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Effectiveness of lifestyle related interventions to improve quality of life among postmenopausal women in selected slums of Bhubaneswar: A community based quasi experimental study

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Abstract:

BACKGROUND: Postmenopausal women considered as risk population, due to estrogen deficiency, 80% of women reduce physical and mental well-being in their menopausal years. Menopausal symptoms are not always reasons for any life-intimidating situations, but it disturbs quality of life (QoL) of middle-aged women.

MATERIALS AND METHODS: This non-randomized control trial was conducted among slum women in the age group of 40 to 60 years who were in their postmenopausal period (within 5 years). Study group was intervened by lifestyle-related interventional module about concept of menopause, symptoms, health issues, dietary habit for reducing menopausal symptoms with a practical demonstration of yoga, exercises and pranayama, group and individual counseling to the participants. Independent *t*-test, paired *t*-test, Chi-squared test, and Fisher's exact test were analyzed by SPSS software version 28 licensed to the institute.

RESULTS: The mean age of the participants was 51.02 ± 2.94 years ranging from 47 to 58 years. As per anthropometric and blood pressure measurements data, significant differences were found in weight ($P < 0.02$), body mass index ($P < 0.001$), waist/Hip Ratio ($P < 0.001$), SBP ($P < 0.001$) and DBP ($P < 0.001$) between both the groups. Comparing the mean difference score of vasomotor, psychosocial, physical and sexual domains of the MENQOL questionnaire pre- and post-intervention found that, there was significant reduction of QoL score in study group.

CONCLUSION: The lifestyle related interventions as an alternative therapy are safe, free from side effects, cost-effective and government program may be implemented for the betterment of the menopausal women.

Keywords:

Experimental study, menopause, QoL

Introduction

Women's health is contemplated to be the priority of the society for comprehensive development in the field of science, economics, and politics. Aging or getting old is a normal physiological

process that may lead to structural and functional changes without any known deformity.^[1] Women are experiencing different non-communicable diseases like diabetes, hypertension, osteoporosis, cardiovascular diseases, breast and cervical cancer, etc., in the menopausal phases.

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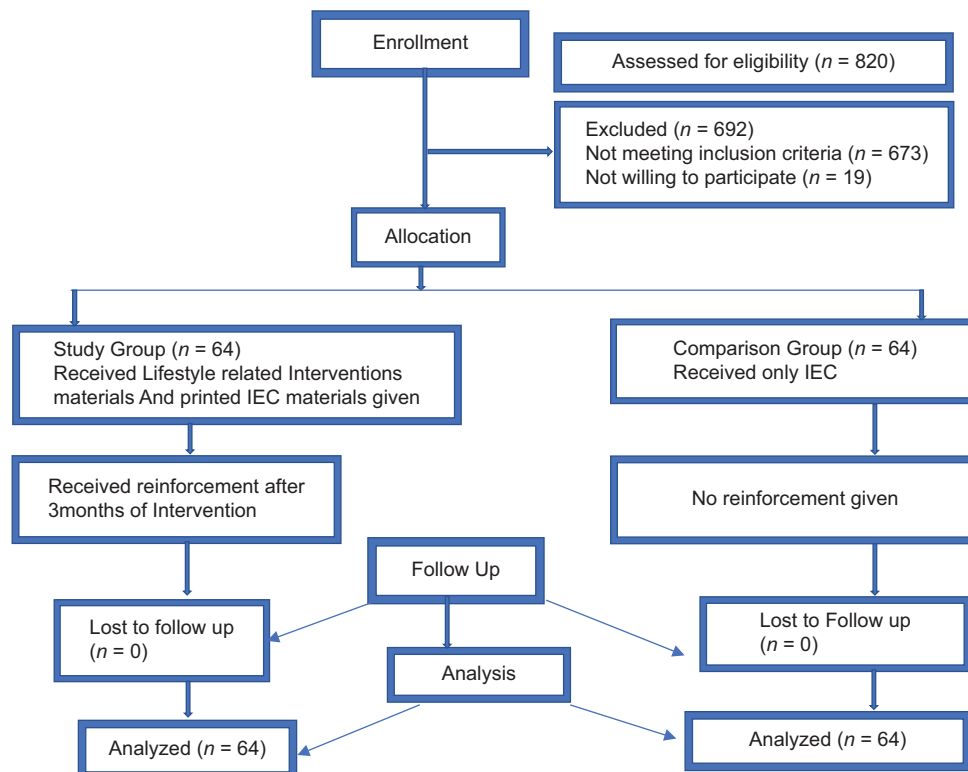


Figure 1: Flowchart showing the details of Participation and Follow Up

Apart from these diseases, women are also experiencing various menopausal symptoms such as hot flushes, night sweats, joint and muscular discomfort, anxiety, memory loss, urogenital symptoms, etc., These menopausal symptoms and menopause-related morbidities are affecting women's quality of life (QoL) in their climacteric phases.^[2]

According to World Health Organization (WHO), QoL is defined as, "an individual's perception of their position in life in the context of culture and values system in which they live, in reference to their goals, standards, and concerns in life."^[3] The most common menopausal symptoms are hot flushes, sweating, joint and muscle pain, insomnia and depression are found among women as physical and psychological symptoms.^[4] These symptoms sometimes become severe that deeply affect their individual and social activities and QoL.

In India especially in slums, menopausal health needs more attention because the mean menopausal age for slum women is 44 years which is 4 years less than the average age of menopause of Indian women.^[5] Postmenopausal women are considered as risk population, due to estrogen deficiency, 80% of women reduce physical and mental well-being in their menopausal years.^[6] Menopausal symptoms are not always the reasons for any life-intimidating situations, but it disturbs QoL of middle-aged women.

Public health practitioners are giving lifestyle-related interventions that may enhance QoL by reducing the menopausal symptoms as well bring down the intensity of those symptoms.^[7] The necessity of lifestyle-related interventions like diet, exercise, yoga, pranayama, etc., may reduce their menopausal symptoms and enhance the QoL. These lifestyle interventions as complementary medicine are suitable and safest substitutes because these have no side effects on the health of menopausal women.^[8] With this background, a community-based quasi-experimental study was designed for the postmenopausal women of urban slums to evaluate the effectiveness of lifestyle-related interventions to improve QoL among them in selected slums of Bhubaneswar city of Odisha.

