

Effects of Obesity on Severity of Menopausal Symptoms in Urban and Rural Women

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ABSTRACT

Background: According to the WHO, obesity is an epidemic and is quantified by obesity indices. Menopause is a crucial period with a tendency toward weight gain and has profound implications on the morbidity and mortality of women. This study provides a greater insight into the aggravating adverse effects of obesity on the lifestyles of urban and rural women during their menopausal phase. Hence, this cross-sectional study aims at analyzing the effects of obesity indices on the severity of menopausal symptoms in urban and rural women. **Objectives:** 1. To compare the obesity indices in rural and urban women and to study the severity of menopausal symptoms in them. 2. To assess the influence of the area and body mass index (BMI) on menopausal symptoms. **Materials and Methods:** This cross-sectional study comprised 120 women, of which 60 healthy women volunteers between the age group of 40 and 55 years from the urban area and 60 age-matched healthy women volunteers from the rural area were recruited. The sample size was calculated based on stratified random sampling. After obtaining informed consent anthropometric measurements were recorded and the Menopausal Rating Scale was used for assessing the severity of menopausal symptoms. **Results:** A positive correlation was observed between the severity of menopausal symptoms and BMI as well as waist circumference in urban women. The problems related to menopausal symptoms were milder in rural women. **Conclusions:** Our study concludes that obesity worsens the severity of several menopausal symptoms which is greater among obese urban women owing to the urban lifestyle and increased stress levels.

KEYWORDS: *Body mass index, menopausal symptoms, rural, urban, waist circumference, waist-hip ratio*

INTRODUCTION

Obesity is one of the most prevalent nutritional and lifestyle disorders where an increase in body weight is >20% of an individual's ideal body weight. This is a complex disorder with serious social and psychological dimensions. There is an increasing trend in the prevalence of obesity as age advances.^[1] According to the WHO, obesity is an epidemic and 13% of the world's adult population are obese, of which 15% are women. Obesity is quantified by indices such as body mass index (BMI), waist circumference, and waist-hip ratio.

BMI is a screening tool for overweight and obesity. It is an indirect measure of obesity that can be strongly

correlated with the direct measure of body fat obtained using bioelectrical impedance.^[2]

Waist circumference is an obesity index which defines central obesity, particularly in women. Women with central obesity are at a higher risk of developing hypertension, diabetes, dyslipidemia, and metabolic syndrome.^[3]

Waist-hip ratio is also a measure of central obesity and a higher value indicates an increased risk for

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cardiovascular diseases and diabetes. It is widely used to identify the pattern of fat distribution. All these three indices are sensitive markers of obesity and hence have been selected as tools for this study.

Menopause is a crucial period that triggers several changes in a woman's life, an important one being a tendency toward weight gain.^[4] Menopause is defined as an event occurring 12 months after the past menstrual period and marks the end of menstrual cycles.^[5] It is associated with several menopausal symptoms that affect the quality of life. The severity of these symptoms can hinder a woman's daily activities. A multitude of factors such as heredity, nutrition, food habits, environment, climate, altitude, socioeconomic status, physical activity, and occupation can have an impact on menopause. Weight gain observed during menopause is possibly due to a fall in estrogen the hormone that plays a vital role in fat storage and distribution. Long-term effects of estrogen deficiency can harm other systems causing adverse cardiovascular changes and osteoporosis.^[6]

Significant change in lifestyle is observed between urban and rural women. Abnormal increase in weight gain in women during this period can also be due to an increase in dietary intake and decrease in energy expenditure along with work-related stress. Menopause may have profound implications on morbidity and cause-specific mortality among women.^[7,8] This study provides a greater insight into the aggravating adverse effects of obesity on the lifestyles of urban and rural women during their menopausal phase. The severity of menopausal symptoms will also provide a clue to the reasons for prolonged menopausal phase and other irregularities in their menstrual cycles. There is a paucity of literature associating the severity of menopausal symptoms with geographical distribution. Hence, this cross-sectional study aims at analyzing the effects of obesity indices on the severity of menopausal symptoms in urban and rural women.

Aims

To study the effects of obesity indices on the severity of menopausal symptoms in urban and rural women.

Objectives

- To compare the obesity indices in rural and urban women in the age group of 40–55 years
- To study the severity of menopausal symptoms in urban and rural women in the age group of 40–55 years
- To assess the influence of area and BMI on menopausal symptoms.

MATERIALS AND METHODS

This cross-sectional study comprised 120 women, of which 60 healthy women volunteers between the age group of 40 and 55 years from the urban area and 60 age-matched healthy women volunteers from the rural area were recruited. The sample size was calculated based on stratified random sampling as per the geographical distribution of women in urban and rural areas. Women below 40 years and above 55 years and women having diabetes mellitus, hypertension, thyroid disorders, and any other chronic illness were excluded from the study. The above disorders were excluded as they are confounding variables for obesity.

