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Soy Reduces the Symptoms of Menopause

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ABSTRACT

Permanent cessation of menstruation is known as Menopause which occurs when there is a loss of ovarian cycle activity. It is derived from a Greek word 'mens' meaning month and 'pausis' meaning cessation. It is the change in normal ovulation cycle to cessation of menstrual cycle. In older life stage menopause eliminates the burden of childbearing. Whereas some women suffer from worse symptoms if in early-stage menopause occur. It is also associated with alteration in reproductive hormones. These symptoms vary in different stages of menopausal changes. This issue can be cured by Hormone Replacement Therapy (HRT) which is considered as more powerful curing management against menopausal abnormalities. This therapy may help to relieve many symptoms of menopause, but it shows many side effects also. Cognitive behavioral therapy, exercise and yoga has also been shown positive results in curing the symptoms. However, diet therapy can be used as an alternative to cure the diseases with no side effects in common. Use of soy isoflavones are being widely used. It is an excellent source of many essential nutrients including carbohydrates, proteins, and lipids. It also contains a functional compound that is α- tocopherol and isoflavones and some phytochemicals. Due to similar structure of 17-β-oestradiol and isoflavones, it has the ability to bind to estrogen receptors. Isoflavones supplementation has shown as an alternative therapy. It has shown positive effect on the improvement of visual memory and cognitive functions in postmenopausal women.

Introduction

Menopause

Permanent cessation of menstruation is known as Menopause which occurs when there is a loss of ovarian cycle activity. This word is derived from a Greek word 'mens' meaning month and 'pausis' meaning cessation. 3-4 years before menopause is a period called perimenopause which is followed by 1 year of amenorrhea. It is the change in normal ovulation cycle to cessation of menstrual cycle [1]. In older life stage menopause eliminates the burden of childbearing. Whereas some women suffer from worse symptoms if in early-stage menopause occur such as sleep disorder, mood swings, hot flashes, depression, anxiety, restlessness, bone problems, sexual dryness and vaginal atrophy and dryness thus affecting th life of women [2]. These symptoms exist with the decrease in reproductive hormones level. These hormonal changes directly affect the sleep patterns. Insomnia is among the major issue among the postmenopausal and menopausal women, due to low levels of both estrogen and melatonin in the body when women reaches at menopausal stage [3]. Decreased levels of these hormones and their interactions in menopausal and postmenopausal women contributes significantly to poor concentration, sleep problems, fatigue, and decreased quality of life [4]. This issue can be cured by Hormone Replacement Therapy (HRT) which is considered as more powerful curing management against menopausal abnormalities.

This therapy may help to relieve many symptoms of menopause, but it shows many side effects such as weight gain, fluid retention in the body, stroke, breast cancer, increased risk of heart and gall bladder associated diseases [5]. Cognitive behavioral therapy along with mindfulness is also helpful in decrease of hot flushes [6]. Exercise is also helpful in reducing the postmenopausal symptoms as due to exercise, there is decrease in the production of endorphin hormone with the decrease in estrogen production [7]. Regular exercise helps to improve mood, prevent from anxiety, and improves cognitive abilities [8]. With respect to exercise yoga is also helpful with menopausal symptoms [9]. However, soy isoflavones are used

as a substitute of hormone replacement therapy and being on a safer side [10]. It has been beneficial in reducing vaginal dryness and reducing hot flushes [11].

Soybean

Soybeans is used as a staple crop in East Asia since long years ago. They are excellent sources of many essential nutrients including carbohydrates, proteins, and lipids. It also contains a functional compound that is α- tocopherol and isoflavones and some phytochemicals [12]. In recent years soy products demand has been increased due to its bioflavonoids content and its potential health benefits [13]. Isoflavones such as daidzein, genistein and glycitein have similar structure to 17-β-estradiol. Due to its similar structure, it has the ability to bind with estrogen receptors [14] and classified as estrogen receptor modulators. Isoflavones supplementation has shown as secondary therapy besides HRT in treatment of menopausal transitions [15]. However, soy has not only shown beneficial effects in treatment of menopausal symptoms but has shown beneficial effect in cure of other chronic diseases. As soy foods are good source of poly unsaturated fats such as omega-3 and omega-6, so it helps in reducing LDL and cholesterol concentration in blood thus improving heart related complications and occurrence of cardiovascular diseases [16]. Genistein in soy alleviates menopausal hot flashes and reduces bone losses due to menopause. It also shows beneficial effect in lowering the incidence of breast and prostate cancers.

