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Assessment of Menopausal Symptoms and their Association with Dietary Pattern among Rural Middle-Aged Women in Coimbatore

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ABSTRACT
The most noticeable perimenopausal event is the menopause, which is the permanent cessation of menstruation that is confirmed retrospectively after twelve months of amenorrhea in midlife. Hot flushes, nocturnal sweats, muscle and joint problems, disturbed sleep, frequent urination, dry vagina, poor memory, anxiety, and depression are frequently mentioned symptoms. The study aimed to examine the relationship between the severity of menopausal symptoms, and nutrient intake. The cross-sectional study was conducted at Vedapatti, Coimbatore among 390 rural menopausal women using validated questionnaire which comprises socio-economic data, anthropometry, and dietary intake. Menopausal rating scale was used to analyze the severity of menopausal symptoms. The results revealed that the mean age of menopause was 51.5 years, nearly 66% were obese, 20% overweight. Only 4% were involved in daily physical activity. Around 86% of the selected subjects had anxiety, 82% sleep problems, hot flushes was reported by 41%, sleep problems 50%, mental exhaustion of 60%. The average intake of calories (1505±110 kcal), protein (48±13 g), fiber (10±3.2g), calcium (482±141 mg) and iron (10.58±2.5mg) were found to be deficit whereas intake of fat (34±12g) was found to be excess. It is evident that severity of the menopausal symptoms is associated with the nutrients energy, protein, calcium and iron (p<0.01). It was concluded that women going through menopause require holistic care, therefore their primary healthcare provider must show them how to control their symptoms using a range of methods, such as pelvic floor exercises, a balanced diet, increasing their physical activity, and meditation.
Keywords: anthropometry, dietary intake, menopause, menopausal rating scale, nutrients.

INTRODUCTION

Despite being a physiological change that is natural, menopause symptoms can occasionally be so severe that they interfere with day-to-day activities. Unfortunately, most women are unaware of these menopausal changes. As a woman approaches menopause, her oestrogen levels begin to decline, which causes these symptoms, which can also be felt in the perimenopausal stage. The estimates for the average age of menopause around the world range from 40 to 65 years old. Women may develop vasomotor, urogenital, psychosomatic, psychological, as well as sexual dysfunction during the transition to menopause.

Nowadays we understand that menopause affects much more than infertility. It hastens the ageing process and hastens the onset of non-communicable diseases. Although it is a natural physiological shift, menopause symptoms can occasionally be so severe that they interfere with day-to-day activities. Sadly, most women are ignorant of some menopausal changes. The primary source of these symptoms, which can also be felt in the perimenopausal stage, is the decline in oestrogen levels as menopause approaches in women. According to studies by the Indian Menopause Society (IMS), Indian women go through menopause on average 47.5 years younger than their Western counterparts 51 years. Menopausal health is therefore significantly more important in the Indian context. Additionally, it has been seen in some post-menopausal women that long-term oestrogen deprivation might alter the cardiovascular system or the bone, which can result in osteoporosis. Menopausal symptoms are caused by a decrease in oestrogen levels as a woman gets closer to menopause, and some of these women start to feel these symptoms as early as the perimenopausal period. In the year leading up to menopause, more than 80% of women have diminished physical and mental well-being due to a shortage of oestrogen; consequently, postmenopausal women can be considered high risk population. In a cross-sectional study by Singh and Pradhan [4], 225 postmenopausal women (89.3%) reported having at least one menopausal symptom or more. In postmenopausal women, sleep problems (62.7%), joint or muscular discomfort (59.1%), hot flushes (46.4%), and night sweats (45.6%) were the most often reported symptoms. Anxiety affected 21.0% (n=53) and depression affected 32.1% (n=81) of postmenopausal women, respectively. It was found that

