RESEARCH PAPER

Prevalence of Early Menopause and Its Association with Lifestyle-Related Quality of Life among Middle-Aged Women in a South Indian Population: A Cross-Sectional Study

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ABSTRACT

Background: Early menopause (onset between 40 and 45 years) and premature menopause (onset before 40 years) are associated with a disproportionate burden of vasomotor, musculoskeletal, and psychological symptoms and with long-term cardiovascular and skeletal morbidity. Community-level data linking lifestyle-derived quality of life (QoL) with symptom burden remain limited in the Indian population.

Objective: To assess the prevalence of early menopause and to examine the influence of lifestyle and dietary habits on postmenopausal symptoms, stratified by QoL category, among middle-aged women.

Methods: A cross-sectional observational study was conducted over six months among 270 middle-aged women in Kumarapalayam Taluk, Erode district, Tamil Nadu. Participants were selected randomly from the electoral roll; women with menopause below 45 years or a history of hysterectomy were included, while pregnant women, those with chronic comorbidities, and women receiving hormone replacement therapy were excluded. Sociodemographic, menstrual, medical/surgical, and symptom data were collected through face-to-face interviews using a pretested questionnaire. Lifestyle was assessed using a validated 12-item tool scored on a 100-point scale and categorised as Good (>70), Moderate (50–70), or Poor (<50). Data were summarised as frequencies and percentages.

Results: Early menopause was identified in 84.4% (228/270) of participants. The cohort was predominantly suburban (75.9%), and 46.7% were illiterate. Within the early-menopause group, 24.1%, 69.2%, and 6.5% fell into the Good, Moderate, and Poor QoL categories, respectively. Joint and muscle pain (83.3%), fatigue (64.8%), and sleep disturbance (56.7%) were the most prevalent symptoms overall, and the prevalence of most symptoms rose consistently as QoL declined, with joint and muscle pain peaking at 93.3% in the Poor-QoL group.

Conclusion: Early menopause was highly prevalent in this at-risk cohort, and a graded, largely inverse relationship existed between lifestyle-derived QoL and postmenopausal symptom burden. Community-based lifestyle interventions targeting diet, physical activity, and health education may help reduce symptom severity in women experiencing early menopause.

Keywords: Early menopause; Premature menopause; Quality of life; Lifestyle; Postmenopausal symptoms; Cross-sectional study

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INTRODUCTION

Menopause is a natural biological transition characterized by the permanent cessation of menstruation for twelve consecutive months due to the loss of ovarian follicular activity. It generally occurs naturally at an average age of approximately 51 years and represents an important stage in a woman's life, accompanied by several hormonal, physical, psychological, and metabolic changes [1]. A subset of women experience menopause considerably earlier than the expected age of natural menopause. Menopause occurring between 40 and 45 years is defined as early menopause, whereas menopause occurring before the age of 40 years is classified as premature menopause or primary ovarian insufficiency [2,3]. The prevalence of early menopause and primary ovarian insufficiency varies

across populations depending on geographical location, ethnicity, and diagnostic criteria. A global meta-analysis reported a substantial burden of early menopause and primary ovarian insufficiency among women worldwide [2].

Early and premature menopause may occur spontaneously because of accelerated depletion of the ovarian follicular reserve or may result from medical and surgical interventions. Surgical procedures, including bilateral oophorectomy and hysterectomy, as well as chemotherapy and pelvic radiotherapy, can contribute to the early cessation of ovarian function [4]. Several genetic, autoimmune, reproductive, lifestyle, and psychosocial factors may also contribute to the development of premature ovarian insufficiency and early menopause [5].

