Original Article

Perceived Stress and Its Determinants among Postmenopausal Women in Urban Puducherry

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ABSTRACT

Background: Menopause characterized by a gradual decline in ovarian hormones takes its toll on the women both physically and mentally. These health problems can negatively impact the mental status. Hence, the current study was done to determine the level of stress and its associated factors among postmenopausal women in urban Puducherry, India. **Materials and Methods:** A facility-based cross-sectional study was done among 219 postmenopausal women attending the outpatient department in urban primary health center during May 2017–June 2017. Information regarding sociodemographic profile was collected using pretested semi-structured questionnaire and Cohen's Perceived Stress Scale was used to assess the stress level. We calculated adjusted prevalence ratios (aPRs) to identify the determinants of stress. **Results:** Among 219 participants, 46.6% were in the age group of 60–74 years; 32.9% had primary to secondary level of education; 56.2% were unemployed; 42.5% belonged to lower socioeconomic class; and 32.9% had both diabetes mellitus and hypertension. The prevalence of stress among the postmenopausal women was 26.0% (95% confidence interval: 20.7–32.2). Postmenopausal woman with higher education (aPR – 2.18), belonging to nuclear family (aPR – 1.93), lesser parity (aPR – 1.18), and current alcohol/tobacco users (aPR-2.32) were found to have a significant association with stress among the study participants. **Conclusion:** The current study showed that more than one-fourth of the postmenopausal women had high to very high level of stress. Education, religion, parity, and substance abuse were the significant determinants of stress. However, further longitudinal research needs to be done to determine whether the factors informed in the current study are truly associated with stress and develop interventions accordingly.

KEYWORDS: *Mental health, middle aged, postmenopause, psychological stress*

INTRODUCTION

Over the past decade, menopausal and postmenopausal health has emerged as an important area of interest as it has failed to receive adequate attention and care. Menopause is a stage characterized by a gradual decline in ovarian hormones which takes its toll on a women's physical and mental health. As the women's reproductive function comes to an end at this phase, they become more susceptible to newer health issues.[1]

However, the severity and type of symptoms vary from person to person. These commonly include hot flushes, sleeping disorders, palpitations and anxiety, depression, sexual difficulties, and bladder problems.[1] These problems will physically strain the women as well as exerts massive burden on the mental health of the women. This further begets more long-lasting comorbidities such

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as diabetes mellitus (DM) and hypertension. A survey conducted among 6500 women across 21 countries showed that 87% of Indian women claim feeling stressed most of the time, with an additional 82% asserting they had insufficient time to relax.[2] Although events occurring in daily life are known to be a major cause of such stress, the proportion of it contributed by menopause *per* se and its effects on the body is still to be determined.

Studies are needed to investigate such psychological changes experienced during the postmenopausal phase as they help the health-care system to identify and understand the mental health issues. It also helps in devising culturally appropriate public health programs to ensure healthy postreproductive life for them. However, studies concerning the mental health of postmenopausal women are still limited in India. The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress and has been approved for all kinds of study settings.[3] Using this scale, we aimed to assess the perceived stress and its determinants among postmenopausal women residing in urban wards of Puducherry.

MATERIALS AND METHODS

Study setting

This was a cross-sectional study conducted within the premises of an urban health center (UHC) attached to tertiary care center Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, during May 2017–June 2017. This UHC caters to four urban wards, namely Vazhaikulam, Kurusukuppam, Chinnayapuram, and Vaithikuppam.

Study participants and sample size

Postmenopausal women visiting the UHC outpatient department (OPD) were included in the study. The operational definition for postmenopausal women was those women aged 40 years or above and a history of amenorrhea for a minimum of 12 months.

The sample size was estimated using OpenEpi v3.01 (AG Dean, KM Sullivan, Atlanta, Georgia).[4] Assuming a prevalence of 35%, absolute precision of 7%, 5% alpha error, and 95% confidence interval (CI), the minimum sample size required was 179. However, we included all the eligible patients visiting the OPD during the study period (219 participants in total).