Genistein also helps to reduce bone losses due to menopause [15]. Soy protein are also useful for treatment of lung issues, diabetes mellitus, most type of cancers, asthma, bone loss, kidney diseases, constipation, diarrhea, improves memory and muscle soreness due to exercise and in treatment of premenstrual syndrome [17].

Mechanism of Action

Due to similar structure of isoflavones and 17-β-oestradiol, it has the ability to bind with estrogen receptors. Estrogen receptors have two forms that is estrogen receptor-α and estrogen receptor-β and these two forms are distributed among many different tissues in the body. Estrogen receptors vary in their binding property with all the isoflavones. Genistein an active compound present in soy have the higher affinity 20-30 times more for estrogen receptors-β as compared to estrogen receptor-α. Whereas the quality of all isoflavones is lower than oestradiol. According to the level of internal secretions of oestadiol, isoflavones can hinder oestrogenic and anti-oestrogenic activity and the type of estrogenic receptors activity through alternative signaling pathways. Isoflavones effects on both the endogenous oestrogen and anti-oestrogenic activities [16]. In post-menopausal state when soy isoflavones are administered, it increases the level of sex hormones binding globulin which are responsible for the attachment of gonadal hormones. Switching from hormone replacement therapy to soy isoflavones could be a safer side in menopause. Supplementation could be given to cope up the need of isoflavones. In post-menopausal women, fifty-four milligrams of isoflavones when administered for eight weeks has shown decrease in the level of female hormone that are luteinizing and follicular stimulating hormones. Improvement in health risk can be controlled by the using soy isoflavones. These have shown balancing effect on endothelial functions and female reproductive hormones [18].

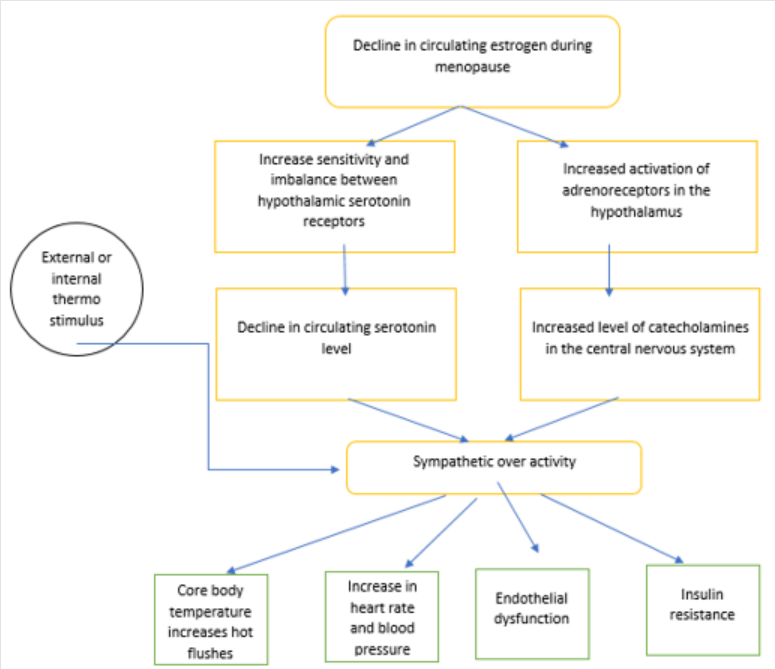

Figure 1

Decline in circulating estrogen level during menopause increases sensitivity and imbalance between hypothalamic serotonin receptors decreasing total serotonin circulatory level. It also increases the activation of adrenoreceptors in the hypothalamus thus causing increase in level of catecholamines in the central nervous system. These factors with external or internal thermo stimulus causes sympathetic overactivity; increasing hot flushes, increase in heart rate and insulin resistance.

