight(to the nearest 0.1kg) and body height(to the nearest 0.1cm) of the each subject were measured, Body Mass Index is measured by using the Qutelet index of formula weight in kilograms is divided by height in meter square were calculated accordingly.
2. For studying of menopausal symptoms, an interview based, pretested, validated, semi structured and printed questionnaire was used. The questionnaires was designed on lines of the questionnaires used across the world for studying menopausal symptoms with the reference of Menopause Specific Quality Of Life Questionnaire, Menopause Rating Scale and other. The menopausal symptoms assessed in the were self reported symptoms by the study subjects.
3. For assessing the cardiovascular risk factors Blood Pressure, Lipid Profile was analyzed

a. For dyslipidemia condition, After 10hrs fasting, venous blood was collected from each subject to estimate the serum concentration of the total cholesterol, high density lipoprotein, low density lipoprotein cholesterol, triglycerides were measured for evaluation of atherosclerotic risk.

b. Blood pressure: at each examination, sitting blood pressure(mm hg) was measured at the left arm by standard mercury sphygmomanometer after at least 5min of rest.

Several food products were formulated by using soybean and subjected to sensory evaluation prior to administration. Sensory evaluation for performed and the most acceptable preparation were used for the present study. Ingredients and Nutritive value are given below

Formulation of Soybean recipe

Ingredients	Amounts
Soybean	50gm
Whole green gram	25gm
Groundnuts	20gm
Sliced carrots	25gm
Roasted cumin seeds	2gm
Citric acid(lemon juice)	5ml

Nutrient content in soybean recipe

Nutrients	Quantity
Energy	402.07k.cal
CHO	28.23gm
Protein	30.98gm
Fat	18.31gm
Fiber	3.71gm
Iron	6.92gm
Calcium	199.1gm

The acceptable soybeans preparation was administrated to the selected samples. All the subjects were asked to follow the dietary soya preparation every day without missing. After completion of study period estimation of Blood pressure, lipid profile, assessment of menopausal symptoms, determination of body weight, BMI was done.

Results

Menopause refers to last menstrual period. Menopause is defined the time of cessation of ovarian function

resulting in permanent amenorrhea. It occurs gradually in women and indicates the transition from the reproductive to the post productive era of a women's life (Daniel et.al.,1997). According to the world health organization, it takes 12 months of amenorrhea to confirm that menopause has set it.

Phytoestrogens are really important in helping combat the effects of the peri menopause and the menopause. Put simply, these plant foods help to balance hormones. They supply with an oestrogenic activity(where needed), which will help with symptoms of the menopause changes, but without risking a serious illness such as cancer.

Scientifically it is proved that estrogen can positively impact on bone density blood pressure, cholesterol level and emotional states.

Hence the present study was under taken to see the effect of soybean consumption on middle aged women of age group 45-50years. For this study totally 75 subjects were requited for the final analysis.

Socio demographic characteristics of participants (n=75)

Characteristics	Number	Percentage
Marital status		
Married	52	69.3
Widow	19	25.3
Divorcee	3	4
Unmarried	1	1.3
Educational qualification		
Illiterates	20	26.6
Primary	23	30.6
Secondary	8	10.6
Graduates	12	16
Post graduates	12	16
Occupation		
House wives	49	65.3
Employee	26	34.66

From the above table socio demographic characteristic of participants (n=75) we selected the subjects of age group 45-50years. The mean age group is 47.15years. this total subjects were characterized into different catogerious as early women marital status was analyzed as married women with her partner n=52 with 69.3% and widows 19 subjects with 25.3% and 1 unmarried, from the marital status statistics it is clear that married women living with partner was highly participated in the study. The sample is also divided by their educational level as 20 subjects (26.6%) are illiterates, 23(30.6%) are>10^{th} standard, 8(10.6%) are secondary level, 12(16%) are graduates, 12(16%) are post graduates. All the participants are categories based on the occupation too as housewives 49(65.35%) and employees 26(34.66%), all categories of employees are undertaken at one base.