Study procedure and study tool

This study was conducted in an outpatient basis targeting the postmenopausal age group women visiting the UHC during outpatient hours. Six training interns posted in the UHC were chosen as data collectors

and adequate training was provided before starting the data collection. Senior resident and postgraduates posted in the same UHC supervised the data collection process and reviewed all the filled questionnaires every day. Informed verbal consent was obtained from the participants before administering the questionnaire.

A pretested semi-structured questionnaire was made and it was used to gather the sociodemographic, obstetric details of the participants such as age, socioeconomic status, occupation, education, religion, marital status, menstrual history, brief obstetric history, use of contraception, tubectomy status, and use of hormone replacement therapy and details regarding health morbidities faced by postmenopausal women were collected. History regarding major comorbidities such as DM and hypertension, dietary history, consumption of tobacco or alcohol, and micronutrient supplements was also taken into account. Height and weight of each participant were measured using a stadiometer with least count of 0.1 cm and standard weighing machine with least count of 500 g, respectively, and thereby, body mass index (BMI) of each participant was calculated in kg/m^2.

Cohen PSS was used as a psychological instrument for measuring the perception of stress during the previous 1-month period. This scale was originally developed as a 14-point scale; however, the shorter version, i.e., the PSS-10 with 10 questions regarding stress was used in this study. This 10-item scale consists of questions which includes both positive and negative aspects of stress. Responses were scored on a 5-point Likert scale ranging from 0 to 4. Scores were valued as follows: 4 means never, 3 means rarely, 2 means sometimes, 1 means often, and 0 means always. It should be noted that the questions 4, 5, 7, and 8 have to be positively calculated. Based on the overall score, stress level can be classified as: "Low" (score: 0–11), "Average" (score: 12–15), "High" (score: "16–20"), and "Very high" (score ≥21). The Cronbach's Alpha coefficient value for the PSS was reported to be 0.72 and the re-test reliability of the questionnaire was 0.93.[5]

Statistical analysis

Data entry was done in EpiData software v 3.01 (EpiData Association, Odense, Denmark).[6] Continuous variables were summarized as mean and standard deviation (SD) or median and interquartile range (IQR) depending on the normality of data distribution. Prevalence of high to very high stress was summarized as the proportion with 95% CI. Log binomial regression was performed to find the factors associated with high to very high perceived stress among the postmenopausal women. All the variables with $P < 0.10$ in the univariable model

were included in the multivariable model. Determinants of perceived stress were identified with high to very level of perceived stress as dependent variable and age, education, family type, parity, self-reported comorbidity, current tobacco/alcohol use, and BMI as explanatory variables in the multivariable model. Adjusted prevalence ratio (aPR) ratio with 95% CI was calculated. Variables with *P* < 0.05 were considered statistically significant. All the analyses were performed using STATA version 12 (CollegeStation, Texas, USA).[7]

RESULTS

In total, we approached 230 postmenopausal women to participate in the study, of which 219 completed the questionnaire (response rate 95%). The mean (SD) age of the study participants was 62.7 (10.0) years. Almost half of the study participants, 102 (46.6%), were in the age group of 60–74 years; one-third, 72 (32.9) were educated up to primary and secondary level of education; more than half, 123 (56.2), were unemployed; two-third, 135 (61.7), were widowed; almost half, 105 (48.0%), had normal BMI; majority, 198 (90.4%), were Hindu by religion; almost half, 105 (48.0%), belonged to nuclear family; more than two-fifth, 93 (42.5%), belonged to lower socioeconomic class; and nearly one-third, 69 (31.9%), had parity 5 or more [Table 1]. The mean (SD) age of menopause was 47.0 (4.8) years; for menarche, it was 14 (1.7) years. The median (IQR) age of the first childbirth was 20 (18–22) years. About 72 (32.9%) had both DM and hypertension and 162 (74.0%) had a history of regular intake of supplements [Table 1].

