ORIGINAL ARTICLE

A study on the Prevalence and Determinants of Health-Related Quality of Life in Women diagnosed with Hypertension

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Abstract

Introduction: Health-Related Quality of Life (HRQoL) is negatively affected by hypertension, which highlights the significance of efficient disease management. **Aim & Objective:** This study assessed the Quality of Life in hypertensive women, comparing those with controlled and uncontrolled blood pressure. **Methods and Material:** The study was designed using the WHO stepwise strategy for NCD surveillance (STEPS) to give prevalence estimates of risk factors for hypertension in three age categories (18-29, 30-44, and 45-69 years). **Results:** A total of 2160 females were screened for hypertension. 827 (38.27%) were found to be hypertensive, with 27.9% in stage 1 and 10.4% in stage 2 HTN. The MINICHAL score was used to measure HRQOL, and the average scores in the somatic and mental categories were 1.10 ± 2.15 and 4.76 ± 4.84, with an overall average total score of 5.99 ± 6.13. The somatic domain of the MINICHAL scale shows statistically significant positive relationship, with an Exp (B) of 1.101, indicating that for each unit increase in this domain, the odds of the outcome increase by approximately 10.1%. **Conclusions:** The MINICHAL-based HRQOL assessment showed that ages 45–69 had higher scores, indicating greater risk of adverse health outcomes.

Keywords

Hypertension, Risk factors, Quality of life, Cardiovascular diseases, Minichal scale

Introduction

Hypertension represents a major global public health issue due to its widespread prevalence.(1-3) It is linked to more than 7.5 million deaths annually worldwide.(4)

Health-related quality of life is an indicator of a person's overall well-being that reflects social, economic and personal perceptions. The World Health Organization describes quality of life as:"an individual's view of their place in life, in the context of the culture and system of values in which they live, as well as in connection to their objectives, aspirations, standards and worries."(1) Several studies using the MINICHAL scale shows that better healthcare access, regular exercise and consistent medication use are linked to improve the quality of life in women with hypertension.(2)

Variations in QoL may be tied to poor blood pressure control, as unmanaged hypertension is often linked to lower QoL, especially in terms of mental well-being.(3) Poor quality of life can impede adherence in hypertension patients, potentially leading to uncontrolled blood pressure.(5)

In Punjab, hypertension affects 40.1% of both men and women. However, only 48.3% of those with the

condition are aware of it.(6) This highlights the need to evaluate the HR-QoL of patients with and without effective blood pressure management.

Objectives

1. The primary objective of the study was to determine the prevalence of hypertension and identify its risk factors among women in Punjab.
2. Another objective was to evaluate and compare the Quality of Life (QoL) of hypertensive women, based on their blood pressure control status, using the MINICHAL scale.

MATERIAL & METHODS

Study type & study design: A community-based, cross-sectional research design was adopted.

Study setting: Direct interviews with survey participants were conducted in their homes to ascertain specific demographic traits and co-occurring conditions. Each eligible family member was interviewed at home. The in-home interviews with the participants lasted between thirty and forty-five minutes.

Study population: The study was conducted on adult females aged 18 to 69 years residing in Punjab state, India.

Study duration: The survey lasted a total of 15 months. Baseline interviews with the individuals were conducted between January 2022 and April 2023.

Sample size calculation: The sample size has been calculated to be 2160. The target population has been divided into districts of Punjab as per census 2011. (8) The districts will serve as a Strata. The sample size was calculated by formula:-

$$n = \frac{Z^2\ P\ (1-P)}{e^2}$$

Where
Z=level of confidence
P=baseline level of the indicators
e=margin of error

Inclusion criteria:

1. Adult females who were willing to participate in the study and were permanent resident of the village.
2. Females aged above 18 years with or without hypertension were included in the study.

Exclusion criteria:

1. Individuals who were unable to respond due to serious physical or mental disease and could not have their anthropometry measurements taken were eliminated from the study.
2. Women who were pregnant and lactating were also excluded from the study.

Strategy for data collection: The community-based study followed the WHO stepwise strategy for NCD surveillance (STEPS) to provide prevalence estimates of risk variables for hypertension across three age groups (18-29, 30-44, and 45-69 years).(7) A multistage stratified sampling approach was adopted, with residences from several villages serving as the final sampling unit. The sample size was calculated using population estimates for each age group from the 2011 Census.