Nutritional assessments:

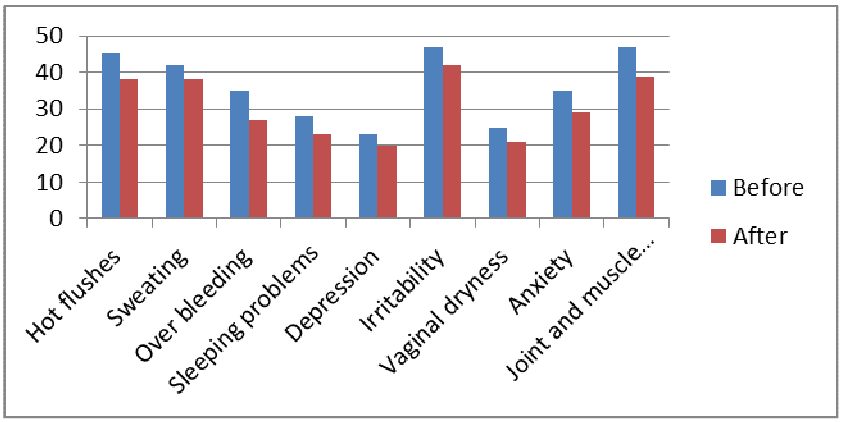
Effect of soy nuts consumption on body weight and BMI

Parameters	Before	After	Mean change %	Pvalue
Body weight	76.12±2.24	73.12±2.24	2.89	0.000
BMI (kg/m^2)	28.46±0.58	27.48±0.58	3.05	0.000

Mean reduction of 2.89% of body weight was noticed in soy nuts consuming participants. A significant difference ($p<0.01$) in the baseline and final values of body weight and BMI of the subjects receiving soy nuts. Mean reducation of 3.05% of the BMI was observed in the study group.

Distribution of menopausal symptoms among participants before and after soybean consumption (n=75)

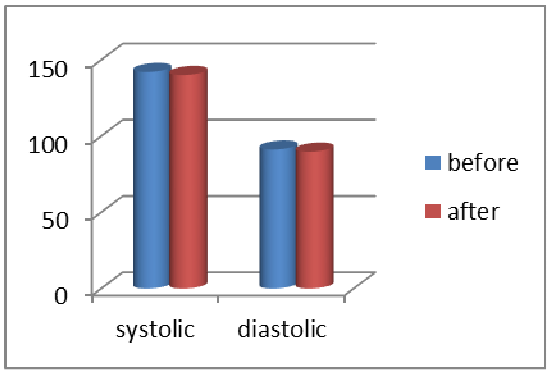
Parameter	Before	After	Mean change%
Hot flushes	45	38	6.8
Sweating	42	38	4
Over bleeding	35	27	8
Sleeping problems	28	23	5
Depression	23	20	3
Irritability	47	42	5
Vaginal dryness	25	21	4
Anxiety	35	29	6
Joint and muscle discomfort	47	39	8



All the participants were requested to fill the questionnaire on menopausal symptoms before and after the study period and compared the values and analyzed the mean changes between them. Mostly 80.2% subjects reported hot flushes, sweating and over bleeding among all the menopausal symptoms. Severe and very sever symptoms like hot flushes, sweating, over bleeding are most common symptoms reported by the women before soybean consumption. There is a significant reduction in those symptoms.

Effect of soy beans consumption on diastolic and systolic blood pressure

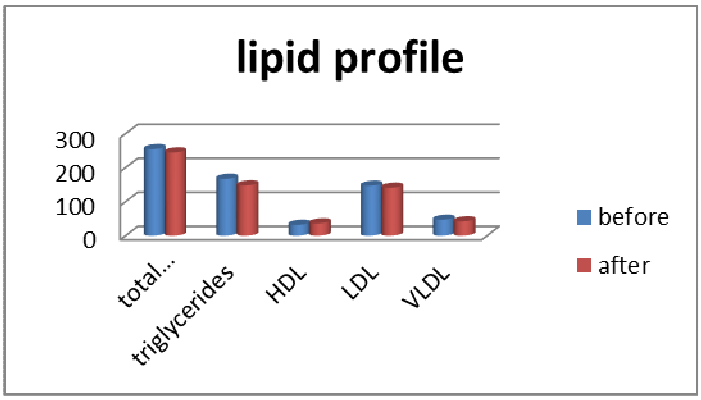
Parameters	Before	After	Mean change	Pvalue
Systolic B.P	142.08±3.56	140.08±3.35	1.35	0.016
Diastolic B.P	91.2±1.94	89.8±1.78	1.54	0.047



From the above table and picture it showing that there is a significant reduction but not in highest range. A mean drop of 1.35% ($p<0.05$) was recorded in systolic blood pressure and the mean of 1.54% ($p<0.05$) was recorded in diastolic blood pressure respectively.

