

# Effectiveness of Pranayama on Health Related QOL and Blood Pressure Control among Postmenopausal

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## ABSTRACT

**Background:** Hypertension and poor quality of life are the most common problems in post-menopausal women and lead to significant health problems if not adequately treated. BP Interventions such as pranayama are effective management for treating and improving the quality of life in post-menopausal women. Therefore, it is necessary to evaluate the effectiveness of pranayama on BP control measures and the quality of life of post-menopausal women attending B.V.V. Sangha's Akkanabalaga, Bagalkot, India.

**Methods:** This was a quasi-experimental study with a randomly selected group of 50 post-menopausal women. Data were collected using a self-administered questionnaire and the QOL scale from WHO. The results were analyzed using descriptive and inferential statistics.

**Results:** The results of the comparison of pre-test and post-test, the quality of life of post-menopausal women show that the mean post-test score BP is significantly lower than the mean pre-test score BP ( $t=12.373$ ,  $p<0.001$ ) and the mean post-test score is significantly higher than the mean pre-test score ( $t=9.802$ ,  $p<0.001$ ). There is no significant association between socio-demographic variables for both BP and QOL scores of post-menopausal women.

**Conclusion:** The study found that the pranayama intervention package is a proper, logical, and cost-effective technique for regulating blood pressure and improving quality of life in post-menopausal women.

**Key-words:** BP, QOL, Effectiveness, Intervention, Post-menopausal women, Socio-demographic variables

## INTRODUCTION

Women are treated as valuable jewels for life, progeny, and happiness, and their life is happier. She has to go through different stages due to anatomical and physiological changes in her. Her responses are different in different situations. There is no change in behavior in menopausal because of hormonal Influence, mainly sex hormones.<sup>[1]</sup>

Researchers are interested in menopause because of increased life expectancy, the importance of women's health, and the belief that this stage of life is as essential as reproduction. Many of us strive to offer these women therapies they can accept and appreciate.<sup>[2]</sup>

The period when the female ovaries gradually begin to produce less of the hormones progesterone and oestrogen is called menopause. During menopause, menstruation becomes more irregular due to decreased hormone production. In women, this leads to physical symptoms.<sup>[3]</sup>

Some doctors believe increased blood pressure is due to hormonal changes during menopause. Menopausal hormonal changes can cause blood pressure to be more salt-sensitive, leading to higher blood pressure.<sup>[4]</sup>

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Menopause is intervened by the menstrual cycle's absence or stoppage for 12 consecutive months. Hot flashes, vaginal dryness, sleep problems, high blood pressure, and other symptoms are common in this stage.<sup>[5]</sup>

Hypertension is one of the significant problems for post-menopausal women and is often undiagnosed or inadequately treated, especially after menopause, when cardiovascular risk increases. In pre-menopausal women, endogenous estrogens maintain vasodilatation, helping to control blood pressure. The ageing process and loss of endogenous estrogen production after menopause are associated with increased blood pressure and contribute to the high prevalence of hypertension in older women. A lack of regular physical activity and a high-salt diet are important factors contributing to the exacerbation of post-menopausal hypertension.<sup>[6]</sup>

During menopause, the body undergoes significant changes, and as a result, several unexpected symptoms may occur, such as high blood pressure. The relationship between menopause and high blood pressure is not yet fully understood. However, recent research shows that oestrogen prevents plaque formation in artery walls. It also helps control the narrowing of the arteries and, thus, resistance to blood flow. So lower oestrogen levels during menopause increase pressure on the arteries and make you more susceptible to heart problems.<sup>[7]</sup>

Several studies have shown that menopausal women do not suffer more from anxiety, depression, anger, nervousness or feelings of stress than women of the same age who are still menstruating. Psychological and emotional symptoms such as fatigue, irritability, insomnia, and anxiety may be related to the lack of estrogen, the stress of ageing, and the changing role of women.<sup>[8]</sup>

The Sanskrit term for breath control, pranayama, literally means "mastery of prana or breath" According to several researchers, pranayama exercises effectively treat a wide range of ailments. Pranayama makes the lungs more robust and more efficient. It strengthens the body's defence mechanisms, calms the mind, and promotes optimistic thinking.<sup>[9]</sup> The goal of pranayama is to connect the body and mind. It also oxygenates the body and clears it of toxins. This is said to bring healing physiological benefits.<sup>[10]</sup>

## MATERIALS AND METHODS

**Study Design-** This study used a quantitative evaluative approach with a pre-test (O1) and post-test (O2) design.

Fifty post-menopausal women were selected for the study, and the sample for this study was determined using the non-probability-based random selection method.