Early menopause is an important public health concern because women experiencing loss of ovarian function at a younger age may be exposed to a prolonged period of estrogen deficiency. This can result in several long-term health consequences, including an increased risk of premature morbidity and mortality [6]. Estrogen deficiency can accelerate bone loss and increase the risk of osteoporosis and fractures [7]. Furthermore, early menopause has been identified as an independent risk factor for cardiovascular disease [8]. Apart from its long-term complications, menopause is associated with several symptoms that can affect the physical and psychological well-being of women. Common symptoms include vasomotor disturbances, sleep problems, mood changes, fatigue, vaginal dryness, and joint and muscle pain. The type and severity of symptoms vary among women and may be influenced by hormonal changes, individual health status, and lifestyle factors. Menopausal symptoms can interfere with daily activities, family responsibilities, occupational performance, and overall quality of life [9]. Quality of life is an important aspect of women's health during the menopausal transition. Menopausal symptoms, health conditions, psychosocial factors, and demographic characteristics can significantly influence the quality of life experienced by middle-aged women [10]. Therefore, assessing quality of life and the factors associated with menopausal symptoms is important for understanding the overall health needs of women during this stage of life.

Lifestyle behaviours are increasingly recognized as important modifiable factors that may influence menopausal health and the severity of associated symptoms. Physical activity, dietary habits, nutritional status, sleep patterns, sedentary behaviour, smoking, and other lifestyle practices may contribute to women's overall health during and after the menopausal transition. Dietary and lifestyle factors have also been reported to influence the timing of natural menopause and reproductive lifespan [11]. The menopausal transition is often associated with changes in metabolic health and lifestyle practices. Indian postmenopausal women have been reported to experience a considerable burden of metabolic syndrome, which may be related to changes in physical activity and dietary patterns [12]. Physical activity and regular exercise are important for maintaining overall health and may help reduce menopausal symptoms and prevent bone loss associated with menopause [13,14].

In addition to physical activity, dietary habits and other lifestyle behaviours may play an important role in determining health outcomes during the menopausal period. Adequate nutrition, healthy food choices, appropriate sleep duration, and reduced sedentary behaviour may contribute to improved quality of life and better management of menopausal symptoms. Since many of these factors are modifiable, lifestyle-based interventions may provide an opportunity to reduce symptom burden and improve the overall well-being of menopausal women. Despite the growing recognition of menopause as an important women's health issue, community-based evidence examining the relationship between lifestyle behaviours, dietary practices, quality of life, and individual postmenopausal symptoms remains limited. Although several studies have reported the prevalence and impact of menopausal symptoms, fewer studies have specifically examined these factors among women experiencing early menopause, particularly in South Indian community settings. Understanding the association between lifestyle-related quality of life and menopausal symptoms is important because it may help identify modifiable factors that can be addressed through health education and community-based interventions. Early identification of women experiencing menopause at a younger age may also facilitate appropriate counselling and management to reduce symptom burden and improve long-term health outcomes [15,16].

The present cross-sectional study was undertaken to assess the prevalence of early menopause and to evaluate the influence of sociodemographic characteristics, lifestyle behaviours, and dietary practices on postmenopausal symptoms. The study further examined the distribution of common postmenopausal symptoms according to lifestyle-derived quality-of-life categories among middle-aged women.

MATERIALS AND METHODS

Study Design and Setting:

A cross-sectional observational study was conducted among middle-aged women in Kumarapalayam Taluk, Erode district, Tamil Nadu, India, over a period of six months.

Sample Size:

The minimum required sample size was calculated using the Raosoft sample-size calculator, assuming a 5% margin of error and a 95% confidence interval, yielding a required sample of 270 women.

Sampling and Recruitment:

Potential participants were identified by random selection from the local electoral (voter) roll, with a specific focus on women within the desired age range. Selected individuals were approached and given a detailed explanation of the study objectives and procedures, and were enrolled after providing written informed consent. Face-to-face interviews were subsequently conducted to collect data.

Eligibility Criteria:

Women below 45 years of age presenting with menopause, and those who had undergone hysterectomy [15], were included. Women who were pregnant, had chronic medical comorbidities, or were currently receiving hormone replacement therapy (HRT) were excluded.

Ethical Considerations:

The study protocol was reviewed and approved by the Institutional Ethics Committee of J.K.K. Nattraja College of Pharmacy, Tamil Nadu, India, prior to the commencement of the study (Certificate of Approval No.: **JKK NCP/IEC-CER/0222123/38**). Written informed consent was obtained from all participants prior to their enrolment in the study. Participant confidentiality and privacy were maintained throughout the study, and the collected information was used solely for research purposes.