Working definition: Blood pressure was measured using a digital BP machine in the right arm, while seated, with 1 mmHg precision. Participants rested quietly for 5 minutes before measurement. Two readings were taken; if the difference exceeded 20 mmHg, a third reading was taken, and the average of the closest two values was recorded. A digital blood pressure machine was used to take blood pressure in the right arm while sitting, to the nearest 1 mmHg precision. Prior to measurement, participants were asked to sit quietly and relax for 5 minutes. The average of two measurements was calculated during the data processing procedure. If the first and second measures varied by more than 20 mm Hg, a third reading was acquired, and the participant's blood pressure was calculated by taking the average of the two values.(9) According to JNC VIII classification, blood pressure is classified into four categories: normal, prehypertension, stage 1 HTN and stage 2 HTN. Individuals diagnosed with prehypertension have an SBP and DBP between 120-139 and /or 80-89 mmHg. Stage 1 hypertension diagnosed, if SBP and DBP between 140- 159 and/or 90-99 mmHg and stage 2 hypertension diagnosed, if SBP and DBP between ≥ 160 and/or ≥ 100 mmHg.(10) The Asian-Pacific cut-off criteria include being underweight (<18.5 kg/m2), normal weight (18.5-22.9 kg/m2), overweight (23-24.9 kg/m2), or obese (≥25 kg/m2) with uncrossed legs before measurement.(11)

Minichal Scale: The 17item MINICHAL scale was developed in Spain in 2001.A patient's quality of life can be evaluated using this metric in clinical trials as well as population-based studies. MINICHAL is formed from "Mini-Cuestionario de Calidad de Vida en Hipertensión Arterial." It has two domains: mental (nine items) and somatic (seven items). The mental domain (MD) covers questions one through nine, with scores ranging from 0 to 27 points. The somatic domain has questions 10-16, and the score ranges from 0 to 21 points. The final question relates to hypertension's overall influence on quality of life. The scoring scale is a Likert scale with four potential responses (0 = No, not at all; 1 = Yes, slightly; 2 = Yes, a lot; and 3 = Yes, very much). The total scores range from 0 (the greatest degree of health) to 51 (the lowest level of health).(12)

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Ethical issues: The study was approved by the Ethics Committee of Sri Guru Granth Sahib World University, Fatehgarh Sahib (SGGSWU/IEC/2023/14, Dated 13-10-2023). The study was carried out in accordance with the ethical principles set by institutional review boards or ethics committees, which assists in preserving the highest levels of research integrity throughout the study.

Informed consent: Informed and written consent was taken from all the subjects of Survey. Participants were assured of their privacy and had the option to withdraw from the inquiry. Respecting privacy and confidentiality is critical, so strong procedures were put in place to protect acquired data and maintain anonymity.

Tool: To verify the legitimacy of the content, this tool was translated into Punjabi, the vernacular language, and thenback translated. Although the questionnaire was created for self-administration, a structured interview was done to assure data dependability. During the interviews, patients were asked to reply to questions about their health during the previous seven days.

Questionnaire (Phase I): Demographic information, Socioeconomic status, Reproductive health status, Minichal scale, History of illness in past 12 months, Family history, Symptoms of hypertension, Lifestyle and Dietary risk factors and COVID-19 information.

Measurements (Phase II): Blood pressure, weight, height, waist and hip circumference.

Data analysis- software: The survey results were input into a database created specifically for the study using the SPSS 21.0 programme. Descriptive statistics (mean and standard deviation) were produced for continuous variables, whereas frequencies and percentages were used to summarise qualitative data. Other statistical tests such as the Chi-square test were used. A significance level of 0.05 was applied.

RESULTS

In Present study, a total of 2160 females were screened for hypertension. Out of 2160 adult females, 827 (38.27%) were found to be hypertensive. A total of 27.9 % were stage 1 hypertensives and 10.4% were of stage 2 hypertension. The background characteristics of study subject was given in Table 1. A Significant associations ($p<0.05$) were observed for age, marital status, caste, family size, education, occupation, socioeconomic status, menstrual status, BMI, disease conditions and previous blood pressure diagnosis. Older age, being married, post-menopausal status, low education, labour-intensive occupations and lower socioeconomic class were more prevalent among hypertensive individuals.