**Setting of the Study-** The environment in which data collection occurs is called the setting. The study was conducted in BVVS Sangha's Akkanbalaga Bagalkot, India.

**Participants-** In this study, participants were post-menopausal women. Total sample consisted of 50 post-menopausal women by purposive sampling technique.

**Data collection procedures-** Data collection instruments are the procedures or tools used by the researcher to observe or measure the critical variables of the research problem. The researcher used standardized scales to assess blood pressure and HRQOL in post-menopausal women.

Tool was comprised of three parts:

**Part 1:** Socio-demographic data included information on post-menopausal women such as age, religion, education level, occupation, monthly family income, marital status, number of children, age at menarche, age at marriage, period after menopause, yoga practice.

**Part 2:** Consist of sphygmomanometer to assess the blood pressure of post-menopausal women.

**Part 3:** Consists of the WHO'S BRIEF scale to assess HRQOL in post-menopausal women, consisting of 26 items.

**Scoring Scheme-** Total 23 positive items Briefs HRQOL scale for assessing HRQOL in post-menopausal women, which consists of 26 items (items 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25), which are scored as follows;

5- Very good or extremely much or entirely or very satisfied or always

4- Good or very much or mostly or satisfied or very often

3- Neither bad nor good or moderately or neither satisfied nor dissatisfied or often abandoned.

2- Poor or a little dissatisfied or rarely

1-Very poor or not at all or very dissatisfied

The letter scale of WHO contains three negative items (items 3, 4, 26) rated as follows (with reversed valence);

5-Very bad or not at all or very dissatisfied

4- Bad or a little disappointed or rarely

3-Neither bad nor good or moderate or neither satisfied nor dissatisfied or often.

2-Good or very much or most of the time or satisfied or very often

1-Very good or extremely much or entirely or very satisfied or always

Thus, the total depression scale score ranges from 0-60 for 20 items.

**Statistical Analysis-** The information was analyzed using SPSS 18. Data were entered into an MS Excel spreadsheet and then transferred into SPSS. Data were organized and explained using descriptive and inferential analyzes to determine the association between variables.

**Ethical clearance-** This was obtained from the BVVS Sajjalashree Institute of Nursing Sciences, Bagalkot, India. Written informed consent was obtained from each participant.

## RESULTS

**Socio-demographic characteristics of post-menopausal women-**Percentage-wise distribution of post-menopausal women according to their age groups (44%) were 51-56 years old. Most post-menopausal women in the sample (42%) were Hindu. Most post-menopausal women (50%) in the sample had primary education. Most post-menopausal women in the sample (52%) were homemakers. Most post-menopausal women in the sample (32%) had their family monthly income between 20000-30000rs. Most of the post-menopausal women in the sample (68%) were married. Most post-menopausal women in the selection married at age (62%) 16-20 years. Most post-menopausal women (48%) in the sample had 1-2 children residing in rural areas. Most post-menopausal women (54%) in the sample, ages from 13-15 years at menarche. Most post-menopausal women (54%) in the sample had periods after menopause between 1-5 years. Most post-menopausal women (68%) in the sample did not practice yoga (Table 1).

**Table 1:** Socio-demographic characteristics of post-menopausal women

S. No	Socio-demographic and clinical variables	Character	Frequency	Percentage (%)
1	Age	40-45Y	4	8
		46-50Y	8	16
		51-55Y	22	44
		56-60Y	16	32
2	Religion	Hindu	42	84
		Muslim	8	16
		Christian	0	0
		Others	0	0
3	Educational status	No formal education	14	28
		Primary education	25	50
		Secondary education	6	12
		Graduation and above	5	10
4	Occupation	Home maker	26	52
		Employed	7	14
		Self employed	2	4
		Agriculture	15	30
5	Family monthly income	10,000-20,000	13	26
		20,000-30,000	16	32
		30,000-40,000	10	20
		40,000-50,000	11	22
6	Marital status	Married	34	68
		Divorce/Widow	16	32