Effect of soy bean consumption on lipid profile:

Parameters	Before	After	Mean change %	P value
Total cholesterol	254.2±4.52	244.56±5.28	3.79	0.008
Triglycerides	167.48±5.31	147.84±4.73	11.73	0.000
HDL	31.88±1.11	36.16±0.86	11.53	0.018
LDL	146.92±2.61	141.16±2.84	3.92	0.000
VLDL	46.88±2.16	42.02±2.19	10.37	0.000



From the above table, it shows that in total serum cholesterol level 3.79% drop and a highly significant reduction($p<0.01$) in triglycerides was noticed with a mean of lowering of 11.73% and a significant increases in the High Density Lipoprotein cholesterol levels of 11.53%, a mean reduction of 3.92% in the Low Density Lipoprotein levels, as well as the mean reduction of 10.37% in the very low density lipoprotein levels was observed in the boiled soy nuts consuming subjects in the study period

Discussion

Menopause though a universal phenomenon has a varied presentation due to influence of different biological, environment and cultural factors like beliefs and attitudes. For this study selected 45-50years of women having with the complication of menopausal symptoms, dyslipidemia condition and having of abnormality in the blood pressure (denova). Firstly the subjects are tested to conform whether they at menopause stage or not. Finally n=75 subjects are requited for the final analysis.

In the present study consumption of boiled soy beans for the period of 3 months. Weobserved the significant decreas in the body weight, BMI, Systolic, Diastolic Blood pressure. A study reveals that daily consumption of soya during 3 months of period may leads to a modest amount of weight loss up to 1 kg.

We observed a mild favorable effect but significant of soynuts consumption on the changes of weight, BMI. Consumption of soybeans shows the significant effect on menopausal symptoms. The presences of isoflavones in soybeans helps to reduces the menopausal symptoms mostly hot flushes, over bleeding, sweeting and other.

Supplementation of soy to the diet of menopause subjects brought significant fall in the blood pressure, which may be attributed to the presences and estrogen in soy beans. Administration of soya bean exhibited anti-hyperlipidemia effect conclusive of the highly significant reduction in total cholesterol, triglycerides, LDL,VLDL with elevated HDL levels. However, magnitude of the change in lipid profile was greater with soybean consumption.

Major constituents of soy protein which maybe responsible for their lipid lowering effects are claimed to the phytoestrogen, namely isoflavones and lignans. Soya protein isolate is a rich source of isoflavones, genistein and diaidzein which exert hypocholesterolemic effects in animals and humans. Thus, the reduction of blood cholesterol by either dietary soya protein in these studies may be due in part of linoleic acid and ALA present in whole beans.

Conclusion

In conclusion, the findings of this study showed that consuming of soybeans have the positive effects on nutritional status of the elderly women and there is significant changes in the menopausal symptoms, and as well the reduction of total cholesterol, triglycerides, LDL and improved in their HDL levels. This helps elderly women to lead a healthy life.

Reference

1. Charu katare, sonali saxena Ameliorationof selected cardiacrisk factors through supplementation of diet with flaxseeds and soya bean, ijnpnd, vol 3, issue 4:2013.
2. Chirstie DR, Grant J, Darnell BE, Chapman VR, Gastaldelli A, Sites CK, Metabolic effect of soy supplementation in post menopausal caucastion and African women; A randomized, placebo-controlled trial. Am J Obstet Gynecol 2010; 2013:153e1-9.
3. McVeigh BL, Dillingham BL, Lampe JW, Duncan AM. Effect of soy protein varying in isoflavone content on serum lipids in healthy young men. Am J Clin Nut:2006;83;244-51.
4. Hall WL, Vafeiadou L, Hallund J,Bugel S, Reimann M, Koebnick C,et.al. soy isoflavone enriched foods and markers of lipid and glucose metabolism in postmenopausal women: interactions with genotype and equol

production. Am J Clin Nut: 2006;83:592-600.
5. Martirosyan DM, Miroshnichenko LA, Kulakova SN, Pogojeva AV, Zoloedov VI.Amaranth oil applicationfor coronary heart diseases and hypertension, lipd health dis; 2007;6:1
6. Jassi HK, Jain A, Arorra S, Chitea R. effect of soy proteins Vs soy isoflavones on lipid profile in postmenopausal women. Indian J Clin Biochem 2010;25:201-7
7. Wang HJ, Murphy PA: isoflavone content in commercial soybean foods. J Agric Food Chem 1994;42:1666-73.
8. Liu XX, Li SH, Chen JZ, Sun K, Wang XJ, Wang XG, et al., Effect ofsoy isoflavones on blood pressure; A meta analysis of randamised controlled trials. Nutr Metab CardiovascDis 2012;22:463-70.