postmenopausal women's health and general well-being during the climacteric period are strongly correlated with general health and a healthy lifestyle, which includes a healthy diet, no smoking, regular exercise, and a positive outlook on ageing and menopause. A change in lifestyle habits, especially nutrition, may postpone the development of risk factors in this population. It is advised that lifestyle changes be used as the main form of treatment for menopause, including sufficient exercise, a diet high in phytoestrogens, calcium, and fibre, and a diet low in fat, especially saturated fats. Nutritional practices are crucial for health promotion and lifestyle adaptation to the postmenopausal stage since they affect all women, are modifiable, and have an impact on both longevity and quality of life. Although there is evidence linking low-fat, plant-based diets to favorable effects on body composition, more research is required to substantiate these findings in postmenopausal women. Though dietary patterns have received less focus, there is evidence to show that nutrition affects menopausal symptoms. Hence the present study aimed to determine the association between severities of menopausal symptoms with dietary pattern among rural menopausal women.

MATERIALS AND METHODS

The study took place at Vedapatti suburb of Coimbatore district, Tamil Nadu, India during the period from May 2022 - April 2023. The principal investigator got ethical approval from the PSG Institution Human Ethics Committee for the study with the reference number PSG/IHEC/2021/Appr/Exp/268. The study participants were rural menopausal women between the age group of 45-60 years of age. The inclusion criteria for subjects were menopausal women between 45-60 years in rural areas. The exclusion criteria was the menopausal women resident in urban areas, menopausal women above 60 years of age, women underwent hormone replacement therapy and with disease conditions like HIV/AIDS, cancer and renal disorder.

The required data was collected using pretested, semi-structured questionnaires by house-to-house visits by the investigators after taking informed consent. If the succeeding woman also is not available then the preceding woman was selected. Help from field health workers of PSG rural health centre, Vedapatti was taken in contacting and tracing the sampled study subjects. The variables covered in study are (a) Socio-demographic variables: Age, educational status, household types, number of family members, employment status, and income level. (b) Anthropometric status: height in cm, weight in kg, Body Mass Index (BMI), waist circumference in cm, hip circumference in cm and waist hip ratio (c) Dietary assessment: 24 hour diet recall. Menopause rating scale (MRS) questionnaire [6] was used as a basis for assessing the severity of menopausal symptoms. The association between severities of menopausal symptoms with dietary intake was analyzed for the collected data using SPSS version 20. The hypotheses stated was that there is no association between severity of menopausal symptoms and energy intake as well as nutrient intake such as calcium, iron & protein.

RESULTS AND DISCUSSION

Socio-Demographic Status of the Selected Menopausal Rural Women

It was already clear that menopause symptoms have a substantial impact on women's Quality of Life (QOL), which emphasises the need to educate menopausal women on menopausal symptoms and management in order to enhance their QOL. The below table-1 depicts the socio-demographic status of the selected menopausal rural women. The socio demographic status of the selected subjects belonged to generation X of the millennial generation, roughly from the early 1960s to late 1970s. The subjects were again divided into groups with a difference of 3 years from 45 years to 56 years. The subjects were quite evenly distributed. Majority of the subjects belonged to the age group of 54 to 56 years of age and a comparatively lower number of subjects were involved in the age group of 48 to 50 years with 32% (126) and 19% (74) respectively. Other age groups had an optimal level of subjects. The data obtained from the selected subjects of rural menopausal women revealed that the majority of the selected subjects say 94% (366) were married and only 6% (24) of the subjects had different marital status. It includes 2% (8), 3% (12), 1% (4) of unmarried, and widow and separated women from the selected subjects.

It was reported that out of 390 selected rural menopausal women only a handful of the 16 subjects were uneducated, 374 subjects were educated. Among the educated women, 85% (332) of the subjects who were higher secondary passed out and only one percent were graduates. The occupational status of the selected subjects was looked up to know their work nature. The data revealed that 22% (86) were homemakers followed by 26% (101), 50% (195) under self-employment and private employees respectively. Only two percent of the selected population were government employees. However, 3% of the selected sample were within an income range of Rs.15000 and above. Majority of the population 36% (142) were having an average income of Rs.9000 to 12,000 per month.