Institutional ethical clearance was obtained. All the participants were explained about the purpose of the study and the study protocol and written informed consent were taken. Selected subjects were requested to complete a menopause questionnaire that included specific information regarding age and detailed menstrual history with menopausal symptoms. The Menopausal Rating Scale (MRS) [Figure 1], which is a reliable, standard, validated, and consistent tool was used for assessing the severity of menopausal symptoms.^[9] The MRS was translated to the regional language and the symptoms were explained to all the participants individually. The menopausal symptoms were graded from 0 to 4 based on their severity. Clinical examination was conducted on all subjects to rule out any systemic disorders. Anthropometric measurements were recorded for all the participants. BMI was calculated as the weight in kilograms divided by the square of the height in meters. Other anthropometric measurements related to obesity indices such as waist circumference and waist-hip ratio were also recorded using measuring tape.

The MRS followed in our study to assess the severity of the symptoms is given below.

The collected data were entered into an Excel sheet and subjected to descriptive statistics which included frequency, percent, arithmetic mean, and standard deviation values. Inferential statistics applied was the Pearson Chi-square test, independent sample *t*-test, and two-way ANOVA. Predictive statistics included the Pearson correlation test. All the statistical analyzes were done using the SPSS Version 20 (IBM) software.

RESULTS

This study consisted of a total of 120 participants. The physical characteristics of both groups are as follows. The mean age distribution of the urban group was

Menopause Rating Scale (MRS)

Which of the following symptoms apply to you at this time? Please, mark the appropriate box for each symptom. For symptoms that do not apply, please mark 'none'.

Symptoms:

	none	mild	moderate	severe	very severe
	-----	-----	-----	-----	
Score =	0	1	2	3	4
1. Hot flushes, sweating (episodes of sweating).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Heart discomfort (unusual awareness of heart beat, heart skipping, heart racing, tightness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sleep problems (difficulty in falling asleep, difficulty in sleeping through, waking up early).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Depressive mood (feeling down, sad, on the verge of tears, lack of drive, mood swings).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Irritability (feeling nervous, inner tension, feeling aggressive).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Anxiety (inner restlessness, feeling panicky).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Physical and mental exhaustion (general decrease in performance, impaired memory, decrease in concentration, forgetfulness).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Sexual problems (change in sexual desire, in sexual activity and satisfaction).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Bladder problems (difficulty in urinating, increased need to urinate, bladder incontinence).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Dryness of vagina (sensation of dryness or burning in the vagina, difficulty with sexual intercourse).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Joint and muscular discomfort (pain in the joints, rheumatoid complaints).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1: Menopausal Rating Scale (MRS)

47.73 years and the mean age distribution of the rural group was 45.8 years. The distribution of BMI among urban and rural women is shown in Table 1.

In our study, the independent sample *t*-test revealed a significant difference in the BMI ($P = 0.026$) as well as waist-hip ratio ($P = 0.001$) of rural and urban women indicating that urban women had higher BMI and waist-hip ratio. Although the waist circumferences of urban women were higher than that of rural women, they were not significant [Table 2].

Based on the MRS, we compared all the menopausal symptoms between urban and rural women. Our study showed that several menopausal symptoms such as sleep problems, physical and mental exhaustion, sexual problems, bladder problems, and joint and muscular discomfort (Questions 3, 7, 8, 9, and 11) were severe in the urban group when compared with the rural group [Graph 1].

The pattern of the severity of the other menopausal problems was similar and there was no significant

Table 1: Frequency distribution of body mass index among rural and urban women

BMI	Area		Total (%)
	Rural (%)	Urban (%)	
Normal	20 (33.3)	8 (13.3)	28 (23.3)
Overweight	8 (13.3)	13 (21.7)	21 (17.5)
Obese I	19 (31.7)	15 (25.0)	34 (28.3)
Obese II	13 (21.7)	24 (40.0)	37 (30.8)

BMI: Body mass index

Table 2: Mean±standard deviation values of obesity indices in the study population and significance of independent sample *t*-test

Obesity indices (n=60)	Rural women	Urban women	<i>P</i>
Waist circumference	92.71±6.42	94.33±22.74	0.595
Waist hip ratio	0.88±0.04	0.90±0.04	0.001*
BMI	26.20±5.33	28.56±6.06	0.026*

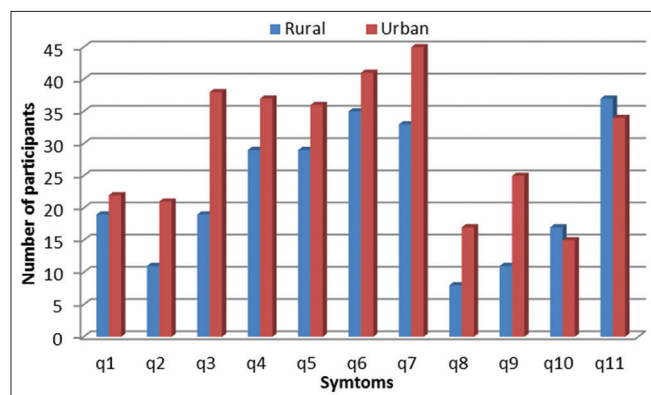
* $P \leq 0.05$. BMI: Body mass index

association of their severity with the area distribution of the study participants.