Materials and Methods

Study design and setting

The present study a Non-randomized (quasi-experimental) study and carried over as a part of a Ph.D. thesis carried over two years and half months from January 2019 to June 2021. Two slums of Bhubaneswar city, India were selected purposively as study settings.

Study participants and sampling

In this study, two slums of Bhubaneswar city were selected purposively and allocated as intervention (Salia sahi) and control group (Baramunda slum). Women

Table 1: Intervention details

Study area	Total sample size	Study groups	No. of subjects	No. of days/Week		Sessions/Day	Content of the sessions	
Salia Sahi Group - 1	64	Sub-group A	16	1 st Week	Day 1	Session 1	Session 1	
					Day 2		Awareness on	
				2 nd Week	Day 3	Session 2	Menopause- Concept, meaning, definition,	
					Day 4		menopausal symptoms,	
				3 rd Week	Day 5	Session 3	health issues in the	
					Day 6		menopausal transition, etc.	
				4 th Week	Day 7	Session 4		
					Day 8			
		Sub-group B	16		1 st Week	Day 1	Session 1	Session 2
						Day 2		Treatment of Menopausal symptoms- Risks and Benefits Hormone
					2 nd Week	Day 3	Session 2	Replacement Therapy and
						Day 4		Non-medicinal treatment for the menopausal women,
					3 rd Week	Day 5	Session 3	etc.,
						Day 6		
					4 th Week	Day 7	Session 4	
						Day 8		
Sub- group C	16		1 st Week	Day 1	Session 1	Session 3		
				Day 2		Nutritional		
			2 nd Week	Day 3	Session 2	Education- importance of phytoestrogen containing		
				Day 4		food items, Group and		
			3 rd Week	Day 5	Session 3	Individual Counselling on		
				Day 6		different menopausal issues and etc.		
			4 th Week	Day 7	Session 4			
				Day 8				
Sub-group D	16		1 st Week	Day 1	Session 1	Session 4		
				Day 2		Physical Activity		
			2 nd Week	Day 3	Session 2	Training- Yoga, Pranayama like Surya namaskar,		
				Day 4		Kapala Bharati, Nadi Sudhi, etc., Encourage to do other		
			3 rd Week	Day 5	Session 3	exercises regularly.		
				Day 6				
			4 th Week	Day 7	Session 4			
				Day 8				
Baramunda Slum Group - 2	64					No Intervention		

in the age group of 40 to 60 years who were in their postmenopausal period (within 5 years) residing in slums as study population after taking their formal written consent. Based on previous similar studies by Shobeiri F and Nazari M *et al.*,^[9,10] taking into account the mean difference of two independent means, considering alpha as 0.05, confidence level interval 95%, moderate effect size 0.75 and power 80% with 1:1 allocation ratio; the sample size was calculated 58 by using G* Power. Considering design effect of 2 and anticipating a 10% loss to follow up final sample size was 128, consisting 64 postmenopausal women participants in each arm.

Postmenopausal women, who were having permanent cessation of menstruation naturally within 5 years were included in this study. Subjects, who were sick or terminally ill, receiving hormonal therapies, and who were not given their consent to participate were excluded from the study [Figure 1].

Data collection and tool

Data regarding participants age, religion, caste, residence, family type, number of family members, education, participants' and head of the family occupation, total monthly family income, participant's reproductive and menstrual history, and history of illness of the participants were collected at baseline of this study.

Diet History: Detailed self-reported dietary history was taken from participants with a set of questions that were mentioned in this section. Diet history included dietary pattern, eating meals per day, weekly fruits and vegetables consumption, daily milk products intake, soy food products intake per week, weekly consumption of non-veg items, etc.

Physical Activity: Physical activity of the study participants was assessed by the International "Physical Activity Questionnaire" (IPAQ).^[11] This IPAQ short form

was an instrument designed initially for population surveillance of physical activities of adults.

Sleep: In this section, participant's total sleeping hours in a day were recorded to measure the mean sleeping hours of the postmenopausal women.

Anthropometric and Blood Pressure Measurement: Anthropometric measurements including height, weight, BMI, waist circumference, hip circumference of each student were done. The blood pressure of the postmenopausal women has been recorded in this section.

Menopause-Specific Quality of Life (MENQOL) Questionnaire: The MENQOL questionnaire was developed by Hilditch JR *et al.* in 1996 to assess health-related QoL in menopausal transition and it addresses the degree to which menopausal symptoms had bothered women.^[12]

This validated and self-administered tool was commonly used to segregate between women according to their QoL and evaluates timely variations in quality of life. A total of 29 questions are there in the MENQOL questionnaire in the Likert-scale design. The domains are "Vasomotor (items 1–3), Psychosocial (items 4–10), Physical (items 11–26), and Sexual (items 27–29)". Scoring was done as per the occurrence of symptoms in the last month. If the woman has not experienced any symptom, she put a tick mark on "no" and if she has any symptoms, must indicate how bothered those symptoms and scored as 0–6. For evaluation, the item scores were altered to the score ranging from 1 to 8. This tool has been translated, validated and used in many countries for the comparison of menopausal experience across the globe.^[12,13]

Baseline Data Collection: Participants were interviewed with a validated questionnaire which was primarily used to gather data on the postmenopausal quality of life of the participants at baseline.

Intervention

After baseline data collection, printed educational materials in the regional Odia language on menopause were given to both the study and control group participants. Study group was intervened by an educational and lifestyle-related interventional module about the concept of menopause, symptoms, health issues, dietary habit for reducing menopausal symptoms with practical demonstration of yoga, exercises and pranayam, group and individual counseling given by telephonic and face-to-face interaction with the affected postmenopausal participants.

In the study group, all the 64 participants were divided into four subgroups and each subgroup consisting 16 participants in the group. Each group was intervened for weekly two days for 1 month and every session was for 1 hour. So, one subgroup was getting lifestyle-related interventions within eight interactive sessions. During all the sessions Covid-19 protocol was well maintained by the researcher and the participants as per the Government guidelines.

After three months gap the participants were reinforced with some interactive sessions. All the participants were encouraged to motivate their family and friends to do yoga and exercises at home. During the reinforcement sessions, the participants were discussed about their health issues related to menopause with the healthcare personnel [Table 1].