Anthropometry measurements of the Selected Menopausal Women
The anthropometry data of the selected subjects was inferred through mean standard deviation. The height of the rural menopausal women was 161 ±7.2cm, weight 68±21.1kg, BMI 28.5±4.6kg/m², waist circumference 108±7.2cm, hip circumference 108±7.2cm and waist to hip ratio 1.01±0.004. Figure-1 depicts the anthropometric data of the selected rural menopausal women, it was pleased that none of the selected women were underweight according to both WHO and Asian category. As per WHO body mass index category the maximum people were classified under the overweight category 54% (212) whereas by Asian classification the majority of the selected subjects were noticed to fall under the category of obese 66% (257). Similar study by Roy et al., [7] reveals that 6.0% of respondents were identified as grade I obese or higher high risk of adiposity (BMI: >27.5kg/m2), while 22% were underweight or had chronic energy deficiency (BMI: 18.5 kg/m2). Of the post-menopausal women surveyed, 43.0% were found to be normal (BMI: 18.5-22.9 kg/m2), 29.0% were at increased risk of adiposity, and 30. Regarding WHR, 36.0% of post-menopausal women (WHR > 0.85) were at high risk. [7].

Physical Activity and Lifestyle Pattern
Regular physical activity has many positive health effects, such as extending life expectancy, lowering the risk of heart, lung, and metabolic diseases as well as some cancers (most notably colon and breast), maintaining energy balance, and enhancing musculoskeletal, functional, and mental health. Menopausal symptoms have a detrimental impact on women's QOL and general health because they are strongly linked to a range of vasomotor, psychosocial, physical, and sexual symptoms that are caused by hormonal and biological changes in the body.
The selected 390 rural menopausal women subjects were questioned upon their lifestyle pattern and physical activity since it played a vital role in determining the health status of the selected subjects. The subjects revealed only four percent were involved in daily physical activity of 30 minutes of walk every day, the rest of the unemployed rural women had only the household chores as their physical activity. The lifestyle pattern followed by the selected subjects decreased the quality of life. Moreover only one percent was involved in tobacco chewing for thrice a week. The rest of the population didn't have any such habits.

Severity of menopausal symptoms among the selected subjects
In the present study around 86% of the study subjects had anxiety, followed by 82% with sleep problems, depressive mood 81%, physical and mental exhaustion 78%. The most common symptom of menopause like hot flushes was reported by 41%. Majority of subjects reported mild-to-moderate symptoms. Similar study reported that the joint and muscular pains were followed by heart discomfort (60%) & physical and mental exhaustion (60%), hot flushes (52.2%), sleep problems (50%), irritability (46.1%), anxiety (42.2%), bladder problems (30%), dryness of vagina (26.1%) and sexual problems (21.9%). The menopausal symptoms were more prevalent in women of lower socioeconomic status and the ones who were illiterate and this difference was significant [8]. Similar outcomes were obtained in a study by Rahman et al (2010) when examining physical and mental weariness (67%) and sleep issues (52%) but less common in his study were sad mood (32%) and heart discomfort (18%) [9].

Dietary assessment of selected subjects
The table-3 reveals the mean daily intake of calories, protein, fat, fiber, calcium and iron of the participants which were assessed using 24 hour's recall method. Compared with Recommended Dietary Allowance, the average intake of calories (1505±110 kcal), protein (48±13 g), fiber (10±3.2g), calcium (482±141 mg) and iron (10.58±2.5mg) were found to be deficit whereas intake of fat (34±12g) was found to be excess.
It remains elucidated that dietary carbohydrates contribute to FM loss. An earlier systematic study of obese adults revealed that a modest low-carbohydrate diet (40 percent of total calories) was not linked to a reduction in fat mass [10]. A recent randomised control experiment with 57 women (age 40 3.5 years, BMI 31.1 2.6 kg/m2) produced comparable findings, showing that a low-carbohydrate, high-fat diet has no advantage over a typical diet for FM [11]. However, depending at least in part on their fibre level, some carbohydrate sources may be advantageous while others are not [12]. The consumption of whole grains for six weeks had positive effects on the resting metabolic rate and stool energy excretion in an RCT with 81 males and 32 postmenopausal women, which altered the energy balance positively [13]

Association between severity of menopausal symptoms with nutrient intake
According to Noll et al. (2021), foods with a high level of processing, saturated fats, and sugars are linked to the severity of these symptoms [14]. Studies on nutrients and particular foods revealed a link between coffee intake and the type of fat consumed and the severity of menopausal symptoms. The intensity of menopausal symptoms was found to be correlated with dietary intake; however, the evidence for this correlation is inconsistent and unclear and is supported by a small number of research. The below table-4 revealed the association between severity of symptoms and specific nutrients calcium, iron, protein and energy.

