

ORIGINAL ARTICLE

Factors Influencing the Natural Menopause Age among Women Attending Gynaecology Outpatient Clinic at a Tertiary Care Hospital in Central India

Nirmala Kiron¹, Nishant Gupta², Shiwani Lilhore³, Durgesh Shukla^{4*}

¹Department of Community Medicine, Shri Aurobindo Institute of Medical Sciences, Indore, Madhya Pradesh, India

²Department of Community Medicine, VKS Government Medical College, Neemuch, Madhya Pradesh, India

³Community Medicine, G.R. Medical College Gwalior, Madhya Pradesh, India

⁴Department of Community Medicine, SPGMC, Mandsaur, Madhya Pradesh, India

*Corresponding author:

Dr. Durgesh Shukla, Assistant Professor cum Statistician, Department of Community Medicine, Sunderlal Patwa Government Medical College, Mandsaur, Madhya Pradesh, India. Email: durgeshstatsgrmc2019@gmail.com

Received date: November 29, 2023; **Accepted date:** June 29, 2024; **Published date:** July 31, 2024



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/).

Abstract

Background: A woman enters the fertility period and then eventually comes a phase when her ovaries start to malfunction. It is challenging to pinpoint the exact age at which menopause begins for each woman.

Objectives: The present study was conducted to assess the socio demographic factors, life style factors, menstrual and reproductive factors among postmenopausal women and to determine the association of these factors with the menopausal age.

Methods: The present hospital based cross-sectional study was conducted including 330 women aged 45-65 years visiting the Obstetrics and Gynaecology Outpatient Department (OPD) at a teaching hospital. The interview proforma comprised questions regarding socio-demographic profile, lifestyle factors, menstrual and reproductive factors. Statistical tests like Chi-square test and logistic regression analysis were applied. Frequency, percentage, Odds ratio (OR) with their respective 95% confidence interval was calculated and *P* value <0.05 was considered as statistically significant.

Results: In present study, 63.03% of women attained menopause before the age of 45 years. The odds of developing early menopause (≤ 45 years) among urban women were higher compared to rural women [OR: 3.39; 95% CI: 2.12-5.43]. Among married women, odds of developing early menopause (≤ 45 years) were 4.19 times higher as compared to unmarried, widowed, divorcee and separated females. The odds of developing early menopause among women who attained menarche at the age of ≤ 13 years were 52% lower than those who attained menarche at > 13 years of age. The odds of developing early menopause (≤ 45 years) among women with parity ≤ 3 were 3.14 times (95% CI: 1.68-5.85) higher as compared to women having parity > 5 .

Conclusion: In this study, area of residence, marital status, socio-economic class, body mass index (BMI), history of addiction, age at menarche, age at first delivery and parity were associated with natural menopause age, indicating that social, lifestyle, and reproductive factors may have an impact on menopausal age.

Keywords: Menarche, Menopause, Menstrual, Parity, Reproductive

Introduction

Women's reproductive years come to an end with menopause, an important step in the continuum of life stages. A woman cannot conceive after menopause, with the possible exception of rare instances in which specialist fertility therapies are employed. Natural menopause, as defined by the World Health Organization, is the end of menstruation due to ovarian follicular activity decline without a clear cause and is verified by amenorrhea for 12 consecutive months. Menopause occurs naturally in most women between the ages of 45 and 55 years as a result of biological aging.^{1,2} Because age at natural menopause (ANM) has multiple possible therapeutic consequences, menopause-related studies in recent decades require extensive research in the field of related factors. Women experiencing an early menopause are at high risk for cardiovascular disease, cardiovascular mortality, depression, osteoporosis, fractures and other diseases.³

Aims and objectives of the present study were -

1. To study socio demographic factors associated with the age of menopause
2. To study life style factors associated with the age of menopause
3. To study menstrual and reproductive factors associated with the age of menopause

Material and Methods

This was a cross-sectional study conducted among middle aged women between 45-65 years of age visiting Obstetrics and Gynaecology Department of Kamla Raja Hospital at Madhav Dispensary and Jaya Arogya Group of Hospitals in G.R. Medical College, Gwalior during the period 1st January 2017 to 30th June 2018.