Post-Intervention Data Collection: After 6 months completion of intervention, data were collected to evaluate variations in the total score and the domain-wise score in all four domains of MENQOL questionnaire. All the measurements of the postmenopausal women were taken again in both study and control groups.

Data Analysis: IBM SPSS Statistics software version 28, licensed to the Institute was used for data analysis. Independent *t*-test and paired *t*-test were performed to compare means of continuous variables. Chi-squared test and Fisher Exact test were used to test the association between categorical variables. *P* value less than 0.05 is considered as statistically significant.

Ethical consideration

Ethical approval was taken from the Institutional Ethical Committee of IMS and SUM Hospital, Bhubaneswar, with ethical code: Ref. No/DMR/IMS-SH/SOA/180313. Confidentiality was ensured throughout the study. Participants were aware of their right to withdraw consent at any point of time without being questioned and that their usual care shall not be influenced otherwise.

The trial was registered with the Clinical Trial Registry of India (www.ctri.nic.in). The CTRI registration has been done in the website of the Indian Council of Medical Research (www.ctri.nic.in) and the registration number for this trial is CTRI/2021/01/030560.

Results

In the current study, 128 postmenopausal women were included, 64 from Salia Sahi (Intervention group) and 64 from Baramunda slum (Control group) of Bhubaneswar city, and analyzed accordingly.

The mean age of the participants was 51.02 ± 2.94 years ranging from 47 to 58 years. Majority 82.8% were Hindus and 17.2% of participants belonged to Christian and Muslim religions. Most of the participants were general in caste (75%) followed by SC (20.3%) and ST (4.7%). Total of 69.5% of participants lived in a nuclear family and the rest (30.5%) were in a joint family. Maximum of 79.7% postmenopausal women were married and the average number of family members was found to be 4. It was observed that 85.2% of participants had got primary education and only 14.8% were educated up to upper primary and above. Nearly two third of the study subjects (65.6%) were housewives and 34.4% were working outside. No difference was found between intervention and control groups in socio-demographic characteristics; therefore the groups were comparable. In this study, 3.9% of the respondent were in lower middle class, 86.7% belonged to upper lower class and 9.4% were in lower class. The average of total monthly family income of the participants was 10855.47/-.

Among 128 women, 58.7% had menarche between 11 and 13 years of age and the mean age of menarche was 13.27 ± 1.21 years. The age of first child delivery ranged between 16-29 years and most of the participants (67.2%) were having 2-3 children. The mean age of natural menopause was 48.66 ± 2.39 years and 78.1% of women reached menopause in between 45-50 years of age. Nearly 43.8% of participants had some complications during their periods like abdomen cramps (31.3%), menorrhagia (10.2%), and vomiting (2.3%). There was no significant difference between both the groups in reproductive and menstrual history of the

participants [Table 2]. In this study maximum number of postmenopausal women were hypertensive both in intervention and control groups followed by diabetes. At baseline, 14.06%, and at follow-up, 14.84% of participants were having hypertension in study group. In control group, 10.94% of women at baseline and 13.28% of women at follow-up were the known cases of hypertension. Only two cases of CHD and stroke were diagnosed at follow-up in control group.

After comparing the eating habits of the participants during follow up-between the intervention and control group, no significant difference was found between both the groups except consuming soy food products. There was a highly significant difference found between study and control groups ($P < 0.001$) for taking soy food products in a week. In baseline, 93.8% and 81.3% were consuming soy food products rarely in their meals both in study and control groups respectively. But in follow-up, we found that maximum of 53.1% of participants were adding soy food products to their meals once/twice a week [Figure 2].

In this study, the mean sleeping hour in the study group was 6.41 ± 1.04 hours and in the control group 5.75 ± 1.26 hours at follow-up. We observed a significant difference in sleeping hours of the study group participants after intervention ($P < 0.002$). In categorical analysis of sleeping hours, results also found that a significant difference in sleeping hours between study and control groups at follow-up ($P < 0.001$) [Table 3]. Physical activity of the postmenopausal women assessed a highly significant difference ($P < 0.001$) between intervention and control groups at follow-up [Table 3].

Table 2: Reproductive and menstrual history

Variables		Overall (n=128)	Intervention (n=64) Number (%) / Mean \pm SD	Control (n=64)	P
Age of Menarche		13.27 \pm 1.21	13.30 \pm 1.15	13.25 \pm 1.28	0.828
Age of Marriage		18.24 \pm 2.22	17.97 \pm 1.95	18.52 \pm 2.45	0.165
Age at 1 st Pregnancy		19.54 \pm 2.77	19.55 \pm 2.69	19.53 \pm 2.87	0.975
Age at 1 st Child delivery		20.44 \pm 2.82	20.09 \pm 2.71	20.78 \pm 2.91	0.169
No. of Children		2.60 \pm 1.21	2.45 \pm 1.21	2.75 \pm 1.21	0.167
Age at Menopause		48.66 \pm 2.39	48.48 \pm 2.17	48.84 \pm 2.59	0.397
Years of Attaining Menopause		2.41 \pm 1.21	2.19 \pm 1.15	2.62 \pm 1.24	0.041
Miscarriage/Clinical Abortion	Yes	62 (48.4)	27 (42.2)	35 (54.7)	0.216
	No	66 (51.6)	37 (57.8)	29 (45.3)	
Regular periods	Yes	116 (90.6)	55 (85.9)	61 (95.3)	0.127
	No	12 (9.4)	09 (14.1)	03 (4.7)	
Problem during periods	Yes	56 (43.8)	25 (39.1)	31 (54.7)	0.373
	No	72 (56.3)	39 (60.9)	29 (45.3)	
Complication during Pregnancy	Yes	28 (21.9)	10 (15.6)	18 (28.1)	0.134
	No	100 (78.1)	54 (84.4)	46 (71.9)	
Method of 1 st child delivery	Normal	119 (93)	60 (93.8)	59 (92.2)	0.470
	Cesarian	8 (6.3)	03 (4.7)	05 (7.8)	
Complication during delivery	Yes	27 (21.1)	15 (23.4)	12 (18.8)	0.665
	No	101 (78.9)	49 (76.6)	52 (81.3)	