Upon interpretation it is evident that severity of the menopausal symptoms is weakly associated with the above mentioned nutrient ($p<0.01$). It was also evident that the severity of menopausal symptoms is weakly associated with energy intake. From this we can infer that not necessarily low levels of energy intake causes increased severity of menopausal symptoms. The study was purely based on rural menopausal women whose dietary pattern was mainly rich in carbohydrates which were not associated with the symptoms. Hence we reject the null hypothesis. In a study done by Mahshid et al., (2019) reported that between three main dietary patterns, including solid fats and snacks (SFS), mayonnaise, liquid oils, sweets, and desserts (MLSD), and fruits and vegetables (VF). They came to the conclusion that there is an inverse relationship between menopausal symptoms and the VF eating pattern. The MLSD and SFS eating patterns, on the other hand, were linked to a higher likelihood of these symptoms [15]. Another study found a possible negative relationship between the symptoms of depression, anxiety, and stress and a diet heavy in dried fruits, canned fruits, fruit juice, olive oil, hydrogenated fats, and fruits. To support this conclusion, additional prospective investigations are required [16].

Table1: Socio-Demographic Status of the Selected Menopausal Rural Women

S. No	Socio-demographic status	Criteria	No. of subjects (n= 390)	
			No	(%)
1.	Age Criteria	45-47 Years	76	20
		48- 50 Years	74	19
		51-53 Years	114	29
		54-56 Years	126	32
		Total	**390**	**100**
2.	Marital status	Married women	366	94
		Unmarried women	8	2
		Widow	12	3
		Separated	4	1
		Total	**390**	**100**
3.	Educational qualification	Uneducated	16	4
		Primary	18	5
		Secondary	18	5
		Higher secondary	332	85
		Graduates	6	1
		Total	**390**	**100**
4.	Occupational status	Homemaker	86	22
		Self employed	101	26
		Private employee	195	50
		Government employee	8	2
		Total	**390**	**100**
5.	Family Income	< 3000	6	2
		3000-6000	74	19
		6000-9000	108	28
		9000-12,000	142	36
		12,000-15,000	48	12
		>15,000	12	3
		Total	**390**	**100**

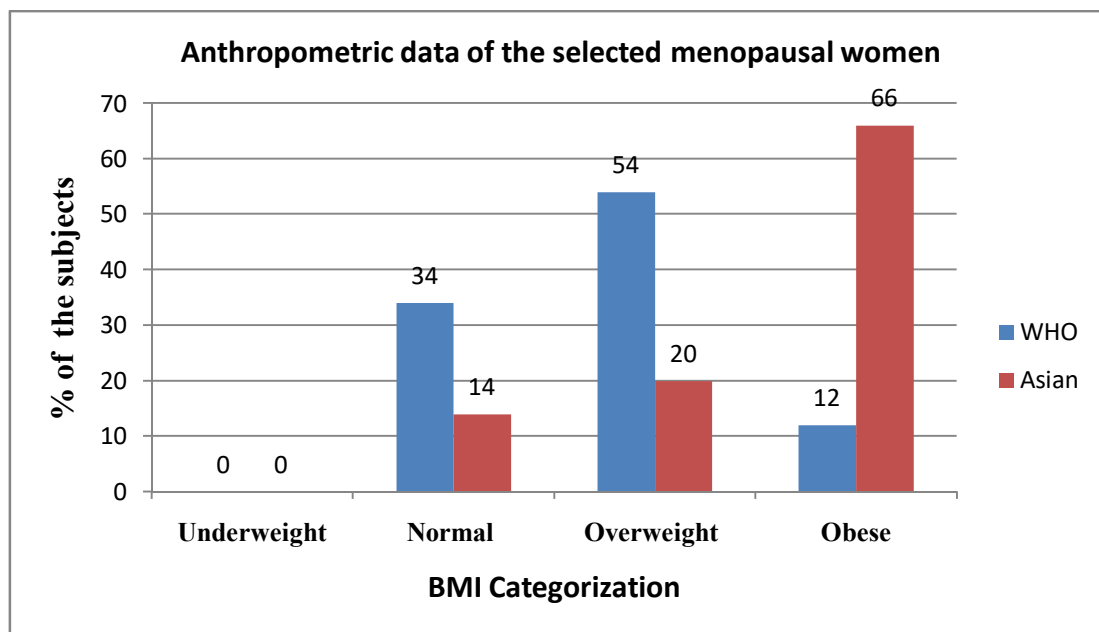## Anthropometric data of the selected menopausal women