Analysis of Risk Factors associated with hypertension

Marital status displayed distinct patterns, with higher HTN prevalence observed among married individuals (90.7%) compared to never-married (6.3%) or widowed (2.5%) counterparts (chi-square = 203.195, $p < 0.001$). The number of children also showed significant association, with increasing HTN prevalence correlating with higher numbers of children (chi-square = 356.815, $p < 0.001$). Menopausal status revealed substantial disparities, as post-menopausal women exhibited higher HTN rates (59.0%) compared to pre-menopausal (37.1%) and peri-menopausal (3.9%) women (chi-square = 485.602, $p < 0.001$). Body Mass Index (BMI) categories also demonstrated significant differences in HTN prevalence, with notable increases in HTN rates correlating with higher BMI ranges (chi-square = 122.804, $p < 0.001$). There was a significant correlation between BMI categories and the presence of hypertension ($p = 0.001$). (Table 1)

Table1: Association of hypertension with socio-demographic and health-related factors

Variable	Category	Normotensives		Hypertensives		p-value
		No. of cases n=(1333)	% age	No. of cases n=(827)	% age	
Age Group	18-29 years	573	43.0	70	8.5	0.001
	30-44 years	539	40.4	210	25.4	
	45-69 years	221	16.6	547	66.1	
Marital Status	Unmarried	432	32.4	52	6.3	0.001
	Married	883	66.2	750	90.7	
	Widowed	14	1.1	21	2.5	
	Divorced	4	0.3	4	0.5	
Caste	Scheduled Caste	188	14.1	79	9.6	0.001
	Lower Caste	396	29.7	209	25.3	
	Agriculture Caste	749	56.2	539	65.2	
Family Members	>5 Members	384	28.8	202	24.4	0.028

	≤5 Members	949	71.2	625	75.6	
Social Participation	None	1207	90.5	700	84.6	0.001
	Member of 1 Org.	126	9.5	127	15.4	
Education	Illiterate	516	38.7	534	64.6	0.001
	Can Read Only	33	2.5	75	9.1	
	Can Read & Write	35	2.6	38	4.6	
	Primary	79	5.9	60	7.3	
	Middle	44	3.3	24	2.9	
	High School	379	28.4	75	9.1	
	Graduate	175	13.1	14	1.7	
	Above Graduate	72	5.4	7	0.8	
Occupation	Labourer	502	37.7	587	71.0	0.001
	Business	76	5.7	10	1.2	
	Independent Profession	180	13.5	64	7.7	
	Cultivation	507	38.0	161	19.5	
	Service	65	4.9	5	0.6	
Socioeconomic status (SES)	Upper Middle Class	190	14.3	40	4.8	0.001
	Middle Class	338	25.4	176	21.3	
	Lower Middle Class	513	38.5	231	27.9	
	Lower Class	292	21.9	380	45.9	
Menstrual Status	Pre-menopause	1101	82.6	307	37.1	0.001
	Peri-menopause	40	3.0	32	3.9	
	Post-menopause	192	14.4	488	59.0	
Disease Status	Heart Attack	0	0	7	0.8	0.001
	Stroke	5	0.4	25	3.0	
	Diabetes	39	2.9	71	8.6	
	Dyslipidemia	4	0.3	19	2.3	
	Thyroid Problem	23	1.7	55	6.7	
	Renal Disease	2	0.2	1	0.1	
	Cancer	0	0	5	0.6	
	Other	23	1.7	28	3.4	
Body Mass Index (kg/m²)	<18.5	204	15.3	53	6.4	0.001
	18.5-22.9	477	35.8	193	23.3	
	23-24.9	242	18.2	174	21.0	
	25-29.9	338	25.4	290	35.1	
	≥30	72	5.4	117	14.1	

Lifestyle Pattern and Dietary Practices

A comprehensive overview of dietary habits among a sample population of 2160 individuals, highlighting significant trends in food consumption. Participants reported high weekly intake of cereals (mean of 6.89 days) and dairy products (mean of 6.65 days), suggesting these are staple foods. Conversely, the consumption of fish and non-vegetarian meals was notably low, with averages of 0.06 and 0.16 days per week, respectively, indicating a predominantly vegetarian diet. Fruits and vegetables showed moderate intake levels, with leafy vegetables consumed on an average of 3.51 days per week. Beverage choices leaned towards high tea consumption (mean of 6.85 days) and lower intake of carbonated drinks (mean of 1.44 days). Water intake was reasonable at a mean of 2.66 litres per day, while sugar and salt consumption indicated potential areas for dietary improvement.