*Independent t test/Chi-squared test/Fisher's exact test

As per anthropometric and blood pressure measurements data, significant differences were found in weight ($P < 0.02$), Body Mass Index ($P < 0.001$), Waist/Hip Ratio ($P < 0.001$), SBP ($P < 0.001$), and DBP ($P < 0.001$)

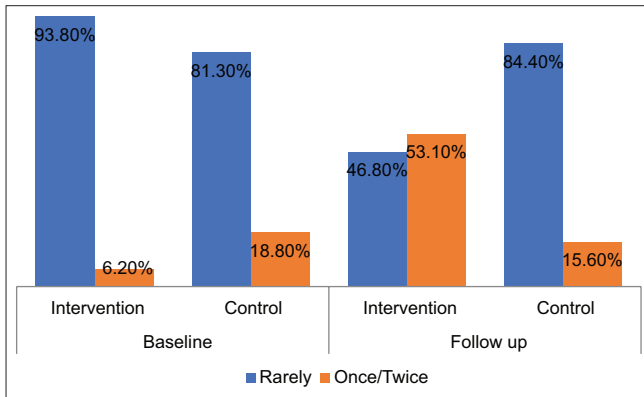


Figure 2: Soy food consumption of the participants

between the intervention and control group at follow up [Table 4].

The mean score of all four domains of MENQOL questionnaire were decreased in the intervention group. There was very high significant difference ($P < 0.001$) found in the intervention group at follow up in all four domains of MENQOL questionnaire [Table 5].

Comparing the mean difference score of vasomotor, psychosocial, physical, and sexual domains of the MENQOL questionnaire pre- and post-intervention found that, there was a significant reduction of QoL score, i.e. improvement in QoL was found in study group. But there was no difference found in QoL score of the control group [Table 5 and Figures 3-6].

In the present study, there was highly significant difference was noticed ($P < 0.001$) in the total score of

Table 3: Sleeping hours (per day) and physical activity of the participants

Variables	Baseline number (Percentage)			Follow up number (Percentage)			
	Intervention (n=64)	Control (n=64)	P	Intervention (n=64)	Control (n=64)	P	
Sleeping Hours	<7 Hours	41 (64.1)	35 (54.7)	0.368	24 (37.5)	43 (67.2)	0.001
	7-9 Hours	23 (35.9)	29 (45.3)		40 (62.5)	21 (32.8)	
Mean Sleeping Hours	6.17±0.95	6.22±1.16	0.803	6.41±1.04	5.75±1.26	0.002	
Physical Activity	Low	39 (60.9)	38 (59.4)		14 (21.9)	37 (57.8)	<0.001
	Moderate	10 (15.6)	14 (21.9)		23 (35.9)	17 (26.6)	
	Vigorous	15 (23.4)	12 (18.8)		27 (42.2)	10 (15.6)	

*Independent t test/Chi-squared test

Table 4: Anthropometric and blood pressure measurements

Parameters	Baseline (Mean±SD)			Follow up (Mean±SD)		
	Intervention (n=64)	Control (n=64)	P	Intervention (n=64)	Control (n=64)	P
Weight (kg)	57.14±8.52	57.84±9.88	0.667	55.02±9.21	58.64±9.27	0.028
BMI (kg/m ²)	24.66±4.22	25.47±4.08	0.270	23.52±3.29	25.77±3.76	<0.001
Waist/Hip Ratio	0.90±0.06	0.90±0.04	0.626	0.87±0.05	0.91±0.04	<0.001
SBP	135.73±16.17	139.02±15.01	0.236	129.38±10.08	137.75±14.62	<0.001
DBP	86.63±10.63	88.05±9.03	0.416	82.94±6.08	86.78±7.42	0.002

*Independent t test

Table 5: Menopause specific quality of life (MENQOL) scores

QoL Domains	Intervention Mean±SD			Control Mean±SD		
	Baseline (n=64)	Follow Up (n=64)	P	Baseline (n=64)	Follow Up (n=64)	P
Vasomotor	19.08±4.74	11.94±3.31	<0.001	19.31±4.70	19.13±4.70	0.077
	Difference in Score and 95% CI 7.14 (5.709 – 8.572)			Difference in Score and 95% CI 0.188 (0.396 – 1.800)		
Psychosocial	36.83±8.68	30.06±5.41	<0.001	37.28±9.17	37.28±8.55	1.000
	Difference in Score and 95% CI 6.77 (5.699 – 7.833)			Difference in Score and 95% CI 0.000 (0.488 – 0.488)		
Physical	81.59±10.63	53.63±8.26	<0.001	84.39±11.63	84.44±10.84	0.868
	Difference in Score and 95% CI 27.97 (24.60 – 31.33)			Difference in Score and 95% CI 0.047 (0.690 – 0.515)		
Sexual	17.73±6.21	11.95±4.27	<0.001	16.53±7.21	16.45±6.87	0.709
	Difference in Score and 95% CI 5.781 (4.09 – 7.46)			Difference in Score and 95% CI 0.078 (0.338 – 0.494)		

*Paired t test

MENQOL in the intervention group in between baseline and follow-up [Table 6].

Comparing the mean difference of total MENQOL score of the MENQOL questionnaire pre and post intervention found that, there was significant reduction of QoL score in the study group. But there was no difference found in the QoL score of the control group [Table 6 and Figure 7].