7	Age at marriage	10-15Y	9	18
		16-20Y	31	62
		21-25Y	4	8
		26-30Y	6	2
8	Number of children	0-2	24	48
		3-4	21	42
		5-6	5	10
9	Age at menarche	10-12	17	34
		13-15	27	52
		15-18	6	12
10	Time period after menopause	0-2Y	27	54
		2-4Y	19	38
		4-6Y	3	6
		6-8Y	1	2
11	Practice of yoga	Yes	16	32
		No	34	68

**Pre-test and Post-test blood pressure assessment in post-menopausal women-** The results of the comparison of pre-test and post-test blood pressures in post-menopausal women show that in the pre-test, the

majority (60%) of post-menopausal women had high blood pressure and 40% had normal blood pressure. In the post-test, the majority (86%) of post-menopausal women had normal blood pressure, and 14% had high blood pressure (Table 2).

**Table 2:** Assessment of pre-test and post-test levels of blood pressure among post-menopausal women

Levels of BP	Pre-test		Post-test	
	No of respondents	Percentage (%)	No of respondents	Percentage (%)
Normal BP	20	40	43	86
High BP	30	60	7	14

**Comparison of Pre-test and post-test blood pressure levels in post-menopausal women-** Analysis of the mean, SD, and mean percentage of health-related quality of life in pre-test and post-test post-menopausal women showed that the mean overall percentage of health-

related quality of life before the test was 54.49 percent, with a mean and SD of 70,847,372. With a mean SD of 76.2259.56, the overall percentage of post-test HRQOL scores was 59.56 (Table 3).

**Table 3:** Comparison of pre-test and post-test level of blood pressure among post-menopausal women

Domain of QOL	Max Score	Pre-test scores			Post-test scores		
		Mean	SD	Mean (%)	Mean	SD	Mean (%)
Over all QOL	10	2.54	0.503	25.4	9.38	0.490	93.8
Physical QOL	35	19.10	2.880	56.85	20.80	2.030	59.42
Psychological QOL	30	16.82	2.265	56.06	15.54	1.432	51.8
Social relationship	15	9.60	1.429	64	10.98	0.795	73.2
Environmental health	40	22.78	3.209	56.95	20.74	2.554	51.85
Grand Total	130	70.84	7.372	54.49	76.22	3.688	59.56



**Comparison of pre and post-test BP and QOL score of post-menopausal women-** Findings related to the comparison of pre-test and post-test BP and QOL scores of post-menopausal women shows that the mean post-test score BP (133) is significantly lower than the mean pre-test score BP (158) at a significance level of 0.001 ( $t=12.73$ ,  $p<0.001$ ). Similarly, the mean post-test QOL

score ( $95.1\pm 17.78$ ) is significantly higher than the mean pre-test QOL score ( $73.72\pm 29.336$ ) at a significance level of 0.001 ( $t=9.802$ ,  $p<0.001$ ). Thus, the mean pre-test QOL value BP is less than the mean pre-test QOL value BP at a significance level of 0.001. Similarly, the mean post-test QOL score is significantly higher than the mean pre-test QOL score at a significance level of 0.001 (Table 4).

**Table 4:** Comparison of pre-test and post-test BP and QOL score of post-menopausal women

Variables	Mean difference	Differential SD	t-paired value	p-value (2-tailed)
Blood Pressure	89.40	13.747	12.730	0.000***
Quality of Life	64.92	7.372	4.873	0.000***

\*\*\* $p<0.001$

**Association between post-test systolic bp score in post-menopausal women and their socio-demographic variables-** Examination of the association between the pre-test systolic blood pressure value in post-menopausal women and their selected demographic

variables shows that there is no significant association between the blood pressure value of post-menopausal women and their socio-demographic variables. Therefore, H<sub>2</sub> is rejected for the socio-demographic variables (Table 5).