Table 3: Significance of Pearson correlation between Menopausal Rating Scale and obesity indices

MRS	BMI	Waist circumference	Waist-hip ratio
Pearson correlation	0.182	0.289	0.121
<i>P</i>	0.047*	0.001*	0.186

**P*<0.05. MRS: Menopausal Rating Scale, BMI: Body mass index



Graph 1: Graphical representation of urban and rural women having menopausal symptoms based on MRS q1 to q11 implies the questions in the MRS scale. MRS: Menopausal Rating Scale

A significant *P* value was obtained on the Pearson correlation between MRS and BMI as well as MRS and waist circumference indicating that as BMI and waist circumference increases, the severity of menopausal symptoms also increases [Table 3]. This positive correlation suggests that abnormal weight gain intensifies the severity of menopausal symptoms.

DISCUSSION

Menopause is a physiological transition that has a profound impact on women during their midlife. The age group in this study sample was 40–55 years considering the possibility of early menopause. Our study aimed to establish an association between obesity indices and the severity of menopausal symptoms among rural and urban women. The observation in our study was that the BMI and waist-hip ratio were significantly higher in urban women than rural women [Table 2]. A similar study conducted on Indian postmenopausal women also showed a significantly higher BMI in urban women than their rural counterparts.^[10] Another study reported a higher waist-hip ratio in postmenopausal women.^[11] According to a study done on women in India, it was found that higher proportions of urban women were overweight and obese than their counterparts from the rural area.^[12]

Waist circumference, which is a marker of central fat distribution was reduced in rural women when compared

to urban women. However, it was not statistically significant in our study. A North American study done on the waist circumference index in postmenopausal women states that later the age of attainment of menopause, the greater is the waist circumference.^[13] Since obesity indices worsen the menopausal symptoms, women of this age group should be cautious about a sudden gain in body weight.

MRS is categorized into physical, psychological, and urogenital factors. Our study is in accordance with another study done on the quality of life in menopausal women, which states that obese women had significant symptoms in physical domains and also had an influence on the psychical domains.^[14] There is a strong association between obesity and menopausal symptoms in our study. A cross-sectional study stated that obese women had more frequent menopausal symptoms.^[15] The severity of obesity has an adverse impact on the severity of menopausal symptoms, which is similar to the findings in this study.

In our study, sleep disturbance was observed more in urban women than in rural women. This could be because sleep patterns vary with interindividual working schedules. An epidemiological study confirms that there is an association between sleep loss and increased risk of obesity.^[16] There is a causal relationship between sleep disturbance and weight gain.^[17] The next significant symptom in our study was that of physical and mental exhaustion. There was moderate exhaustion in urban women and severe exhaustion in rural women. This could be due to the routine rigorous physical work done by rural women. Similar results were noted in a study done on Cambodian women which stated that one of the most prevalent symptoms was physical and mental exhaustion followed by irritability and sleep problems.^[18] Advancing menopause status worsens sexual function.^[19] Sexual problems were reported more by urban women than rural women in our study. This finding might be due to the higher literacy rates among urban women which enables them to report their sexual problems. On the other hand, rural women might not have reported such findings. One of the findings of our study was that urban women had mild and severe symptoms associated with urinary bladder problems, whereas rural women had mild and moderate symptoms for the same. Studies have established that there is a correlation between obesity and bladder-related symptoms.^[20] The results from our study were not consistent with another study which stated that urogenital problems were more in rural women than in urban women.^[21] The symptom of joint and muscular discomfort was mild-to-moderate in rural women,

whereas it was severe in urban women. This could be due to reduced estrogen levels. This is confirmed by a study which states that menopausal transition increases the prevalence of arthralgia and may result from the reduction in estrogen levels.^[22]

Based on the WHO standards, the degree of severity of menopausal symptoms was categorized as follows: absence of severity indicates no problems, slight severity indicates mild problems, medium severity indicates moderate problems, extreme severity indicates severe problems, and total severity indicates complete problems.^[9]

When the severity of the menopausal symptoms was compared between rural and urban women, our study found that rural women had more mild problems (46.7%) and urban women had more moderate problems (43.3%).

A positive correlation was observed between the severity of menopausal symptoms and BMI as well as waist circumference in the study population [Table 3]. This contradicts the finding of another study which states that the severity of symptoms was found to be more distressing for rural women.^[21]

The limitation of this study is its small sample size. Large-scale studies can give better insight into assessing obesity and the severity of menopausal symptoms. The scope of this study can be expanded by further categorizing the age group of the study population.

CONCLUSIONS

Many women experience disturbing symptoms in the years leading to menopause. These symptoms are influenced by variations in lifestyle and environmental factors like geographical distribution. Awareness of menopausal symptoms, coping and dealing with these symptoms can reduce morbidity in menopausal women. Our study concludes that obesity worsens the severity of several menopausal symptoms, which is greater among obese urban women owing to the urban lifestyle and increased stress levels. To smoothen their menopausal process regular exercise regimen and modification of lifestyle can be recommended to all menopausal women. Prevention and reduction of obesity will improve the health outcomes, reduce the morbidity, and improve their quality of life.

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Conflicts of interest

There are no conflicts of interest.

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