Figure 1- Anthropometric data of the selected rural menopausal women

Table2: Severity of menopausal symptoms among the selected subjects

Menopausal Symptoms	Prevalence and severity of menopausal symptoms among selected women(n=390)				
	Never No (%)	Mild No (%)	Moderate No (%)	Severe No (%)	Extremely severe No (%)
Hot flushes, sweating	230 (59)	20 (5)	86 (22)	50 (13)	4 (1)
Heart discomfort	11 (3)	189 (48)	75 (19)	108 (28)	7 (2)
Sleeping problems	70 (18)	11 (3)	77 (20)	168 (43)	64 (16)
Depressive mood	74 (19)	47 (12)	116 (30)	110 (28)	43 (11)
Irritability	19 (5)	25 (6)	112 (29)	117 (30)	117 (30)
Anxiety	54 (14)	22 (6)	79 (20)	55 (14)	180 (46)
Physical and mental exhaustion	86 (22)	20 (5)	71 (18)	104 (27)	109 (28)
Sexual problems	8 (2)	113 (29)	187 (48)	70 (18)	12 (3)
Bladder problems	9 (2)	122 (31)	158 (41)	73 (19)	28 (7)
Dryness of vagina	8 (2)	93 (24)	159 (41)	98 (25)	32 (8)
Joint and muscular discomfort	4 (1)	78 (20)	118 (30)	162 (42)	28 (7)

Table3: Dietary intake of the selected subjects

Nutrients	Mean intake	RDA* for moderate activity	Excess/Deficit
Energy (kcal)	2305 ± 610	2130	Excess
Protein (g)	48 ± 13	45.7	Inadequate
Fat (g)	34 ± 12	25	Excess
Fiber (g)	10 ± 3.2	40	Inadequate
Calcium (mg)	482 ± 141	1000	Inadequate
Iron (mg)	10.58 ± 2.5	29	Inadequate

*RDA 2020

Table4: Association between menopausal symptoms and nutrient intake such as Calcium, Iron, Protein and Energy

		Symptoms	Calcium	Iron	Protein	Energy
Symptoms	Pearson Correlation	1	-.145**	-.065	.127**	.182**
	Sig. (1-tailed)		.002	.099	.006	.000
	N	390	390	390	390	390
***. Correlation is significant at the 0.01 level (1-tailed).*						

CONCLUSION

Menopause and its symptoms frequently have an impact on quality of life, a metric that menopausal women are influenced by a variety of societal and personal circumstances. The quality of life is negatively impacted by some factors. The number of menopausal women who experienced symptoms like anxiety, insomnia issues, melancholy mood, and physical and mental tiredness was much higher. Women going through menopause require holistic care, therefore their primary healthcare provider must show them how to control their symptoms using a range of methods, such as pelvic floor exercises, a balanced diet, increasing their physical activity, and meditation. Menopause is a typical biological phase, so no special medical attention is required. In order to provide these women with the best management, the team of healthcare providers should use nutrition care process and evidence-based management practices. Instead of letting them suffer in silence, everyone should support the idea of women gently embracing menopause.

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