Data Collection Instrument:

A pretested, structured questionnaire was used to record sociodemographic details (age, area of residence, nutritional status, educational level, occupation, marital status, and number of children), menstrual and reproductive history (age at menarche, cycle regularity, and age at menopause), medical and surgical history, family history of early menopause, and the presence of five common postmenopausal symptoms (vaginal dryness, mood swings, sleep disturbance, joint and muscle pain, and fatigue).

Assessment of Lifestyle-Related Quality of Life:

Lifestyle and dietary habits were assessed using a validated 12-item questionnaire covering smoking, alcohol and tobacco use, sleep duration, physical activity, sedentary behaviour, dietary pattern, meal-skipping habits, and consumption of vegetables, sweets, carbonated beverages, and vitamin-D-rich foods. One point was awarded for each favourable response, and the cumulative score was standardised to a 100-point scale. Participants scoring above 70 were categorised as having a "Good" lifestyle-related quality of life, those scoring 50–70 as "Moderate," and those scoring below 50 as "Poor."

Statistical Analysis:

Data were entered and analysed using descriptive statistics. Categorical variables were summarised as frequencies and percentages, and the distribution of postmenopausal symptoms was compared descriptively across the Good, Moderate, and Poor QoL categories.

RESULTS

Prevalence and Age Distribution:

Of the 270 women screened, 228 (84.4%) met the study criteria for early menopause (onset below 45 years or history of hysterectomy), while 42 (15.6%) had undergone menopause at or after 45 years. The largest proportion of participants (35.2%) was aged 45–50 years, followed by 26.3% aged 51–55 years, 24.1% aged 56–60 years, 7.8% aged 61–65 years, and 6.7% aged 66–70 years (Table 1).

Sociodemographic Profile:

The majority of participants resided in suburban areas (75.9%), followed by rural (14.8%) and urban (9.3%) areas. Nearly half of the participants were illiterate (46.7%), while 31.9% had primary education, 11.9% had higher secondary education, and 9.6% were graduates. With respect to family size, 47.0% of participants had two children, 21.5% had three, 20.7% had one, 5.6% had none, and 5.2% had four children (Table 1).

Table 1: Sociodemographic Profile of the Study Population (n = 270)

Parameter	Category	Number of Participants	Percentage (%)
Age Distribution	45–50 years	95	35.2
	51–55 years	71	26.3
	56–60 years	65	24.1
	61–65 years	21	7.8
	66–70 years	18	6.7
Area of Residence	Urban	25	9.3
	Suburban	205	75.9
	Rural	40	14.8
Educational Status	Illiterate	126	46.7
	Primary	86	31.9
	Higher Secondary	32	11.9
	Graduation	26	9.6
	1 Child	56	20.7

Number of Children	2 Children	127	47.0
	3 Children	58	21.5
	4 Children	14	5.2
	No Children	15	5.6

Menstrual, Clinical and Surgical Profile:

Menarche occurred between 11 and 13 years in 60.4% of participants, between 14 and 16 years in 35.6%, and between 8 and 10 years in 4.1%. Menstrual cycles were irregular in 51.1% of participants and regular in 48.9%. Regarding age at menopause, 68.9% experienced menopause between 40 and 45 years, while 15.6% each experienced menopause before 40 years and after 45 years. Most participants had no known medical comorbidity (89.6%); thyroid disorders and diabetes were present in 4.8% and 5.6%, respectively. Nearly one-third (29.6%) had undergone hysterectomy and 5.9% had undergone surgical removal of the ovaries, while 64.4% had no surgical history. A family history of early menopause was reported by 21.8% of participants (Table 2).