Prevalence of high to very high stress among the postmenopausal women was 26.0% (95% CI: 20.7–32.2) [Table 2]. Univariate analysis found that the participants aged 60 years or more (prevalence ratio [PR] – 1.69, *P* = 0.03), belonging to the nuclear type of family (PR –2.35, *P* = 0.001), parity <2 (PR – 1.58, *P* = 0.04), and current users of tobacco/alcohol (PR-2.84, *P* < 0.001) had higher risk of having high to very high stress when compared to women belonging to 40–59 years, belonging to joint/three-generation type of family, higher parity, and with no tobacco/alcohol use, respectively [Table 3].

In adjusted analysis, we found that the postmenopausal woman with higher educational qualification (aPR – 2.18, 95% CI: 1.04–4.59), belonging to the nuclear type of family (aPR –1.93, 95% CI: 1.23–3.04), lesser parity (aPR – 1.18, 95% CI: 1.18–2.40), and current users of tobacco/

Table 1: Sociodemographic characteristics of the study participants, (*n*=219)	
Sociodemographic characteristics	Frequency, *n* (%)
Age category (years)	
45- 59	96 (43.8)
60- 74	102 (46.6)
≥75	21 (9.6)
Education (in class)	
No formal education	132 (60.3)
Primary and middle	72 (32.9)
Secondary and above	15 (6.8)
Occupation	
Unemployed	123 (56.2)
Employed	96 (43.8)
Marital status	
Currently married	66 (30.1)
Widowed	135 (61.7)
Separated	9 (4.1)
Unmarried	6 (2.7)
Divorced	3 (1.4)
Religion	
Hindu	198 (90.4)
Christian	21 (9.6)
Type of family	
Nuclear	105 (48.0)
Joint	69 (31.5)
Three generation	45 (20.5)
Socioeconomic class (Rs.)*	
Lower - Class V (≤₹938)	93 (42.5)
Lower middle - Class IV (₹939- 1875)	75 (34.2)
Middle - Class III (₹1876- 3126)	93 (17.8)
Upper middle - Class II (₹3127- 6253)	9 (4.1)
Upper - Class I (≥₹6254)	3 (1.4)
Receiving old-age pension	
Yes	156 (71.2)
No	63 (28.8)
Previous menstrual cycles	
Regular	210 (95.9)
Irregular	9 (4.1)
Parity	
0	9 (4.1)
1	21 (9.6)
2- 4	120 (54.8)
5 or more	69 (31.5)
History of contraceptive use	9 (4.1)
History of tubectomy	129 (58.9)
Self-reported chronic comorbidity	
Nil	30 (13.7)
Hypertension	72 (32.9)
DM	27 (12.3)
DM and hypertension	61 (31.5)
Bronchial asthma	9 (4.1)
Others#	9 (4.1)
Thyroid disorders	3 (1.4)

Contd...

Table 1: Contd...	
Sociodemographic characteristics	**Frequency, *n* (%)**
Current alcohol users	3 (1.4)
Current tobacco users	17 (7.8)
Intake of supplements‡	
Yes	162 (74.0)
No	57 (26.0)
BMI†	
Underweight (<18.50)	9 (4.1)
Normal (18.50- 22.99)	105 (48.0)
Overweight (23.00- 24.99)	90 (41.1)
Obesity (≥5.00)	15 (6.8)

*Modified BG Prasad Scale, January 2017, #Included different combinations of bronchial asthma, thyroid disorders, DM and hypertension, †WHO criteria for the Asian population, ‡Includes any one of the following: iron and folic acid, calcium and Vitamin B complex. BMI: Body mass index, DM: Diabetes mellitus

Table 2: Prevalence of stress among postmenopausal woman residing in selected wards of urban Puducherry using CPSS questionnaire, *n*=219

Perceived stress	Frequency, *n* (%)	95% CI
Low (0- 11)	72 (32.9)	27.0- 39.4
Average (12- 15)	90 (41.1)	34.8- 47.7
High (16- 20)	33 (15.1)	10.9- 20.4
Very high (≥20)	24 (10.9)	7.5- 15.8

CI: Confidence interval, CPSS: Cohen Perceived Stress Scale

alcohol (aPR – 2.32, 95% CI: 1.49–3.61) were found as the significant determinants of perceived stress [Table 4].

