Background: The severity of menopausal symptoms negatively impacts a woman’s quality of life (QoL). Objective: The aim of the study was to assess the prevalence of menopause-related impaired QoL and determine its associated factors among postmenopausal women living in slum areas of Bhubaneswar, India. Materials and Methods: This cross-sectional study was conducted among 198 postmenopausal women aged 45–65 years during the year 2016–2017. The Menopause Rating Scale (MRS) was used to assess the prevalence and severity of menopausal symptoms. Results: Joint and muscular discomfort was the most prevalent moderate-to-severe symptom (90.4%), followed by hot flushes (72.8%), irritability (67.2%), and physical and mental exhaustion (64.2%). More than two-third (133, 67.2%) of women had impaired QoL (severe total MRS score ≥17). Multivariate logistic regression analysis revealed that impaired QoL was associated younger age (adjusted odds ratio [AOR]: 4.6, 95% confidence interval [CI]: 2.12–9.98), tobacco consumption (AOR: 2.0, 95% CI: 1.05–3.82), not being satisfied in relation with husband (AOR: 3.33, 95% CI: 1.84–6.06), not having autonomy in health-care decision-making in the family (AOR: 2.30, 95% CI: 1.12–4.73), history of reproductive tract infection (AOR: 4.57, 95% CI: 1.71–12.19), and earlier onset of menopause (AOR: 3.26, 95% CI: 1.18–8.96). Conclusion: The point prevalence of menopause-related impaired QOL in postmenopausal women living in slums of Bhubaneswar was high. Incorporating these determinants in the existing strategies can be useful to improve the QoL of these women.

Keywords: Postmenopausal women, quality of life, reproductive tract infection, slum, tobacco consumption

Menopause is a normal physiological process which is characterized by the permanent cessation of menses in women due to reduced ovarian hormone secretion.[1,2] Various menopausal symptoms such as vasomotor, psychological, physical, and urogenital symptoms start appearing during this period, which may disturb a woman’s quality of life (QoL).[2-4] The severity of menopausal symptoms negatively affects daily life activities and social life, thus significantly impairs QoL.[5-7] According to the WHO, QoL refers to one’s perceptions of his/her status in life as per the cultural and value systems in which they live and with regard to their goals, expectations, standards, and concerns.[8] There is a considerable variation in the prevalence of menopausal symptoms and its severity[8,10] and this variation depends on the geographic, socioeconomic, and cultural environment of the women where they live.[11-13] The age of onset of natural menopause varies worldwide ranging between 44.6 and 52 years.[14] In India, the mean age of onset of natural menopause is 45.02 ± 4.35 years[15] and life expectancy of a woman is around 70 years. Thus, the postmenopause period corresponds to around one-third of a woman’s lifespan which makes the QoL during this period a big concern.

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Moreover, women face the burden of social discrimination throughout their lives from the womb to the tomb. Slum-dwellers are deprived of the basic needs for a healthy life and live in an unhygienic environment which puts them at greater risk of developing various health hazards. Women living in such areas experience very poor QoL because of being under shadows of poverty, ignorance, neglect, and sufferings. To date, there is limited information about menopause-related QoL in India, particularly in this region. The issue of specific problems of women beyond the reproductive age, especially in slum areas, always gets less attention and thus remains unaddressed. With this backdrop, we designed the present study to assess the prevalence of menopause-related impaired QoL and associated factors among postmenopausal women living in slum areas of Bhubaneswar city in the Eastern region of India.

**Materials and Methods**

**Study participants**

A community-based cross-sectional study was carried out in 11 selected slum areas of Bhubaneswar, the capital city of Odisha state in the Eastern part of India during the year 2016–2017. Assuming the prevalence of severe menopausal symptoms among postmenopausal women as 50% with an estimated 10% absolute precision at 95% confidence interval (CI) and a design effect of 2, the sample size was calculated as 192. A multistage cluster sampling technique was adopted to select the study areas. The city of Bhubaneswar is divided into five zones: East, West, North, South, and Central, of which East and North zones were randomly selected. A list of all the wards having slums in the selected zones was obtained from Bhubaneswar Municipal Corporation and 50% of these wards in each zone were randomly chosen. Overall, 11 wards were selected and from each ward, one slum was randomly selected. Then, in each slum, 20 households having eligible women were considered for the study purpose. In case of the presence of more than one eligible woman in a household, only one woman was randomly selected for the study. All the postmenopausal women aged 45–65 years with at least 1 year of amenorrhea residing in slum areas for at least 5 years and willing to participate in the study were included in the study. Women receiving any kind of hormone therapy, those who attained surgical menopause, those with chronic illnesses such as diabetes, hypertension, cardiac disease, thyroid disorder, and mental disorder were excluded from the study. After screening of 332 menopausal women, 220 (66.3%) women were found eligible, of which 207 (94.1%) agreed to participate in the study.