Discussion

In the present study, mean age of the participants was 51.02 ± 2.94 years ranging from 47 to 58 years. Majority, 82.8% were Hindus which was similar to that reported (95%) in NFHS-4 (2015-16)^[14] for the state of Odisha, and 17.2% of participants were Christians and Muslims. Total of 69.5% of participants lived in nuclear family and 30.5% were in joint family. This might be due to majority of participants were migrated from different

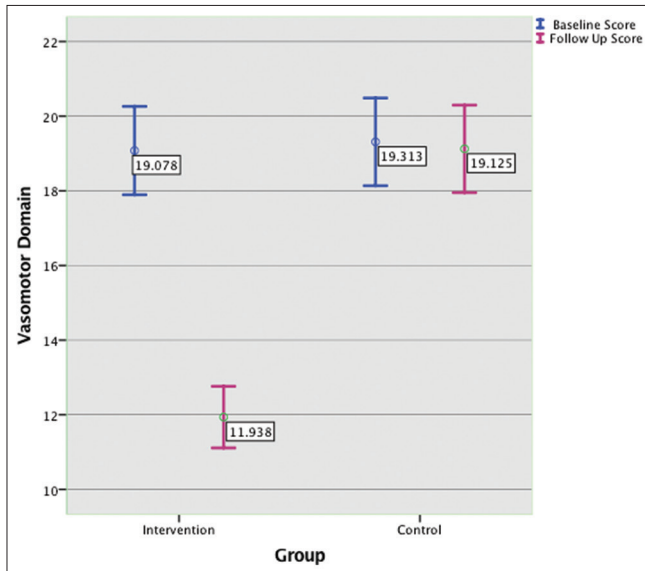


Figure 3: Mean difference in vasomotor domain

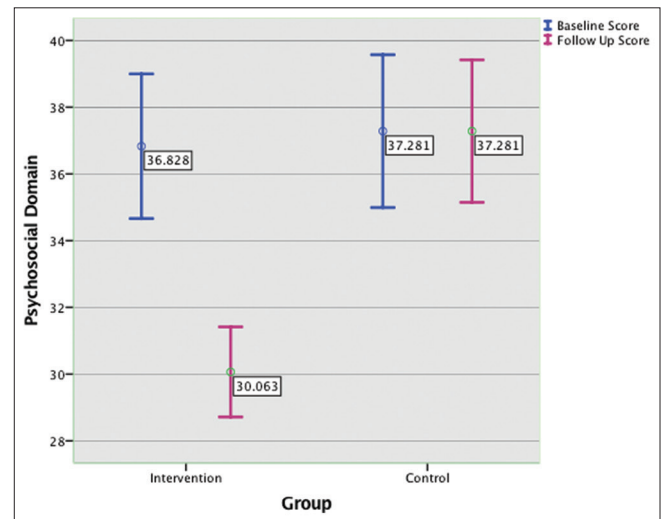


Figure 4: Mean difference in psychosocial domain

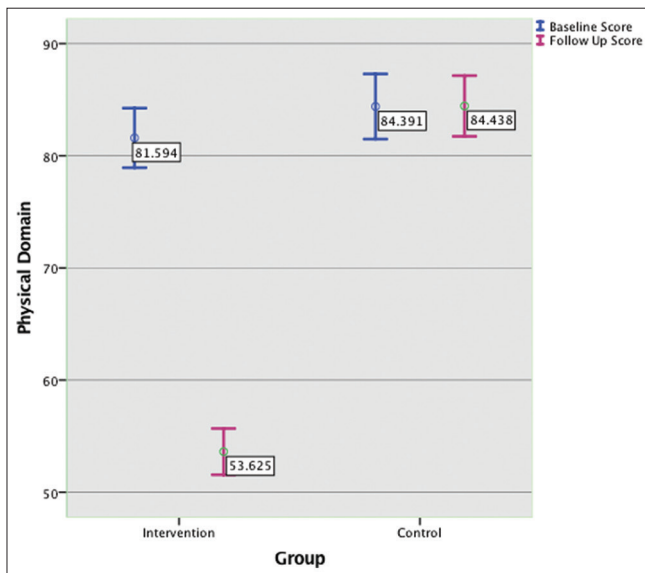


Figure 5: Mean difference in physical domain

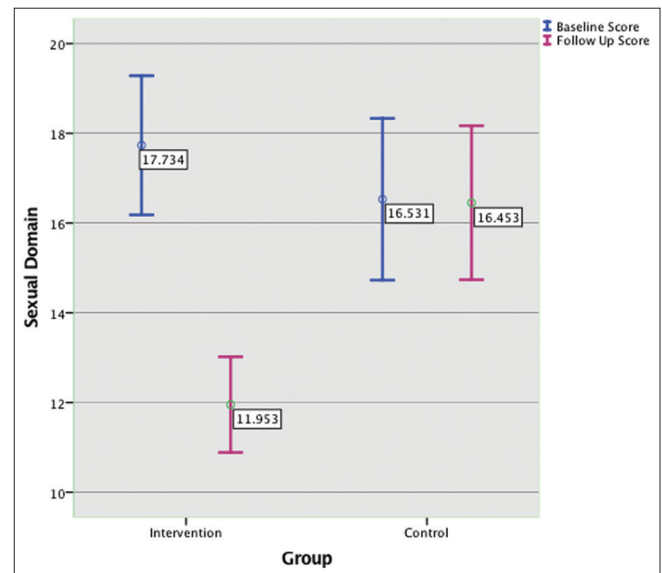


Figure 6: Mean difference in sexual domain

Table 6: Menopause specific quality of life (MENQOL) total scores

Total MENQOL score	Baseline (n=64)	Follow up (n=64)	Difference in score	P
		Mean±SD (95% Confidence interval)		
Intervention	155.23±18.66	99.28±15.22	55.95 (49.91 – 61.99)	<0.001
Control	157.52±22.33	157.30±21.28	0.219 (0.638 – 1.075)	0.612

*Paired t test

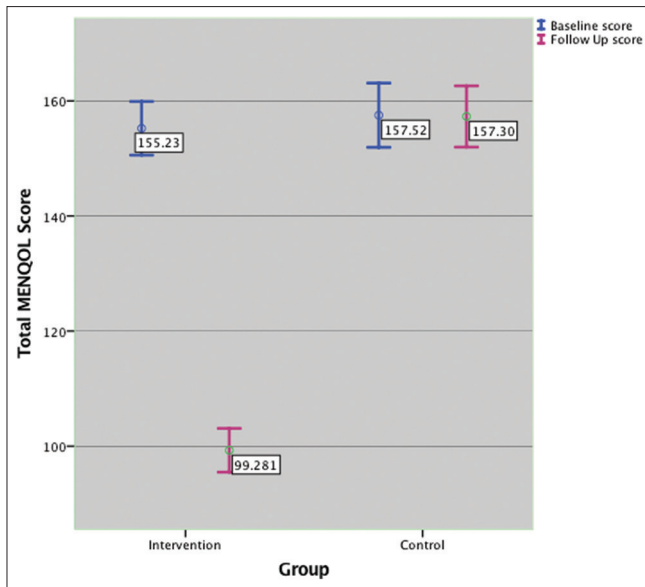


Figure 7: Mean difference in total MENQOL score

areas for their livelihood and residing in the urban slums. The socio-demographic results of our study were consistent with a PAN India survey by Ahuja M *et al.*,^[15] reported that majority of menopausal women were married, most of them were housewives and maximum participants were Hindus. The results were also similar to a study by Dos Santos Mota MP *et al.*^[16] which showed that majority of participants were married.