Chi-square tests were employed to evaluate the relationships between hypertension status and a range of lifestyle and health-related variables, including alcohol consumption, physical activity and sleep duration. Each factor such as cooking practices, stress levels and dietary patterns was assessed separately. Associations were considered statistically significant when the p-value was less than 0.05, indicating meaningful differences between hypertensive and non-hypertensive participants for certain variables. Notably, the type of cooking fuel used and the duration of sleep demonstrated significant associations with hypertension.

The results revealed significant associations between hypertension and various variables. But no significant differences were observed between

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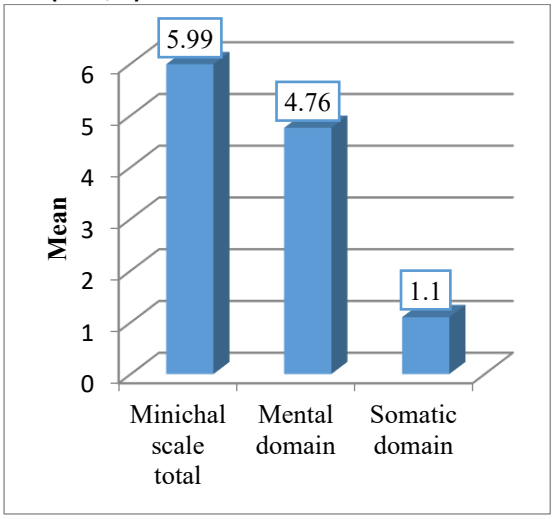
hypertensive and non-hypertensive participants regarding the practice of regularly changing cooking oil or fat (p = 0.877), nor in smoking and alcohol consumption history among women in Punjab. However, significant disparities emerged in dietary habits: hypertensive subjects exhibited higher average sugar intake (p = 0.006), salt intake (p = 0.007) and were more likely to add table salt during meals (p = 0.013) compared to non-hypertensive subjects. In addition, hypertensive individuals consumed pickles with their meals significantly more often than non-hypertensive individuals, showing a notable difference between the groups (p = 0.001). These findings underscore potential associations between certain dietary practices and the prevalence of hypertension, suggesting avenues for targeted interventions to mitigate cardiovascular risks. (Table 2)

Table 2: Chi-square analysis of lifestyle and dietary factors in relation to hypertension status

Variable	Category	Normotensives		Hypertensives		Chi-square Value	p-value
		No. of cases n=(1333)	% age	No. of cases n= (827)	% age		
Alcohol Consumption	No	1333	100	827	100	-	1.000
Smoking	No	1333	100	827	100	-	1.000
Fuel used for cooking	Electricity	1	0.1	0	0	18.195	0.006
	LPG	1251	93.8	743	89.8		
	Biogas	28	2.1	33	4.0		
	Kerosene	32	2.4	36	4.4		
	Wood	5	0.4	1	0.1		
	Agricultural crop waste	2	0.2	0	0		
	Dung cakes	14	1.1	14	1.7		
Type of cooking method	Stove	153	11.5	21	2.5	62.828	0.001
	Chullah	194	14.6	100	12.1		
	Open fire	3	0.2	5	0.6		
	Gas	983	73.7	701	84.8		
Ventilation in cooking area	Yes	1100	82.5	718	86.8	7.079	0.008
	No	233	17.5	109	13.2		
Physical Activity	Vigorous intensity activity	138	10.4	46	5.6	15.028	0.001
	Moderate intensity activity	1195	89.6	781	94.4		
Physical activity per week (days)	1 day	23	1.7	4	0.5	49.362	0.001
	2 days	46	3.5	6	0.7		
	3 days	28	2.1	1	0.1		
	4 days	36	2.7	9	1.1		
	5 days	47	3.5	24	2.9		
	6 days	29	2.2	13	1.6		
	7 days	1124	84.3	770	93.1		
Time spent on physical activity	1 hour	338	25.4	165	20.0	22.327	0.014
	2 hours	367	27.5	262	31.7		
	3 hours	269	20.2	177	21.4		
	4 hours	161	12.1	117	14.1		
	5hours	73	5.5	36	4.4		
	6 hours	45	3.4	29	3.5		
	7 hours	43	3.2	17	2.1		
	8 hours	36	2.7	20	2.4		
	9 hours	0	0	3	0.4		
	10 hours	1	0.1	1	0.1		
	Walking or jogging	269	20.2	66	8.0	71.333	0.001