Table 2: Menstrual, Clinical and Surgical Profile of the Study Population (n = 270)

Parameter	Category	Number of Participants	Percentage (%)
Age at Menarche	8–10 years	11	4.1
	11–13 years	163	60.4
	14–16 years	96	35.6
Menstrual Regularity	Regular	132	48.9
	Irregular	138	51.1
Age at Menopause	Under 40 years	42	15.6
	40–45 years	186	68.9
	Above 45 years	42	15.6
Medical Conditions	Thyroid Disorders	13	4.8
	Diabetes	15	5.6
	None	242	89.6
Surgical Interventions	Removal of Ovaries	16	5.9
	Hysterectomy	80	29.6
	None	174	64.4
Family History of Early Menopause	Yes	59	21.8
	No	211	78.1

Lifestyle and Dietary Behaviour:

Most participants had a normal nutritional status (80.4%); 11.5% were overweight, 6.3% underweight, and 1.9% obese. A mixed (vegetarian and non-vegetarian) diet was followed by 88.1% of participants. Sleep duration was 7 hours in 48.9% of participants, less than 7 hours in 37.0%, and more than 7 hours in 14.1%. Most participants (73.0%) did not skip any meals, while 19.6%, 4.1%, and 3.3% reported skipping breakfast, dinner, and lunch, respectively. Tobacco use was reported by 11.9% of participants, alcohol use by 3.7%, and smoking by 0.7% (Table 3).

Table 3: Lifestyle and Dietary Behaviour of the Study Population (n = 270)

Parameter	Category	Number of Participants	Percentage (%)
Nutritional Status	Underweight	17	6.3
	Normal Weight	217	80.4
	Overweight	31	11.5
	Obese	5	1.9
Dietary Pattern	Vegetarian	28	10.4
	Non-Vegetarian	4	1.5
	Mixed (Both)	238	88.1
Sleep Duration	Less than 7 hours	100	37.0
	7 Hours	132	48.9
	More than 7 Hours	38	14.1
Meal-Skipping Habits	Breakfast	53	19.6
	Lunch	9	3.3
	Dinner	11	4.1
	None skipped	197	73.0
Substance Use (Yes)	Smoking	2	0.7
	Alcohol	10	3.7
	Tobacco	32	11.9

Quality of Life and Prevalence of Postmenopausal Symptoms:

Within the early-menopause cohort (n = 228), lifestyle-derived QoL scores classified 69.2% of women as having Moderate QoL, 24.1% as Good QoL, and 6.5% as Poor QoL. Across the overall study population (n = 270), joint and muscle pain was the most prevalent postmenopausal symptom (83.3%), followed by fatigue (64.8%), sleep disturbance (56.7%), mood swings (34.1%), and vaginal dryness (29.3%).

When stratified by QoL category within the early-menopause cohort, the prevalence of vaginal dryness, mood swings, sleep disturbance, and joint and muscle pain increased consistently as QoL declined from Good to Poor. Joint and muscle pain rose from 82.27% (Good QoL) to 87.91% (Moderate QoL) and 93.33% (Poor QoL); sleep disturbance rose from 49.09% to 62.03% to 73.33%; mood swings rose from 34.55% to 37.34% to 46.67%; and vaginal dryness rose from 27.27% to 31.65% to 40.00% across the same categories. Fatigue was the only symptom that did not follow this monotonic pattern, being most frequently reported in the Good-QoL group (76.36%) compared with the Moderate-QoL (62.66%) and Poor-QoL (66.67%) groups (Table 4).

Table 4: Prevalence of Postmenopausal Symptoms Stratified by Quality-of-Life (QoL) Category within the Early-Menopause Cohort (n = 228)

Symptom	Good QoL (n = 55) %	Moderate QoL (n = 158) %	Poor QoL (n = 15) %	Overall Prevalence (n = 270) %
Vaginal Dryness	27.27	31.65	40.00	29.3
Mood Swings	34.55	37.34	46.67	34.1
Sleep Disturbance	49.09	62.03	73.33	56.7
Joint and Muscle Pain	82.27	87.91	93.33	83.3
Fatigue	76.36	62.66	66.67	64.8

QoL distribution within the early-menopause cohort (n = 228): Good QoL 24.1% (n = 55), Moderate QoL 69.2% (n = 158), Poor QoL 6.5% (n = 15). Overall prevalence is calculated across the entire study population (n = 270), while QoL-specific symptom percentages are calculated within the early-menopause cohort (n = 228).