DISCUSSION

Our study found that about 26% (95% CI: 20.7–32.2) of postmenopausal women have high to very high level of stress. National Mental Health Survey 2015–2016 has reported that the prevalence of stress among the Indian adult population as 3.5%. There was a clear difference in the prevalence with respect to gender, menopause, and geographical region. Females had two times more risk of having stress when compared to males in India. Similarly, urban population had more than three times higher risk of having stress when compared to the rural population. Women in the age group attaining menopause had the highest prevalence of stress when compared to the other age groups.[8]

Hence, the current study was done on this target population and reported that more than one-fourth (26%) of postmenopausal women in urban area have high to very high level of stress. A similar finding was found in studies conducted in other countries such as Arab and Iran where around 25% had a higher stress level.[9,10] However, a study done in South Indian population like Chennai showed contrast findings, in which more than

75% had high to very high level of stress.[11] This difference in stress can be attributed to the difference in selection of the study participants and inclusion of only postmenopausal women with health problems in the above-mentioned study.

Major determinants of stress among postmenopausal women were higher education level, nuclear type family, lesser parity, and current alcohol/tobacco usage. Of the above-mentioned predictors, substance use such as alcohol or tobacco was found to be the most significant stressor among the postmenopausal women. The influence of behavioral habits on stress needs to be studied further through a longitudinal research, as stress can lead to engaging in harmful habits and vice versa. Educational status, religion, and parity were the other determinants found in the current study.

The current study has certain strengths. Since it was a facility-based study, it was feasible for early linkage with the department of psychiatry to screen and counsel for stress. Use of validated scale and high response rate were added strengths to the study. The current study also adds to the limited literature available regarding the prevalence of stress among postmenopausal women in Indian settings.

In spite of these strengths, there were certain limitations in the study. Though facility-based setting was advantageous for early linkage of the patients, the results obtained in our study might not be representative of postmenopausal women in the community. Causal inference cannot be made with the determinants identified in our study findings because of cross-sectional design. Further large-scale longitudinal research is required to confirm the determinants identified in our study that are truly associated with stress and develop targeted interventions.

Holistic health-care approach is being adapted throughout the country to ensure that all the people have adequate physical, social, and mental well-being. In India, women spend about one-third of their life span in the postmenopausal phase. Therefore, to achieve a holistic health upliftment in the country, it is imperative to address these psychological problems not only at the national level but also at the community as well as individual level where they can be targeted easily and tackled much more efficiently. However, inadequate understanding about psychological morbidities like stress will act as a barrier in achieving this. The current study provides such baseline information to the policymakers and relevant stakeholders, which will help them in devising appropriate strategies to tackle stress among

Table 3: Association of sociodemographic, behavioral, anthropometric, and morbidity profile with perceived stress among postmenopausal woman in urban Puducherry *n*=219