Literature Review

Soy Isoflavon Improve Cognitive Function of Postmenopausal Women: Cheng PF et al., [19] conducted a study to find out health benefits of soy isoflavones. In this 1024 participants were divided into contort and treatment groups. Participants were advised to consume soy isoflavones supplementation for 6 weeks to 30 months. At the end of study findings revealed a synergetic supportive effect of isoflavones supplements on vision and cognition in participated postmenopausal women [19].

Evaluation on Hot Flashes Among Menopausal Women: Akbari Torkestani N et al, [20] proposed by the double-blind trial, there were two groups enrolled. One group used fenugreek seeds (6 gr daily) and another group used soy (25 mg daily). The results showed that, daily intake of 25 grams of soy or 6 gr of fenugreek seeds after two months is efficient in lowering the number and intensity of hot flashes [20]. A similar study was performed by Cianci A et al, [21] in 2015. Participants were divided into 4 groups, 500 mg calcium, 300 IU vitamin D3, 40 mg isoflavones and inulin 3g. The findings suggested that soy supplement with 40 mg isoflavones helps to reduce hot flashes [21].

Effect of Soy Protein on Fatigue and Menopausal Symptoms: Lecithin is considered as major soy protein and has potential to cure many chronic diseases. Hirose A et al., conducted a study in 2018 to determine therapeutic potential of soy lecithin. Ninty six (96) postmenopausal women with severe fatigue and menupausal symptoms were selected. These participants were divided into three groups, one group was provided 1200mg lacithin supplements, second 600mg supplement and third group was control group. They were prescribed to consume these supplements daily for 2-months. After 2month of study time, data analysis showed an effective improvement in group with 1200mg of lecithin supplement as compare to other groups. Fatigue rate was also improved with p-value less than 5% [22].

Isoflavone Aglycone Reduces Psychological Symptoms 0f Menopause: Hirose A and his colleagues proposed a study in which adult healthy women (aged 40-60) were selected. Similar to previous study participants divided into three groups, one placebo and two intervention groups. Participant of intervention group received 12.5 and 25mg of isoflavone aglycons' tablets for two months. Results of this study showed a significant reduction in meopausal symptoms such as depression, insomia and fatigue among intervention group with 25mg of isoflavone aglycon [22].

Soy Isoflavones Reduce Endometrial Thickness on Postmenopausal Women: Effect of soy isoflavones on endometrial thickness in postmenopausal women was evaluated by Alekel DL et al, [23]. Healthy women between the age of 46-65 years were randomly selected. They were provided 80 and 120mg tablets of isflavones and high dose tablet showed a greater improvement than low-dose(80mg) on endometrial thickness with p-value less than 0.05 [23].

Effect of Soymilk Usage on The Quality of Life in Postmenopausal Women: Nourozi M et al, [24] conducted the randomized clinical controlled trial. Two groups soy group and cow group were provided soy milk and cow milk, respectively. Soy group was further divided into two groups genistein and daidzein group. Participants were advised to consume 28.86 mg/dl genistein and 8.25 mg/dl daidzein with 500ml soy milk for 32 weeks on daily basis. Results showed that there was a significant relationship between the soymilk consumption and psychosocial improvement [24].

Soy Germ Extract Reduces Hot Flushes Among Postmenopausal Women: Imhof M et al, [25] in 2018 included 192 women. The assessment of hot flushes among control and intervention group showed a significant reduction in hot flashes among intervention group or group that consume 100mg of soy germ extract [25].

Effect of Soy Isoflavones on Somatic and Psychological Symptoms: Ahsan M et al, [10] was observed pilot study. In this study 29 and 21 perimenopausal and postmenopausal women respectively were advised to consume 100mg SIF for 3-months. After treatment time, somatic and psychological symptoms among participants were significantly reduced [10].

Impact of Soy Drink on Menopausal Symptoms: Tranche S et al, [26] conducted conducted a study to find out impact of soy drink on menopausal symptoms. Two groups received 15 g of soy protein with 50 mg of isoflavones and 500ml vive soy. Findings showed that there was a significant reduction in menopausal symptoms among both groups [26].