DISCUSSION

The present study, involving 270 middle-aged women from Kumarapalayam Taluk, Erode district, found early menopause in 84.4% (228/270) of participants - a figure considerably higher than the pooled international estimates of 12.2% for early menopause and 3.7% for primary ovarian insufficiency reported in a large meta-analysis [2], and higher than the approximately 1% prevalence of premature menopause described in the general population [3]. This divergence is explained largely by the eligibility criteria of the present study, which specifically enrolled women with menopause below 45 years or a history of hysterectomy rather than sampling an unselected community cohort; the 84.4% figure should therefore be interpreted as the prevalence of early/hysterectomy-related menopause within a targeted risk group rather than as a general-population estimate. Within this cohort, 60.4% of women reported menarche between 11 and 13 years, closely mirroring the mean menarcheal age of 13 ± 1.1 years reported among South Indian adolescent girls by Omidvar et al. [16], suggesting that the reproductive timing of this population is broadly consistent with regional norms despite the accelerated menopausal transition observed later in life.

Lifestyle patterns around the menopausal transition also vary across populations and study settings. In an Italian cohort, Galfo et al. [17] observed lower physical activity but more regular breakfast consumption among postmenopausal compared with premenopausal women, indicating that menopause-associated lifestyle shifts are heterogeneous rather than uniformly adverse. Prevalence estimates for early ovarian insufficiency are similarly population- and definition-dependent: among women with systemic sclerosis, Jutiviboonsuk et al. [18] reported a primary ovarian insufficiency prevalence of 9.7%, considerably lower than the prevalence observed in the present cohort, underscoring how underlying comorbidity, diagnostic criteria, and sampling frame materially influence reported prevalence and reinforcing the value of population-specific data such as that generated by the present study.

Sociodemographic determinants of QoL in the present cohort were broadly consistent with previous literature. Illiterate women constituted the largest proportion across all QoL categories (55% of the Good-QoL group and 44% of the Moderate-QoL group), echoing the findings of Avis et al. [19], who demonstrated a strong association between educational attainment and postmenopausal quality of life. Similarly, women with exactly two children showed the most favourable QoL profile (47% of the Good-QoL and 51% of the Moderate-QoL groups), a pattern that parallels the observation by Ghorbani et al. [20] that a two-child family size was associated with

more balanced lifestyle demands, whereas larger family sizes corresponded to a greater impairment in the vasomotor domain of QoL.

With respect to symptom burden, joint and muscle pain was the most prevalent complaint in the present cohort (83.3% overall), rising to 93.3% among women with Poor QoL - a rate distinctly higher than that reported by Abdullah et al. [21] in Malaysian women (73.3%) and by Borker et al. [22] in a rural Kerala cohort (53.3%), possibly reflecting differences in occupational physical strain, nutritional calcium/vitamin-D status, or symptom-reporting thresholds between populations. Fatigue affected 64.8% of participants overall, a rate closely comparable to the 65.4% and 59.3% reported by Borker et al. [22] and Abdullah et al. [21], respectively; notably, however, fatigue in the present cohort did not follow the same graded QoL pattern observed for the other symptoms, being most frequent in the Good-QoL group (76.4%) rather than the Poor-QoL group (66.7%) - a finding that may reflect fatigue's multifactorial origin (occupational, domestic, and psychosocial) rather than a purely lifestyle-mediated symptom, and merits targeted evaluation in future studies. Sleep disturbance (56.7% overall) and mood swings (34.1% overall) both increased consistently as QoL worsened, a pattern concordant with data from the Penn Ovarian Aging Study reported by Freeman et al. [23], which linked irritability and mood instability to declining reproductive hormone levels across the menopausal transition. The comparatively low proportion of women in the Poor-QoL category in the present cohort (6.5%), relative to the 52.3% reported by Abdullah et al. [21], likely reflects differences in the QoL instruments used, cultural symptom perception, and the composition of the underlying study populations.