**Study tool and data collection**

With the help of a structured schedule, data on sociodemographic variables including age, education, occupation, marital status, and monthly income of the family; reproductive characteristics such as parity, age at last menstruation, and history of reproductive tract infection during the past year; dietary habit; personal relation with husband; and autonomy in health-care decision-making in the family were collected. After physical examination of each study participant, the Menopause Rating Scale (MRS) was used to assess the health-related QoL.

The MRS is a menopause specific health-related QoL scale that was originally developed in the early 1990s to measure the severity of menopause-related complaints. It is a standardized health-related QoL scale with good psychometric characteristics which has been well accepted internationally. The scale consists of 11 items to assess the menopausal symptoms and is categorized into three subscales: (a) somatic: hot flushes, heart discomfort, sleep problems, and joint and muscular discomfort (items 1, 2, 3, and 11, respectively); (b) psychological: depressive mood, irritability, anxiety, and physical and mental exhaustion (items 4, 5, 6, and 7, respectively); and (c) urogenital: sexual problems, bladder problems, and dryness of the vagina (items 8, 9, and 10, respectively). Each item can be graded by an individual from 0 (none) to 4 (1 = mild; 2 = moderate; 3 = severe; and 4 = very severe). The total score for each subscale is the sum of each graded item contained in that subscale. Total MRS score is the sum of the three subscale scores and a total score of ≥17 was considered severe.

**Ethical considerations**

The study was approved by the Institutional Ethics Committee of the authors’ institution and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Written informed consent was obtained from all the study participants before involvement in the study.

**Statistical analysis**

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, N.Y., USA). Data were expressed as mean ± standard deviation, percentage, odds ratio, and confidence interval. Based on total MRS scores, two categories were created: those exhibiting total scores ≥17 indicating the impaired QoL and those with total scores <17 indicating the unimpaired QoL. First, each sociodemographic and reproductive characteristic was tested with univariate logistic regression analysis, and all those found to have $P \leq 0.1$ were included in the
final multivariate logistic regression model. All $P$ values were two tailed, and $P < 0.05$ was considered statistically significant. In the multivariate model, independent variables found to have significant associations with the impaired QoL were examined for the presence of any interactions. Model Wald F statistic was checked to assess whether the model adequately fits the data. As a complex sampling design was used in the study, sample weights were taken into consideration during the data analysis for obtaining more valid results.

**RESULTS**

A total of 207 eligible women participated in the study, of which 198 were considered for statistical analysis, as the rest were excluded due to incomplete data. The mean age of the study respondents was 54.7 ± 5.4 years and the majority (82, 41.4%) of women respondents were more than 55 years of age [Table 1]. Of 198 women surveyed, almost half (95, 48%) of the study participants were illiterate, 166 (83.8%) were housewives, and 147 (74.2%) were married. In 140 (70.7%) households, the monthly income was less than rupees 8000 (120 USD equivalent). Other aspects related to surveyed women include vegetarian (20.7%), consumed tobacco (71.7%), satisfactory relation with husband (57.6%), and having autonomy in health-care decision-making in the family (73.2%). Regarding the reproductive characteristics of the study participants, it was found that two-third of them reported having attained menarche at ≤13 years of age, and the mean age at last menstruation was 45.8 ± 2.7 years. The mean age at marriage was 17.7 ± 3.4 years and the mean age at first childbirth was 19.4 ± 3.1 years.