Types of physical activity	Running	19	1.4	5	0.6		
	Gym	11	0.8	3	0.4		
	Yoga	2	0.2	0	0		
	Agricultural work in fields	2	0.2	1	0.1		
	Rearing of domestic animals	0	0	2	0.2		
	Labour work or MGNREGA	10	0.8	7	0.8		
	Gardening	1	0.1	1	0.1		
	Household work at home	985	73.9	725	87.7		
	Stitching or tailoring	14	1.1	8	1.0		
Sleep duration	5 hours	27	2.0	82	9.9	74.871	0.001
	6 hours	241	18.1	178	21.5		
	7 hours	524	39.3	276	33.4		
	8 hours	466	35.0	252	30.5		
	9 hours	59	4.4	30	3.6		
	10 hours	16	1.2	9	1.1		
Stress	Yes	310	23.3	236	28.5	7.536	0.006
	No	1023	76.7	591	71.5		
	Emotional stress	235	17.6	182	22.0	6.279	0.014
	Physical stress	56	4.2	71	8.6	17.727	0.001
Change oil/fat regularly	Yes	302	22.7	224	27.1	5.437	0.020
	No	1031	77.3	603	72.9		
Sugar intake daily	Very mild	328	24.6	213	25.8	13.84	0.003
	Mild	893	67.0	578	69.9		
	Moderate	105	7.9	32	3.9		
	Severe	7	0.5	4	0.5		
Salt intake daily	Very mild	323	24.2	178	21.5	17.548	0.001
	Mild	382	28.7	185	22.4		
	Moderate	495	37.1	369	44.6		
	Severe	133	10.0	95	11.5		
Table salt	Yes	443	33.2	311	37.6	4.94	0.041
	No	890	66.8	516	62.4		
Pickles	Yes	726	54.5	338	40.9	37.728	0.001
	No	607	45.5	489	59.1		

Figure 1: Evaluation of Health-Related Quality of Life (HRQoL)



Analysis of HRQoL scores

HRQoL was evaluated using the MINICHAL scale, yielding mean scores of 4.76 ± 4.84 in the mental domain and 1.10 ± 2.15 in the somatic domain, with an overall average total score of 5.99 ± 6.13. (Figure 1)

Association of Different Factors with HRQOL

The regression analysis showed that specific variables were significantly linked to the outcome of interest. Specifically, the somatic domain of the MINICHAL scale shows a statistically significant positive relationship, with an Exp (B) of 1.101, indicating that for each unit increase in this domain, the odds of the outcome increase by approximately 10.1%. Additionally, in the age group 45-69 years, the total MINICHAL scale score also exhibits a significant effect (Sig. = 0.033, Exp(B) = 1.047), suggesting that each unit increase in the score corresponds to a 4.7% increase in odds. In contrast, the 18-29 and 30-44 age groups showed no

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significant association with the outcome, as reflected by their high p-values of 0.574 and 0.867, respectively. Overall, these findings highlight the importance of the MINICHAL scale in predicting outcomes, particularly in older age groups. (Table 3)

Table 3: Association of age with Minichal Scale

Variable	Significance (Sig.)	Exp(B)	95% C.I. for Exp(B)	Lower	Upper
Somatic Domain of Minichal Scale	0.001	1.101	1.039	1.166	
HTN, Age 18-29 Years	0.574	0.778			
HTN, Age 30-44 Years	0.867	1.040			
HTN, Age 45-69 Years	0.033	1.047	1.004	1.092	

Correlation of HRQoL with different parameters among hypertensive individuals:

Among the treatment-related factors, subjects who were engaged in regular physical activity reported significantly lower MINICHAL scores (MD = 2.7 ± 2.3, p = 0.001; SD = 2.4 ± 2.7, p = 0.05; TS = 4.7 ± 4.4, p = 0.003), indicating better quality of life. In contrast, the severity of hypertension, its duration, adherence to salt restriction and the number of medications used showed no significant effect on HRQoL. Additionally, controlling blood pressure through the prescribed medication regimen showed a strong significant correlation with HRQoL ($p < 0.05$).

DISCUSSION

The study assessed the prevalence of hypertension in a rural female population of 2,160 individuals, finding that 38.27% had hypertension, with a considerable number classified in stage 1 and stage 2 categories. It also evaluated HRQoL among these hypertensive patients using the MINICHAL scale, analyzing different factors impacting their quality of life. Key demographic characteristics such as age, marital status, number of children and menopausal status were closely related to the occurrence of hypertension.