These findings are consistent with, and extend, broader evidence that dietary and lifestyle factors - including body mass index, physical activity, and specific dietary components - are predictive of the timing and reproductive span leading up to menopause [24], and that genetic, autoimmune, reproductive, lifestyle, and psychosocial factors collectively shape the risk and clinical course of premature ovarian insufficiency and early menopause [25]. Collectively, the present results demonstrate a graded, largely dose-dependent relationship between a simple, lifestyle-derived QoL score and the prevalence of individual postmenopausal symptoms within a large early-menopause cohort - an association that, to the best of our knowledge, has not previously been quantified in this manner in a South Indian community setting. Given that physical activity, dietary pattern, and sedentary behaviour are directly modifiable [12,13,14], this relationship strengthens the case for structured, community-based lifestyle intervention as a first-line, low-cost strategy for symptom mitigation, complementary to pharmacological management, particularly in resource-limited settings. It also supports calls for earlier recognition and individualised management - including consideration of hormone therapy where clinically appropriate - among symptomatic women with early ovarian insufficiency [26,27].

Strengths and Novelty of the Study

This study is strengthened by its relatively large, community-derived sample (n = 270) and its use of a structured, validated lifestyle/dietary instrument to derive a composite QoL score against which individual postmenopausal symptoms could be stratified. Rather than reporting symptom prevalence in isolation, as is common in the existing literature, the present study quantifies a graded, symptom-specific association between lifestyle-derived QoL and postmenopausal symptom burden within a large early-menopause cohort from a South Indian community setting - an approach that, to our knowledge, has not previously been reported in this population, and which offers a practical, low-resource framework that primary-care and community health workers could adapt for symptom-risk stratification and targeted lifestyle counselling.

Limitations

This study has several limitations. First, its cross-sectional design precludes causal inference between lifestyle-derived QoL and postmenopausal symptom prevalence. Second, reliance on self-reported symptom and lifestyle data introduces the potential for recall and reporting bias. Third, sampling was restricted to a single taluk (Kumarapalayam) in Erode district, which may limit the generalisability of the findings to other regions of India. Fourth, because the sample was deliberately enriched for women with early menopause or hysterectomy, the observed 84.4% prevalence should not be extrapolated as a general-population estimate. Fifth, menopausal status was determined from self-reported menstrual history without hormonal confirmation (e.g., serum FSH or estradiol). Finally, potential confounding variables such as socioeconomic status and access to healthcare were not statistically adjusted for in the analysis.

CONCLUSION

Early menopause was highly prevalent among the at-risk women sampled in this South Indian community, and postmenopausal symptom burden - most notably joint and muscle pain, fatigue, and sleep disturbance - showed a broadly consistent, graded relationship with lifestyle-derived quality of life. These findings support incorporating structured lifestyle counselling, encompassing physical activity, balanced nutrition, and health education, into routine community care for

women approaching or experiencing early menopause, and highlight the need for larger, hormonally confirmed, multi-centric studies to validate these associations and to inform community-level screening and intervention strategies.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

All authors contributed to the study design, data collection, analysis, manuscript drafting, and critical revision, and approved the final version for submission.