Characteristics	Total	Participants with high and very high stress (*n*=57), *n* (%)	Unadjusted prevalence ratio (95% CI)	*P*
Age category (years)				
45- 59	96	18 (18.8)	Reference	-
≥60	123	39 (31.7)	1.69 (1.04- 2.76)	0.03
Education (in class)				
No formal education	132	39 (29.5)	1.77 (1.01- 3.17)	0.05
Primary and middle	72	12 (16.7)	Reference	-
Secondary and above	15	6 (40.0)	2.40 (1.07- 5.38)	0.03
Occupation				
Unemployed	123	33 (26.8)	1.07 (0.68- 1.69)	0.76
Employed	96	24 (25.0)	Reference	-
Marital status				
Currently married	66	12 (18.2)	Reference	-
Widowed/separated/unmarried/divorced	153	45 (29.4)	1.62 (0.92- 2.85)	0.11
Religion				
Hindu	198	51 (25.8)	Reference	-
Christian	21	6 (28.6)	1.11 (0.54- 2.27)	0.77
Type of family				
Nuclear	105	39 (37.1)	2.35 (1.44- 3.85)	0.001
Joint/three generation	114	18 (15.8)	Reference	-
Socioeconomic class (Rs.)*				
Lower	93	24 (25.8)	1.10 (0.60- 2.00)	0.76
Lower middle	75	21 (28.0)	1.19 (0.64- 2.20)	0.57
Middle/upper middle/upper	51	12 (23.5)	Reference	-
Parity				
0- 2	69	24 (34.8)	1.58 (1.02- 2.46)	0.04
≥3	150	33 (22.0)	Reference	-
Self-reported chronic comorbidity				
Nil	30	15 (50.0)	2.25 (1.44- 3.52)	<0.001
Present	189	42 (22.2)	Reference	-
Current tobacco/alcohol users				
No	202	46 (22.8)	Reference	-
Yes	17	11 (64.7)	2.84 (1.84- 4.38)	<0.001
Intake of supplements‡				
Yes	162	39 (24.1)	Reference	-
No	57	18 (31.6)	1.31 (0.82- 2.10)	0.25
BMI†				
Underweight/normal	114	48 (36.8)	2.58 (1.52- 4.37)	<0.001
Overweight/obesity	105	15 (14.3)	Reference	-

*Modified BG Prasad Scale, January 2017, †WHO criteria for the Asian population, ‡Includes any one of the following: Iron and folic acid, calcium and Vitamin B complex. BMI: Body mass index, CI: Confidence interval

postmenopausal women. Still, more studies targeting the postmenopausal women are needed to expand our understanding of this seldom-explored field to improve mental well-being throughout the country.

CONCLUSION

The current study showed that more than one-fourth of the postmenopausal women had high to very high level of stress. Education, religion, parity, and harmful habits such as tobacco or alcohol use were the significant determinants of stress. Hence, postmenopausal women should be advised lifestyle modifications to spend time with the loved ones, plan activities in advance, and indulging into some form of daily relaxing activities that can help to lower mental stress and lead a healthy life.

Table 4: Multivariable model showing the determinants of perceived stress among postmenopausal woman in urban Puducherry *n*=219

Characteristics	Total	Participants with high and very high stress (*n*=57), *n* (%)	aPR (95% CI)	*P*
Age category (years)				
45- 59	96	18 (18.8)	Reference	-
≥60	123	39 (31.7)	0.79 (0.61- 1.04)	0.09
Education (in class)				
No formal education	132	39 (29.5)	1.36 (0.78- 2.40)	0.28
Primary and middle	72	12 (16.7)	Reference	-
Secondary and above	15	6 (40.0)	2.18 (1.04- 4.59)	0.04
Type of family				
Nuclear	105	39 (37.1)	1.93 (1.23- 3.04)	0.004
Joint/three generation	114	18 (15.8)	Reference	-
Parity				
0- 2	69	24 (34.8)	1.68 (1.18- 2.40)	0.004
≥3	150	33 (22.0)	Reference	-
Self-reported chronic comorbidity				
Nil	30	15 (50.0)	1.64 (1.03- 2.61)	0.03
Present	189	42 (22.2)	Reference	-
Current tobacco/alcohol users				
No	202	46 (22.8)	Reference	-
Yes	17	11 (64.7)	2.32 (1.49- 3.61)	<0.001
BMI[†]				
Underweight/normal	114	48 (36.8)	1.77 (1.24- 2.53)	0.002
Overweight/obesity	105	15 (14.3)	Reference	-

[†]WHO criteria for the Asian population, [‡]Includes any one of the following: iron and folic acid, calcium and Vitamin B complex. aPR: Adjusted prevalence ratio, BMI: Body mass index, CI: Confidence interval

Conflicts of interest

There are no conflicts of interest.

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