India, as a developing nation, is experiencing rapid demographic and epidemiological transitions similar to other countries in this category. The prevalence of hypertension in this study (38.27%) was higher than in previous studies.(13-15)Few research reported the results consistent with the present investigation.(16)

The current study found a notably higher rate of hypertension in women compared to a prior investigation in Bihar, which reported a prevalence of 23.73%.(15) The variation in findings may be attributed to differences in social norms, cultural practices, dietary patterns, lifestyle choices, participant age groups and research design.

HRQoL was evaluated using the MINICHAL scale, showing average scores of 4.76 ± 4.84 for mental health, 1.10 ± 2.15 for physical health and a total average score of 5.99 ± 6.13.

A positive correlation was found in the somatic domain of the MINICHAL scale, where an Exp (B) value of 1.101 indicates that each one-point increase in the score increases the likelihood of the outcome by about 10.1%. In individuals aged 45 to 69, the total MINICHAL score significantly influences the outcome, with a p-value of 0.033 and an Exp (B) of 1.047, indicating that each one-point increase in the score raises the odds of the outcome by 4.7%. Meanwhile, no significant link was found in the younger age brackets (18-29 and 30-44 years), as indicated by non-significant p-values of 0.574 and 0.867.

In this study, the age groups were aligned with the HRQoL measurement tools employed. Similar findings have been reported in other research examining the link between quality of life and age. For instance, Youssef et al.(17) found that younger adults experienced higher HRQoL, whereas Grimm et al.(18)noted better HRQoL scores among older adults.

This study focused on evaluating the quality of life (QOL) of hypertensive patients, but it has several limitations. The short duration and small sample size may affect the robustness of the findings. Moreover, the MINICHAL scores evaluate quality of life based only on health status from the last seven days, overlooking the effects of earlier treatment experiences.

Hypertension is widely recognized to considerably diminish health-related quality of life, with factors like physical activity further affecting this impact. Additionally, studies have identified strong relationships between medication-related factors, including the number of drugs taken, the length and severity of the condition and the presence of adverse drug effects and HRQoL. Measuring HRQOL assessment aids in identifying the best treatment options for patients with hypertension and facilitates population-level studies to explore various quality of life factors within this group.

CONCLUSION

This study underscores the high prevalence of hypertension among women in a rural setting,

affecting 38.27%, with a significant number classified in stages 1 and 2. The assessment of health-related quality of life (HRQOL) via the MINICHAL scale showed notable links with demographic variables, especially in the 45-69 age group, where higher scores were associated with increased risk of adverse outcomes. Additionally, the research found a positive correlation between hypertension and BMI, along with reduced physical activity among those with hypertension.

Recommendation

Hypertension is a major contributor to cardiovascular morbidity and mortality, yet it often remains undiagnosed, especially among women in rural areas. Identifying the high prevalence of asymptomatic hypertension highlights the urgent need for community-based screening and awareness. The findings of this study provide critical evidence for policymakers to strengthen preventive strategies and integrate hypertension management into primary healthcare in Punjab.

Relevance of the Study

This study highlights the hidden burden of asymptomatic hypertension among adult females in rural Punjab, a group often underrepresented in epidemiological research. By identifying prevalence, key risk factors and associations with demographic variables, it provides region-specific evidence that can guide community-based interventions. The findings add to current knowledge by emphasizing the need for gender-sensitive screening and preventive strategies in primary healthcare.

Authors Contribution

RK[1]: Contributed significantly to the conceptualization of the study, performed literature searches and was actively involved in clinical and experimental studies. Contributor also participated in manuscript preparation and editing. **CKS[2]:** Participated in overall study design and manuscript review. Additionally, she served as the guarantor, taking full responsibility for the integrity and accuracy of the work. **MA[3]:** Contributed to data acquisition, ensuring proper collection and organization of study data. **AC[4]:** Involved in defining the intellectual content of the study and carried out statistical analysis. **PS[5]:** Contributed to data analysis, providing interpretation and ensuring the accuracy of results.

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Nil

Conflict of Interest

There are no conflicts of interest.

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

This manuscript was developed without the assistance of generative AI tools for content creation, data analysis or interpretation. All findings and conclusions presented are the result of the authors' independent work and scholarly expertise.

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