**Table 5:** Association between the post-test systolic blood pressure scores of post-menopausal women and their socio-demographic

Socio-demographic variables	Level of significance	Chi-square value	p-value
Age	0.05	0.403	0.525
Religion	0.05	0.277	0.598
Educational status	0.05	0.547	0.459
Occupation	0.05	0.425	0.705
Family monthly income	0.05	0.001	0.995
Marital status	0.05	0.980	0.322
Age at marriage	0.05	0.13	0.718
No of children	0.05	0.591	0.44
Age at menarche	0.05	0.097	0.754
Time period after menopause	0.05	0.572	0.449
Practice of yoga	0.05	0.048	0.826

Df- Degree of Freedom= 1; \*\*\* $p<0.001$ ; NS-Not significance

**Association between post-menopausal women's diastolic blood pressure levels and their socio-demographic characteristics-** The results regarding the association between post-menopausal women's diastolic blood pressure levels and their selected socio-

demographic variables show that there is no significant association between post-menopausal women's blood pressure levels and their socio-demographic variables (Table 6).

**Table 6:** Association between the post-test diastolic blood pressure scores of post-menopausal women and their socio demographic variables

Socio demographic variables	Level of significance	Chi square value	p-value
Age	0.05	0.048	0.826
Religion	0.05	0.139	0.709
Educational status	0.05	0.013	0.91
Occupation	0.05	0.074	0.785
Family monthly income	0.05	0.002	0.963
Marital status	0.05	0.037	0.846
Age at marriage	0.05	0.021	0.887
Number of children	0.05	0.011	0.914
Age at menarche	0.05	0.835	0.360
Time period after menopause	0.05	0.057	0.811
Practice of yoga	0.05	0.367	0.544

Df- Degree of Freedom= 1; \*\*\*p<0.001; NS-Not significance

## DISCUSSION

The present study was conducted to investigate the effectiveness of pranayama on HRQOL and BP control in post-menopausal women in BVVS Sangha's Akkanbalaga Bagalkot. A quasi-experimental one-group pre-test-post-test research design was adopted to achieve the study's objectives. A sample of 50 post-menopausal women was selected using a non-probability sampling technique.

The percentage distribution of post-menopausal women according to their age group shows that most post-menopausal women (32.33%) were 48-50 years old. The study results are supported and conducted by Borker *et al.* [11]. The study randomly enrolled 106 post-menopausal women for more than six months. The results show that the mean age at menopause was 48.26 years. The percentage distribution of post-menopausal women according to their religion showed that most of them (84%) were Hindus. Percentage distribution of post-menopausal women according to marital status: Most (68%) post-menopausal women were married.

This study is supported by Sievert *et al.* [12]. Married women generally report a later average age at menopause. The results from a survey conducted in Greene County, New York, are no exception. Married and widowed women report a later mean age at natural

menopause than single and divorced women ( $p < 0.05$ ). The percentage distribution of post-menopausal women according to their educational status the majority of post-menopausal women (50%) had primary education.

The results of the present study do not agree with the survey conducted by Veenadevi *et al.* [13], according to which there is a significant relationship between the level of education and the level of knowledge of the respondents at the level of 0.05 with a chi-square value (20.87). The study concluded that women should be better prepared for the changes to minimize the risk. Most post-menopausal women (32.33%) had a monthly family income of Rs. 20,000 and above. The percentage distribution of post-menopausal women according to the number of their children shows that most post-menopausal women (24%) had two children.

The study is supplemented by a retrospective population study by Marthe *et al.* [14] of 310147 women in Norway between 50-69 years at the time of data collection. Results showed that women with three births had the highest mean age at menopause (51.36 years; 95% CI: 51.33-51.40 years), and women without births had the lowest (50.55 years; 95% CI: 50.48-50.62 years). The study concluded that women with the most births should also have the highest age at menopause if pregnancies delay menopause.

The results related to systolic BP assessment in post-menopausal women show that the highest percentage (74.0%) of women had high systolic BP. Similarly, the results related to diastolic BP assessment in post-menopausal women show that the highest rate (80.0%) of women had high diastolic blood pressure. The effects associated with HRQOL showed that most post-menopausal women (63.33%) had good health-related quality of life.

The results of the present study were consistent with the survey conducted by Eman *et al.* [15]; there were statistically significant differences between the control and intervention groups in promoting QOL and improving health-promoting behaviours before and after the nursing intervention. The study concluded that healthy lifestyle modifications improved the QOL scores of post-menopausal women immediately and three months after the nursing intervention. Therefore, these modifications can be used by all post-menopausal women to improve their health and quality of life.