Education plays a vital role in women empowerment as new knowledge and adopting healthy practices may improve their quality of life. A community-based study conducted by Pathak N and Shivaswamy MS, stated in their study more than half postmenopausal women participants were educated up to upper primary and above, which was different from our study.^[17] Socio-economic status was measured according to the modified Kuppaswamy socio-economic scale, 2021.^[18] In a hospital-based descriptive study, it was found that less participants belonged to upper lower class and maximum participants belonged to lower middle class which was contradicted to our study.^[19]

Aging factor contributes a significant role in menopause and it is an inevitable process that is related to physical and mental health of a menopausal woman. In this study, the mean age of natural menopause was 48.66 ± 2.39 years and 78.1% of women reached menopause between 45-50 years of age. According to Indian Menopause Society (IMS), the age of attaining menopause was 46.2 years in India which was earlier than the Western countries (51 years).^[20] Many other studies showed that age of attaining menopause in Indian women was lower than the other region of the world.^[21-23] A study was done by Satpathy M in urban areas of western Odisha found

that majority of women reach menopause by the age of 45 years and the mean age of attaining menopause was not similar to our study.^[24] The mean duration after menopause was 2.41 ± 1.21 years in both the study and control group participants. As per an Iranian study conclusion, duration of post-menopausal years had significantly associated with menopause-specific QoL of women.^[25]

In the menopausal phases, unhealthy diet and nutritional deficiency may cause several health problems.^[26,27] At the time of dietary assessment of a South Indian study^[28] found that majority of postmenopausal participants were taking non-vegetarian food which was similar to the present study. Most of the participants have taken outside food once or twice a week which was considered an unhealthy eating practice in a different study.^[26] Among the participants, 45.3% usually take tea more than twice a day and as per data, the mean tea intake was two cups. This finding was not similar to a different study, as majority of subjects were consuming tea regularly and the regular intake of tea may delay the age of attaining menopause because of the antioxidant and non-steroidal estrogenic effect of flavonoids which neutralize the degenerative process.^[29]

The eating habits of the participants during follow-up between both groups were compared and no difference was observed between both the groups except for consuming soy food products. The difference was highly significant between study and control group for taking soy food products in a week. Other studies assessed impact of soy powder on menopausal women and found significant differences between the pre- and post-test scores in the menopausal symptoms among the study and control group participants.^[30,31] In a recent experimental study, a combination of low-fat, vegetarian diet, and 86 g cooked whole soybeans was given to the study group which was decreased the frequency and severity of hot flashes and enhanced the QoL of the post-menopausal women.^[30] It was found that participants experienced a reduction in hot flashes^[32] and these findings were similar to some other controlled trials.^[33,34]

Physical activity is used as a most common therapy for the treatment of menopausal symptoms. It has also decreased the risk of health issues such as cardiovascular diseases, diabetes, obesity, cancer, osteoporosis, and mental health problems.^[26,35] In a study, it was evidenced that menopause-related symptoms were prevented or reduced by doing regular physical activity.^[36] In the present study, 60% of postmenopausal women were doing low physical activity in their day-to-day life. This finding was consistent with another study^[37] conducted by using the same IPQA short form and maximum study subjects, especially postmenopausal age group were

performed low physical activity. Increased physical activity was found in the study group which may be due to the lifestyle-related interventions that were given to the study group participants.

In this study, it was found that the average sleeping hours of the postmenopausal women participants were 6.20 ± 1.05 hours/night. According to "The American Academy of Sleep Medicine and The Sleep Research Society", adults should sleep 7 or more hours of adequate sleep per night.^[38] Adequate sleep of 7–9 hours was observed among 40.6% of participants in our study. There was no difference observed between study and control group at baseline. To know the effect of sleep quality and disorders on menopause, a longitudinal study was conducted among Canadian menopausal women.^[39] The mean sleeping hours was 6.79 ± 1.2 hours/night which was similar to our study. The previous study revealed that menopause was associated with increased insomnia and obstructive sleep apnea (OSA), mostly developed among postmenopausal women. In this study, we observed differences in sleeping hours of the study group participants after intervention. Various studies stated that improvement in QoL during the menopausal transition may be the cause of decreasing insomnia among the menopausal women.^[40-42] At follow-up, most of the postmenopausal women (62.5%) of the study group were having 7–9 hours of adequate sleep which was indicating improvement in their quality of life.

In baseline anthropometric parameters of the participants, no difference was found between study and control group. Majority of participants 85.2% were at risk as per the waist-hip ratio (WHR) calculation. At baseline, it was found that 45.3% from intervention group and 43.8% from control group were coming under overweight category. In a case-control study, majority urban menopausal women were more obese than the rural women. The increased BMI and WHR were identified as principal factors of breast cancer in India.^[43] Some other studies concluded that despite of nutritional deficiency augmented BMI, WHR found among the postmenopausal women participants, it may be due to sedentary lifestyle and hormonal changes during menopausal transition.^[28,44] Educational and Lifestyle related interventions may decrease the mean score of weight, BMI, W/H Ratio, SBP, and DBP in study group. Increased physical activities may be the reason of reduction of obese participants in the intervention group which was similar to an experimental study in that both dietary and exercise intervention groups had significant weight loss than the control groups.^[45]

The results of the present study found that lifestyle-related interventions improved QoL scores of study group participants after 1 month interventions. It was observed

that, the mean score of vasomotor, psychosocial, physical and sexual domains of postmenopausal women were significantly decreased in the intervention group. Yazdkhasti M *et al.*^[46] had done similar interventional study and found improved menopause related QoL scores in all four domains after getting training sessions for few weeks as intervention in the study group.