All the subscales except the urogenital subscale showed acceptable internal consistency reliability with Cronbach’s $\alpha \geq 0.70$ [Table 2]. It was observed that 133 (67.2%) study participants had a total score of 17 or more, indicating impaired QoL, and the severity is more in the urogenital domain (76.3%). The mean total MRS score was 20.42 ± 7.56 (median: 19.0, range: 0–44); somatic subscale: 8.24 ± 3.13 (median: 8.0, range: 0–16); psychological subscale: 7.2 ± 3.08 (median: 7.0, range: 0–16); and the urogenital subscale: 4.98 ± 2.21 (median: 4.5, range: 0–12). It was also revealed that joint and muscular discomfort was the most prevalent moderate-to-severe symptom (90.4%) followed by hot flushes (72.8%), irritability (67.2%), physical and mental exhaustion (64.2%), heart discomfort (63.6%), anxiety (62.6%), sleep problems (62.1%), bladder problems (60.6%), depressive mood (54.1%), dryness of the vagina (47.7%), and sexual problems (43.0%).

Logistic regression determined that impaired QoL (severe total MRS score ≥17) was associated with younger age (AOR: 4.6, 95% CI: 2.12–9.98), tobacco consumption (AOR: 2.0, 95% CI: 1.05–3.82), not being satisfied in relation with husband (AOR: 3.33, 95% CI: 1.84–6.06), not having autonomy in health-care decision-making in the family (AOR: 2.30, 95% CI: 1.12–4.73), history of reproductive tract infection (AOR: 4.57, 95% CI: 1.71–12.19), and earlier onset of menopause (AOR: 3.26, 95% CI: 1.18–8.96) [Table 3].

**DISCUSSION**

In our study, among the moderate-to-severe symptoms, joint and muscular discomfort was found to be the most prevalent (90.4%) complaint followed by hot flushes (72.8%), irritability (67.2%), and physical and mental exhaustion (64.2%). This is consistent with other study results.[6,16,25,26] Many other studies have also reported joint and muscle pain as the most common menopausal symptom.[4,26,27]

It was observed in the study that the prevalence of impaired QoL (severe total MRS score ≥17) among postmenopausal slum women was 67.2% which is higher as compared to findings of other studies conducted in various countries which range from 13.7% to 57.7%.[4,28,29] This might be due to methodological differences, different study populations, and sociocultural differences.

In the present study, age was found to be a protective factor for severe symptoms. Younger postmenopausal women (45–50 years) were 4.6 times more likely to have a severe MRS score than older women (>55 years). Studies have demonstrated that the MRS score was inversely associated with age[4,30] supporting our results.

It was also noticed that tobacco consumption did show a significant impact on menopausal symptoms. Women who were consuming tobacco had twice the odds of presenting severe symptoms than those who did not consume tobacco. Perez et al. observed that women who smoked were 1.9 times more likely to report severe symptoms than those who did not smoke.[31] Similar results have been reported in previous studies.[25,30,32,33] Women who smoke usually have low estrogen levels as compared to nonsmokers and this may be associated with the severity of the menopausal symptoms.[4,33]

Women who reported that they were not satisfied with the relationship with their husbands were 3.3 times more likely to have poor QoL (AOR: 3.57) than their counterparts. Women having good relations with their husbands may develop psychological stability which may help in reducing the severity of symptoms. Ray
et al. revealed in their study that deterioration of the relationship with the husband had a detrimental effect on the QoL of postmenopausal women. This indicates how a harmonious relationship with the husband positively influences the QoL of the postmenopausal women. In addition, women having autonomy in health-care decision making in the family had significantly better QoL than those who did not have autonomy. Murtagh and Hepworth reported that women’s autonomy in making decisions regarding their menopausal symptoms can positively impact the quality of their lives.

The present study revealed a significant association between history of reproductive tract infection and severity of menopausal symptoms. The odds of presenting severe symptoms increased about 4.6 times in postmenopausal women who had a positive history of reproductive tract infection.
of reproductive tract infection last year as compared to those reporting no such infection. Studies have shown that immune factors are compromised in the reproductive tract of postmenopausal women which increases the