Soy Intake in Association with Menopausal Symptoms: Dorjgochoo T et al, [27] evaluated relation between the occurrence of MPS and soy products intake. Premenopausal breast cancer patients with hot flashes who were in the highest score of isoflavone intake at 24 weeks postdiagnosis compared with the lowest score. This association was stronger at 36 months postdiagnosis. Results showed there was no indication that soy consumption reduced MPS among patients with breast cancer [27].

Whole Soy and Isoflavone Daidzein Effect on Menopausal Symptoms: Liu ZM et al, [28] was conducted by randomized trial study. Three treatment groups were enrolled. Group one with 40g soy flour, group 2 with 40g low fat milk and third group was placebo. The participants were advised to consume these food products for

24 weeks. Findings revealed that there was no significant difference observed in these groups [28].

Effect of Soy-Derived Isoflavones: Chedraui P et al, [29] evaluated the effect of soy isoflavones. Fifty women with BMI greater than 25 were enrolled. They were prescribed to receive 100mg soy isoflavones supplementation for 3-months. At the end of study supplementation had great impact on hot flushes and reduced the percentage and intensity of these menopausal symptoms among postmenopausal women [29].

Soy Isoflavones' Effect on Menopausal Quality of Life Menopause: Amato P et al, [30] was designed by randomized controlled study. Aglycone hypocotyl soy isoflavone supplementation (80/120mg) received by 403 postmenopausal women. After intervention, SIF supplement has no beneficial on the improvement of life in participants [30].

Effect of soy isoflavones on BP, Sex Hormones and Postmenopausal Discomforts: Husain D et al, [5] was conducted experimental controlled study. In this study 61 middle age women were divided into two groups, control, and intervention. In intervention group participants were provided 30g soy biscuits as a supplementation with 54mg added isoflavones. Ther were advised to consume it for 2 months. After 2-months of study time period data analysis showed a significant reduction in pre- and post-intervention symptoms. These soy supplements also improved post intervention blood pressure of postmenopausal symptoms [5].

Comparison Between S-equol And Soy Isoflavones And Their Effect on Hot Flashes in Menopausal Women: Jenks BH et al, [31] was conducted a study in postmenopausal women, who complained increased rate of hot flashes. Participants (n = 102) were assigned to S-equol/day and soy isoflavones groups. 10 mg S-equol, showed similar effect to soy isoflavones both help to prevent hot flashes and muscles fatigue caused by menopause. But 20mg S-equol, showed greater impact on all these menopausal symptoms as compare to soy isoflavones [31].

Soy Germ Isoflavones Alleviate Menopausal Symptoms: Ye YB et al, [32] was randomly assigned post-menopausal women. All participants were divided into three groups including placebo group. In two intervention groups, participants were provided with 84 and 126mg of isoflavones extracted from soy germ. Findings exposed greater improvement in high dose group as compared to placebo and other intervention group [32].

Soy Isoflavones In the Prevention of Menopausal Bone Loss: A study was designed by Levis S et al, [33] Women (45 to 60years) were selected as a study participant. They were advised to consume 200 mg tablets of isoflavones derived from soy. Pre and post intervention bone mineral density analysis showed a great difference than placebo group. On other hand menopausal symptoms were also reduced in intervention group [33].

Soy Isoflavones In the Treatment of Climacteric Vasomotor Symptoms: Bolaños R et al, [34] was nineteen studies of placebo-controlled clinical trials enlisted. Result showed a standardized mean difference of 0.40 in favor of soy as well as 0.45, 0.51 and 0.20 for the B-concentrate, B-extract, and B-dietary supplement subgroups, respectively [34].

Table 1: Soy Reduce the Symptoms of Menopause.