Comparing the mean difference score of vasomotor, psychosocial, physical, and sexual domains of the MENQOL questionnaire pre- and post-intervention found that there was significant reduction of QoL score in study group, but no difference was found in QoL score of the control group. These findings were similar with a clinical trial of Iran conducted among 100 postmenopausal women by giving educational intervention to improve their menopausal QoL. Before intervention, there was no difference found in between study and control group in all four domains of QoL.^[47] Our study findings are consistent with another quasi-experimental study conducted among 103 postmenopausal women of Haryana state.^[30]

In this study, highly significant difference was noticed in the total score of MENQOL of intervention group between baseline and follow-up. Another study by Farokhi F *et al.*^[48] had similar findings after taking life-skill training sessions where the total score of QoL was improved significantly in study group except psychological domain. These findings were also consistent with an experimental study conducted by Nazari M *et al.*,^[10] to evaluate the effectiveness of lifestyle-related educational intervention regarding menopausal symptoms and health-promoting behavior. In this study, all four domains of menopausal QoL mean scores significantly reduce in study group. Our findings were inconsistent with a study by Enjezab B *et al.*^[49] and similar with a study by Dastgerdi FA *et al.*^[50] that self-care and support improve the QoL of the menopausal women. This study did not confirm the health condition and severity which may be a limitation of the study. Laboratory investigations of the participants would have increased the strength of the study. For overcoming these limitations, researchers recommended that government programs should be implemented for the betterment of the menopausal women and there is a need for periodic screening of menopause-related symptoms and health problems among menopausal women for further management.

Conclusion

The lifestyle-related interventions significantly improved the postmenopausal women's of the intervention group body mass index, blood pressure, waist-hip ratio, eating habits, physical activity, sleep and quality of life. These

interventions as a complementary therapy are safe, free from side effects, cost-effective and can be practiced in their own home settings. Women may practise the lifestyle-related interventions regularly for the improvement of their quality of life in their menopausal transition. Government program should be implemented for the betterment of the menopausal women.

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Conflicts of interest

There are no conflicts of interest.

References

- Saei Ghare Naz M, Sayehmiri F, Kiani F, Ozgoli G: A Systematic Review and Meta-analysis on the Average Age of Menopause among Iranian Women J Evid Based Care 2019, 8 (4):26-34.
- Anderson E, Hamburger S, Liu JH, Rebar RW. Characteristics of menopausal women seeking assistance. Am J Obstet Gynecol 1987;156:428-33.
- Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument (WHOQOL). Qual Life Res 1993;2:153-9.
- Whelan TJ, Goss PE, Ingle JN, Pater JL, Tu D, Pritchard K, et al. Assessment of quality of life in MA.17: A randomized, placebo-controlled trial of letrozole after 5 years of tamoxifen in postmenopausal women. J Clin Oncol 2005;23:6931-40.
- Satpathy, M. A study on the knowledge and awareness about menopause among middle aged women from Western Odisha. Int J Sci Res (IJSR) 2016;5:1759-61.
- Joseph N, Nagaraj K, Saralaya V, Nelliyanil M, Rao PJ. Assessment of menopausal symptoms among women attending various outreach clinics in South Canara District of India. J Midlife Health 2014;5:84-90.
- Forouhari S, Khajehei M, Moattari M, Mohit M, Rad MS, Ghaem H. The effect of education and awareness on the quality-of-life in postmenopausal women. Indian J Community Med 2010;35:109-14.
- Taebi M, Abdollahian S, Ozgoli G, Ebadi A, Kariman N. Strategies to improve menopausal quality of life: A systematic review. J Educ Health Promot 2018;7:93.
- Shobeiri F, Jenabi E, Hazavehei SM, Roshanaei G. Quality of life in postmenopausal women in Iran: A Population-based Study. J Menopausal Med 2016;22:31-8.
- Nazari M, Farmani S, Kaveh MH, Ghaem H. The effectiveness of lifestyle educational program in health promoting behaviors and menopausal symptoms in 45-60-year-old women in Marvdasht, Iran. Glob J Health Sci 2016;8:55414.
- Hagströmer M, Oja P, Sjöström M. The International Physical Activity Questionnaire (IPAQ): A study of concurrent and construct validity. Public Health Nutr 2006;9:755-62.
- Hilditch JR, Lewis J, Peter A, van Maris B, Ross A, Franssen E, et al. A menopause-specific quality of life questionnaire: Development and psychometric properties. Maturitas 1996;24:161-75.
- Lewis JE, Hilditch JR, Wong CJ. Further psychometric property development of the Menopause-Specific Quality of Life questionnaire and development of a modified version, MENQOL-Intervention questionnaire. Maturitas 2005;50:209-21.
- International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.
- Ahuja M. Age of menopause and determinants of menopause age: A PAN India survey by IMS. J Midlife Health 2016;7:126-31.
- Dos Santos Mota MP, Gomes Moura IC, Marinho RM, Sternick EB, Almeida AM. Evaluation of cardiovascular risk in climacteric women: A cross-sectional study. J Midlife Health 2018;9:123-9.
- Pathak N, Shivaswamy MS. Prevalence of menopausal symptoms among postmenopausal women of urban Belagavi, Karnataka. Indian J Health Sci Biomed Res 2018;11:77-80.
- Saleem SM, Jan SS. Modified Kuppaswamy socioeconomic scale updated for the year 2021. Indian J Forensic Community Med 2021;8:1-3.
- Senthilvel S, Vasudevan S, Anju PS, Sukumaran A, Sureshbabu J. Assessment of symptoms and quality of life among postmenopausal women in a tertiary care hospital in Kochi, South India: A Hospital-based Descriptive Study. J Midlife Health 2018;9:185-90.
- Dos Santos Mota MP, Gomes Moura IC, Marinho RM, Sternick EB, Almeida AM. Evaluation of cardiovascular risk in climacteric women: A cross-sectional study. J Midlife Health 2018;9:123-9.
- Ozumba BC, Obi SN, Obikili E, Waboso P. Age, symptoms and perception of menopause among Nigerian women. J Obstet Gynecol Ind 2004;54:575-8.
- Rahman SA, Zainudin SR, Mun VL. Assessment of menopausal symptoms using modified Menopause Rating Scale (MRS) among middle age women in Kuching, Sarawak, Malaysia. Asia Pac Fam Med 2010;9:5.
- Marahatta RK. Study of menopausal symptoms among peri and postmenopausal women attending NMCTH. Nepal Med Coll J 2012;14:251-5.
- Satpathy, M. A Study on Age at Menopause, Menopausal symptoms and problems among urban women from Western Odisha, India. Int J Sci Res Publ 2016;6:422-7.
- Fallahzadeh H. Quality of life after the menopause in Iran: A population study. Qual Life Res 2010;19:813-9.
- Abdolalipour S, Mirghafourvand M, Ghassab-Abdollahi N, Farshbaf-Khalili A. Health-promoting lifestyle and quality of life in affected and unaffected menopausal women by primary osteoporosis. J Educ Health Promot 2021;10:45.
- Lambrinoudaki I, Brincat M, Erel CT, Gambacciani M, Moen MH, Schenck-Gustafsson K, et al. EMAS position statement: Managing obese postmenopausal women. Maturitas 2010;66:323-6.
- Ranasinghe C, Shettigar PG, Garg M. Dietary intake, physical activity and body mass index among postmenopausal women. J Midlife Health 2017;8:163-9.
- Sapre S, Thakur R. Lifestyle and dietary factors determine age at natural menopause. J Midlife Health 2014;5:3-5.
- Malik E, Sheoran P, Siddiqui A. Health-Promoting behaviors and menopausal symptoms: An interventional study in rural India. J Midlife Health 2018;9:200-6.
- Kaur S, Sidhu GK. Quasi – Experimental study to evaluate the effectiveness of soya powder on selected menopausal problems among perimenopausal women in selected rural areas of Ludhiana, Punjab. Asian J Nurs Educ Res 2017;7:524-8.
- Barnard ND, Kahleova H, Holtz DN, Del Aguila F, Neola M, Crosby LM, et al. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. Menopause 2021;28:1150-6.
- Scheiber MD, Liu JH, Subbiah MT, Rebar RW, Setchell KD. Dietary inclusion of whole soy foods results in significant