REFERENCES

1. McKinlay SM. The normal menopause transition: an overview. Maturitas. 1996;23(2):137-145.
2. Golezar S, Ramezani Tehrani F, Khazaei S, Ebadi A, Keshavarz Z. The global prevalence of primary ovarian insufficiency and early menopause: a meta-analysis. Climacteric. 2019;22(4):403-411.
3. Okeke T, Anyaehie U, Ezenyeaku C. Premature menopause. Annals of Medical and Health Sciences Research. 2013;3(1):90-95.
4. Reynolds RF, Obermeyer CM. Age at natural menopause in Spain and the United States: results from the DAMES project. American Journal of Human Biology. 2005;17(3):331-340.
5. Luborsky JL, Meyer P, Sowers MF, Gold EB, Santoro N. Premature menopause in a multi-ethnic population study of the menopause transition. Human Reproduction. 2003;18(1):199-206.
6. Jewelewicz R, Schwartz M. Premature ovarian failure. Bulletin of the New York Academy of Medicine. 1986;62(3):219-236.
7. Shuster LT, Rhodes DJ, Gostout BS, Grossardt BR, Rocca WA. Premature menopause or early menopause: Long-term health consequences. Maturitas. 2010;65(2):161-166.
8. Gallagher JC. Effect of early menopause on bone mineral density and fractures. Menopause. 2007;14(3 Pt 2):567-571.
9. Atsma F, Bartelink ML, Grobbee DE, van der Schouw YT. Postmenopausal status and early menopause as independent risk factors for cardiovascular disease: a meta-analysis. Menopause. 2006;13(2):265-279.
10. Jacobsen BK, Heuch I, Kvåle G. Age at natural menopause and all-cause mortality: a 37-year follow-up of 19,731 Norwegian women. American Journal of Epidemiology. 2003;157(10):923-929.
11. Ikeme A, Okeke TC, Akogu S, Chinwuba N. Knowledge and Perception of Menopause and Climacteric Symptoms among a Population of Women in Enugu, Southeast, Nigeria. Annals of Medical and Health Sciences Research. 2011;1(1):31-36.
12. Pandey S, Srinivas M, Agashe S, et al. Menopause and metabolic syndrome: A study of 498 urban women from western India. Journal of Mid-Life Health. 2010;1(2):63-69.
13. Daley A, Stokes-Lampard H, Macarthur C. Exercise for vasomotor menopausal symptoms. Cochrane Database of Systematic Reviews. 2011;(5):CD006108.
14. Bonaiuti D, Shea B, Iovine R, et al. Exercise for preventing and treating osteoporosis in postmenopausal women. Cochrane Database of Systematic Reviews. 2002;(3):CD000333.
15. Keshavarz H, Hillis SD, Kieke BA, Marchbanks PA. Hysterectomy Surveillance - United States, 1994-1999. Morbidity and Mortality Weekly Report Surveillance Summaries. 2002;51(SS-5):1-8.
16. Omidvar S, Amiri FN, Bakhtiari A, Begum K. A study on menstruation of Indian adolescent girls in an urban area of South India. Journal of Family Medicine and Primary Care. 2018;7(4):698-702.
17. Galfo M, Maccati F, Melini F. Lifestyle Behaviours and Dietary Habits in an Italian Sample of Premenopausal and Postmenopausal Women. International Journal of Health Sciences and Research. 2022;12(3):1-10.
18. Jutiviboonsuk A, Salang L, Eamudomkarn N, Mahakkanukrauh A, Suwannaroj S, Foocharoen C. Prevalence and clinical associations with premature ovarian insufficiency, early menopause, and low ovarian reserve in systemic sclerosis. Clinical Rheumatology. 2021;40(6):2267-2275.
19. Avis NE, Assmann SF, Kravitz HM, Ganz PA, Ory M. Quality of life in diverse groups of midlife women: assessing the influence of menopause, health status and psychosocial and demographic factors. Quality of Life Research. 2004;13(5):933-946.

20. Ghorbani R, Nassaji M, Shahbazi A, Rostami B, Taheri M. Association between quality of life, menopausal status, and sociodemographic factors among middle-aged women in Iran. Journal of the Egyptian Public Health Association. 2015;90(4):166-170.
21. Abdullah B, Moize B, Ismail BA, Zamri M, Mohd Nasir NF. Prevalence of menopausal symptoms, its effect to quality of life among Malaysian women and their treatment seeking behaviour. Medical Journal of Malaysia. 2017;72(2):94-99.
22. Borker S, Venugopalan P, Bhat S. Study of menopausal symptoms, and perceptions about menopause among women at a rural community in Kerala. Journal of Mid-life Health. 2013;4(3):182.
23. Freeman EW, Sammel MD, Lin H, Gracia CR, Kapoor S. Symptoms in the Menopausal Transition. Obstetrics & Gynecology. 2008;111(1):127-136.
24. Dorjgochoo T, Kallianpur A, Gao YT, et al. Dietary and lifestyle predictors of age at natural menopause and reproductive span in the Shanghai Women's Health Study. Menopause. 2008;15(5):924-933.
25. Giri R, Vincent AJ. Prevalence and Risk Factors of Premature Ovarian Insufficiency/Early Menopause. Seminars in Reproductive Medicine. 2020;38(4/5):237-246.
26. Nelson LM. Clinical practice. Primary ovarian insufficiency. New England Journal of Medicine. 2009;360(6):606-614.
27. Panay N, Kalu E. Management of premature ovarian failure. Best Practice & Research Clinical Obstetrics & Gynaecology. 2009;23(1):129-140.