Author Name	Year	Groups	Intervention	Duration	Outcomes
Cheng PF et al, [19]	2015	Controlled vs placebo	Soy isoflavon	30 months	Improved cognitive function and visual memory
Akbari Torkestani N et al, [20]	2015	Two groups of double-blind trial	Soy 25mg and fenugreek seed was 6 gr	2 months	Decreased the severity of hot flashes
Hirose A et al, [22]	2018	Controlled and placebo	Soy lecithin was 1200 mg or 600mg/day	8 weeks	1200 mg/day showed the synergetic effect on diastolic B.P and cardio-ankle vascular index among fatigue women.
Terauchi M et al, [35]	2016	Controlled vs placebo	Isoflavone aglycone tablet was 25mg or 12.5mg	8 weeks	Reduced depression and symptoms of insomnia
Alekel DL et al, [23]	2015	Randomized controlled or placebo	Two doses were (80 and 120 mg/day) of soy isoflavones	N/A	Positive effect of endometrial thickness was (p=0.43)
Nourozi M et al,[24]	2015	Clinical controlled trial was SG or CG groups	SG received soy milk 500ml was containing genistein and daidzein mg/dl)	32 weeks	Soy milk improved the vasomotor, psychological, and physical activity.
Imhof M et al, [25]	2018	Soy group vs placebo	Extract soy germ isoflavone glycosides was 100mg	N/A	Reduced the hot flashes among menopause women
Cianci A et al, [21]	2015	Treated or untreated	Dietary supplement containing was 3g insulin, calcium was 500mg, vitamin D3 was 300IU or soy isoflavon was 40mg per day	N/A	Soy isoflavon with insulin per day decreases the symptoms of hot flashes

Ahsan M et al, [10]	2017	Pilot study including was peri/ postmenopausal	Soy isoflavon was 100mg	12 weeks	Improved the somatic and physiological symptoms
Tranche S et al, [26]	2016	Study include Peri/ postmenopausal	Vivesoy 500ml per day containing 15g protein and 50mg isoflavon	N/A	Improved the quality life was 18.1 %, urogenital domain was 21.3% and reduced climatric symptoms was 20.4%
Dorjgochoo T et al, [27]	2011	Pre and post diagnose	Consumption of soy food	6 months of premenopausal or 36 months post diagnose	No significant improved MPS among breast cancer women
Liu ZM et al, [28]	2014	Three groups of randomized trial study	Soy flour was40 g, Powder of low-fat milk was 40 g+ diadzein 63 mg, 40 g of low-fat milk powder.	6 months	No significant effect
Chedraui P et al, [29]	2011	One group of fifty females	Soy isoflavon (Climasoyl) was 100mg/day	3 months	Improved the severity of hot flashes and also mood as well as vasomotor activities
Amato P et al, [30]	2013	Randomized controlled study	Aglycone hypocotyl soy isoflavone was 80 or 120mg/ day	N/A	No positive results showed after intervention
Husain D et al [5]	2015	Controlled vs placebo	Supplementation of 33g soy and 53mg isoflavon containing biscuits	8 weeks	After intervention FSH and LH hormones decreased and also reduced B.P
Jenks BH et al, [31]	2012	Four treatment groups	10,20, 40 mg S-equol/day or soy isoflavon	N/A	10mg decreases the hot flashes and relieving muscles and joints pain, S-equol 20mg showed greater alleviating to reduce the hot flashes
Ye YB et al [32]	2012	Three treatment groups	80 and 124 mg of soy germ isoflavon	N/A	Positive impact to reduce the menopause symptoms
Levis S et al, [33]	2011	Controlled vs placebo	200mg soy isoflavon	2 years	Changed in BMD, vaginal cytological or menopause symptoms but not showed positive mpact
Bolaños R et al, [34]	2010	Placebo controlled clinical trial	Bconcentrate, Bextract, and Bdietary	N/A	Soy improved climacteric symptoms of menopause

Conclusion

Cessation of menstrual cycle is known as menopause and it eliminates childbearing burden in women after a specific age. But women have to suffer from some worse symptoms such as lack of sleep, mood swings, bone pain, vaginal abnormalities, and psychological discomforts. These menopausal discomforts and symptoms also affect the working and life of women. Hormone replacement therapy (HRT) is used to treat these menopausal symptoms besides many complications, so soy foods has shown beneficial effect in improvement of these consequences. Isoflavones, active compound in soy have similar structure to 17-β-estradiol and due to this similarity, it has potential to bind to estrogen receptors thus reducing the symptoms of menopause.

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