- reductions in clinical risk factors for osteoporosis and cardiovascular disease in normal postmenopausal women. *Menopause* 2001;8:384-92.
34. Franco OH, Chowdhury R, Troup J, Voortman T, Kunutsor S, Kavousi M, *et al.* Use of plant-based therapies and menopausal symptoms: A systematic review and meta-analysis. *JAMA* 2016;315:2554-63. doi: 10.1001/jama.2016.8012.
 35. Physical Activity Guidelines Advisory Committee: Physical Activity Guidelines Advisory Committee Report. Washington, DC: U.S. Department of Health and Human Services; 2008.
 36. Li S, Holm K, Gulanick M, Lanuza D, Penckofer S. The relationship between physical activity and perimenopause. *Health Care Women Int* 1999;20:163-78.
 37. Kim MJ, Cho J, Ahn Y, Yim G, Park HY. Association between physical activity and menopausal symptoms in perimenopausal women. *BMC Womens Health* 2014;14:122.
 38. Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, *et al.* Recommended amount of sleep for pediatric populations: A consensus statement of the American academy of sleep medicine. *J Clin Sleep Med* 2016;12:785-6.
 39. Zolfaghari S, Yao C, Thompson C, Gosselin N, Desautels A, Dang-Vu TT, *et al.* Effects of menopause on sleep quality and sleep disorders: Canadian Longitudinal Study on Aging. *Menopause* 2020;27:295-304.
 40. Williams RE, Levine KB, Kalilani L, Lewis J, Clark RV. Menopause-specific questionnaire assessment in US population-based study shows negative impact on health-related quality of life. *Maturitas* 2009;62:153-9.
 41. Bondarev D, Sipilä S, Finni T, Kujala UM, Aukee P, Laakkonen EK, *et al.* The role of physical activity in the link between menopausal status and mental well-being. *Menopause* 2020;27:398-409.
 42. Fabbrini M, Aricã I, Tramonti F, Condurso R, Carnicelli L, De Rosa A, *et al.* Sleep disorders in menopause: Results from an Italian Multicentric Study. *Arch Ital Biol* 2015;153:204-13.
 43. Mathew A, Gajalakshmi V, Rajan B, Kanimozhi V, Brennan P, Mathew BS, *et al.* Anthropometric factors and breast cancer risk among urban and rural women in South India: A multicentric case-control study. *Br J Cancer* 2008;99:207-13.
 44. Skrzypczak M, Szwed A, Pawlińska-Chmara R, Skrzypulec V. Assessment of the BMI, WHR and W/Ht in pre- and postmenopausal women. *Anthropol Rev* 2007;70:3-13. <https://doi.org/10.2478/v10044-008-0004-6>.
 45. Cheng CC, Hsu CY, Liu JF. Effects of dietary and exercise intervention on weight loss and body composition in obese postmenopausal women: A systematic review and meta-analysis. *Menopause* 2018;25:772-82.
 46. Yazdkhasti M, Keshavarz M, Khoei EM, Hosseini A, Esmaeilzadeh S, Pebdani MA, *et al.* The Effect of Support Group Method on Quality of Life in Post-menopausal Women. *Iran J Public Health* 2012;41:78-84.
 47. Shobeiri F, Jenabi E, Khatiban M, Hazavehei SMM, Roshanaei G. The Effect of Educational Program on Quality of Life in Menopausal Women: A Clinical Trial. *J Menopausal Med* 2017;23:91-5.
 48. Farokhi F, Narenji F, Salehi B, Mehrabi F, Rafiei M. Effect of skill life training in quality of life in menopausal women. *Sci J Hamadan Nurs Midwifery Fac.* 2015;23:54-64.
 49. Enjzab B, Farajzadegan Z, Taleghani F, Aflatoonian A, Morowatisharifabad MA. Health promoting behaviors in a population-based sample of middle-aged women and its relevant factors in Yazd, Iran. *Int J Prev Med* 2012;3(Suppl 1):S191-8.
 50. Dastgerdi FA, Zandiyeh Z, Kohan S. Comparing the effect of two health education methods, self-directed and support group learning on the quality of life and self-care in Iranian postmenopausal woman. *J Educ Health Promot* 2020;9:62.