Table 2: Reliability analysis and summary of total and subscale Menopause Rating Scale scorings showing the degree of severity

| MRS Scorings                          | n (%) | Cronbach’s α | Cronbach’s α based on standardized items |
|---------------------------------------|--------|--------------|------------------------------------------|
| Total score (11 items)                |        |              |                                          |
| Mild (5-8)                            | 8 (4.0)| 0.911        | 0.913                                    |
| Moderate (9-16)                       | 57 (28.8)|          |                                          |
| Severe (17+)                          | 133 (67.2)|         |                                          |
| Somatovegetative domain (4 items)     |        |              |                                          |
| No, little (0-2)                      | 7 (3.5)| 0.853        | 0.853                                    |
| Mild (3-4)                            | 12 (6.1)|          |                                          |
| Moderate (5-8)                        | 100 (50.5)|         |                                          |
| Severe (9+)                           | 79 (39.9)|          |                                          |
| Psychological domain (4 items)        |        |              |                                          |
| No, little (0-1)                      | 3 (1.5)| 0.832        | 0.846                                    |
| Mild (2-3)                            | 18 (9.1)|          |                                          |
| Moderate (4-6)                        | 73 (36.9)|         |                                          |
| Severe (7+)                           | 104 (52.5)|         |                                          |
| Urogenital domain (3 items)           |        |              |                                          |
| No, little (0)                        | 2 (1.0)| 0.670*       | 0.659*                                   |
| Mild (3-4)                            | 2 (1.0)|            |                                          |
| Moderate (5-8)                        | 43 (21.7)|         |                                          |
| Severe (9+)                           | 151 (76.3)|          |                                          |

*Does not meet acceptable minimum of 0.70. MRS: Menopause Rating Scale

Table 3: Multivariate logistic regression analysis showing the association between socio-demographic and reproductive characteristics with impaired quality of life (severe Menopause Rating Scale score) (n=198)

| Variable                                | AOR (95% CI) | P      |
|-----------------------------------------|--------------|--------|
| Age in years                            |              |        |
| 45-50                                   | 4.60 (2.12-9.98) | 0.000  |
| 51-55                                   | 0.95 (0.53-1.73) | 0.883  |
| >55                                     | 1             | -      |
| Dietary habit                           |              |        |
| Vegetarian                              | 1.81 (0.72-4.53) | 0.204  |
| Nonvegetarian                           | 1             | -      |
| Tobacco consumption                     |              |        |
| Yes                                     | 2.0 (1.05-3.82) | 0.035  |
| No                                      | 1             | -      |
| Relation with husband                   |              |        |
| Not satisfactory                        | 3.33 (1.84-6.06) | 0.000  |
| Satisfactory                            | 1             | -      |
| Decision-making autonomy                |              |        |
| No                                      | 2.30 (1.12-4.73) | 0.024  |
| Yes                                     | 1             | -      |
| History of reproductive tract infection |              |        |
| Present                                 | 4.57 (1.71-12.19) | 0.003  |
| Absent                                  | 1             | -      |
| Age at last menstruation in years       |              |        |
| ≤45                                     | 1.90 (0.72-5.0) | 0.190  |
| 46-49                                   | 3.26 (1.18-8.96) | 0.022  |
| ≥50                                     | 1             | -      |

P<0.05 (statistically significant); Model Wald F=5.342, P<0.001 indicates that the model adequately fits the data. Nagelkerke’s R²=0.272, The classification table reports that overall expected model performance is 73.2%, that is, 73.2% of the cases can be expected to be classified correctly by the model. AOR: Adjusted odds ratio, SD: Standard deviation, CI: Confidence interval
susceptibility to infections. \cite{36,37} Furthermore, women with earlier onset of menopause had a higher chance of developing severe symptoms than those with late onset. The QoL of women is more adversely affected when entering menopause at earlier ages.\cite{38}

Our study has some limitations. Due to the cross-sectional nature of the study, it is difficult to establish a causal association between various factors and QoL among postmenopausal women. As the information collected is mostly subjective, it might introduce recall bias and bias due to social desirability.

**Conclusion**

In conclusion, more than two-third of postmenopausal women living in slums of Bhubaneswar had menopause-related impaired QoL. Incorporating determinants like young age, tobacco consumption, dissatisfaction relationship with husband, lack of autonomy in health-care decision-making in the family, history of reproductive tract infection, and earlier onset of menopause in the existing strategies can be useful to improve the QoL of these women in this important phase of their lives. Further studies are required to ascertain the predicting factors of the menopause-related impaired QoL so that appropriate preventive and therapeutic measures can be planned for ensuring good QoL for postmenopausal slum women.

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**Conflicts of interest**

There are no conflicts of interest.

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