The results of the present study are consistent with the survey conducted by Elazim *et al.* [16]. The highest mean score was obtained in the sexual domain ( $3.19 \pm 1.99$ ), followed by psychosocial ( $2.94 \pm 1.45$ ), vasomotor ( $2.55 \pm 1.53$ ) and finally, physical symptoms ( $2.28 \pm 0.749$ ) [16]. The results show that comparing pre-test and post-test BP values in post-menopausal women revealed that most (12.730%) of post-menopausal women had high BP in the pre-test BP. In the post-test, most (86.67%) post-menopausal women had normal BP. Comparing the HRQOL scores of post-menopausal women before and after the test showed that the majority (62.0%) had poor HRQOL at the pre-test. Most (96%) of post-menopausal women had good HRQOL at the post-test.

The results of the present study are consistent with the survey conducted by Sakuntala *et al.* [17], in which a significant difference in QOL was found after seven days of yoga practice (mean pre-test score  $74.5 \pm 13.31$ ,  $p < 0.0001$ ). This study shows that the QOL of perimenopausal women was low before the intervention, but after the intervention, the quality of life improved to medium and high QOL. The study's results compare the mean percentage of BP of post-menopausal women in the pre-test and post-test, showing a decrease of 18.43% of the mean BP value of post-menopausal women after implementing the pranayama intervention.

The above findings are supported by the study of Jacob *et al.* [18], which investigated the efficacy of pranayama in reducing menopausal symptoms among perimenopausal women in Coimbatore. The results of the study are as follows paired 't' test was used to evaluate the efficacy of pranayama in reducing the symptoms of menopause in perimenopausal women, obtained "t" value 6.63 was significant at  $p < 0.05$ . The study concluded that pranayama can lessen the severity of menopausal symptoms. The results of comparing the mean percentage of HRQOL of post-menopausal women in the pre-test and post-test show a decrease of 5.07 percent in the mean HRQOL of post-menopausal women after applying for the pranayama intervention programme.

The results of the present study are consistent with a similar experimental study conducted by Veena D.S. to evaluate the effectiveness of measuring the BP of hypertensive patients before and after pranayama, noting the severity of BP before and after pranayama. Before pranayama, the mean BP is 71.66%, mild 19.99% and severe 8.33%, and after pranayama, the mild BP is 54.99%, normal 36.66% and mean 4.99%. The severity of blood pressure before and after pranayama in lowering BP. [19] The results of the present study are consistent with a similar pilot study conducted by Cathryn *et al.* [20]. An assessment of the feasibility and efficacy of yoga treatment for menopausal symptoms. The results of the study 11 women completed the study and attended a mean of 7.45 (S.D=1.63) classes. The study concluded that the yoga treatment and study procedures were feasible for midlife women.

The results regarding the significance of the difference between the pre-test and post-test values BP in post-menopausal women show that the difference between the pre-test mean (12.730) and the post-test mean (3.909) BP in post-menopausal women was statistically significant at the 0.05 level of significance ( $t=10$  (t-value=1.96),  $p < 0.05$ ). Similarly, the difference between the pre-test mean (59.56) and post-test mean (70.84%) for HRQOL in post-menopausal women was not statistically significant at the 0.05 level of significance ( $t=10.26$  (t-value=1.96),  $p < 0.05$ ). The results regarding the significance of the difference between the post-test values of HRQOL of post-menopausal women showed that a statistically non-significant difference was found between the pre-test values of HRQOL of post-menopausal women ( $t=6.01$  (t-value= 1.96),  $p < 0.05$ ).

The results related to the association between BP levels of post-menopausal women and their selected socio-demographic variables show that no significant association was found between blood pressure levels of post-menopausal women and their selected socio-demographic variables. Therefore, 'H3' is rejected. The results related to the association between the pre-test HRQOL scores of post-menopausal women and their selected socio-demographic variables show that no significant association was found between the HRQOL scores of post-menopausal women and their selected socio-demographic variables. Therefore, 'H3' is rejected.

### CONCLUSIONS

The study proves that the intervention package (pranayama) on BP and the quality of life of socio-demographic women is an effective, scientific, logical, and cost-effective strategy for BP manage and improve the quality of life of post-menopausal women.

### CONTRIBUTION OF AUTHORS

**Research concept-** Shambhavi I. Korishetti, Savita Angadi, Deelip S. Natekar

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