Inclusion Criteria

Women in the age group of 45 to 65 years, having amenorrhea for at least past 12 months, consenting to participate in the study were included.

Exclusion Criteria

Pregnant and breast-feeding women, women with uncontrolled medical conditions such as hypertension, diabetes mellitus, heart disease, patients undergoing treatment for cancer, or those on remission, women on hormone replacement therapy, severely ill patients and those not willing to participate were excluded from the study.

Sample Size

The sample size was calculated by using formula $4PQ/\Delta^2$, Where P (=25%) was proportion of menopausal women having age at natural menopause as 45 years (25 percentile) in Madhya Pradesh and Q was 100-P, L was (5% absolute error considered) allowable error and at 5% level of significance.⁴ Calculated sample size was 300, assuming 10% non-response rate.

Sampling Tool and Technique

The study procedure involved a face-to-face interview with the participants using a predesigned questionnaire in Hindi language. For the selection of cases, convenient sampling was adopted. The subjects who fulfilled the inclusion criteria were selected from the patients visiting the OPD of Obstetrics and Gynaecology department. For every four eligible subjects visiting the department, one participants was randomly selected for the present study.

Statistical Analysis

Data were entered into MS Excel 2007 and analysis was done. Frequency and percentages were calculated and the statistical analysis was done using Chi square test. *P* value <0.05 was considered to be statistically significant and *P* value >0.05 was considered non-significant. Logistic regression analysis was performed and odds ratio (OR) along with their 95% CI were calculated.

Ethical Consideration

Informed written consent was obtained from the participants and the anonymity was maintained. Ethical approval was taken from the ethical committee of G.R. Medical College, Gwalior for conducting the study (D.No. 320/Bio/MC/Ethical Dated 11/04/2017).

Results

The mean age of postmenopausal women was 52.71 ± 5.27 years. The mean age at natural menopause was found to be 45.65 ± 4.44 years. Out of the total 330 postmenopausal women, maximum number of participants (44.84%) were in 45-50 year age group, followed by 56-60 year age group (30.30%). Out of the total 330 postmenopausal women, 63.03% participants were from urban areas. Out of the total 330 postmenopausal women, maximum number of participants (70.51%) were Hindus, followed by Muslims (23.03%). Out of the total 330 postmenopausal women, 61.21% of participants were illiterates. Out of the total

330 postmenopausal women, 50.91 were homemakers. Out of the total 330 postmenopausal women, maximum number of participants were married (87.88%), 9.39% women were widows, 2.12% women were separated, 0.60% were unmarried.

Table 1: Sociodemographic characteristics of participants (n=330)

Characteristics		Number	Percentage (%)
Age group (in years)	45-50 years	148	44.85
	51-55 years	60	18.18
	56-60 years	100	30.30
	61-65 years	22	6.67
Area of Residence	Urban	208	63.03
	Rural	122	36.97
Religion	Hindu	236	71.52
	Muslim	76	23.03
	Sikh	5	1.51
	Christian	13	3.94
Education	Illiterate	202	61.21
	literate	128	38.79
Occupation	Homemaker	168	50.91
	Working	162	49.09
Marital status	Married	290	87.88
	Unmarried	2	0.61
	Widowed	31	9.39
	Separated	7	2.12
Type of Family	Nuclear	166	50.30
	Joint	148	44.85
	Single/alone	16	4.85
Socio-economic class	Low (IV, V)	240	72.73
	High (I, II, III)	90	27.27
Diet	Vegetarian	216	65.45
	Non-vegetarian	144	43.64

About half of the women were from nuclear families (50.30%), followed by joint families (44.85%) and 4.85% women were staying alone. In terms of socio-economic status, majority of the study participants belonged to class III (29.09%) and class II (23.64%) followed by class I (20%), class IV (16.06%), and class V (11.21%). In this study, 65.45% women were vegetarians, while 43.64% were non-vegetarians [Table 1].

In the present study, the proportion of women with menopause age ≤ 45 years was higher in urban areas (73.56%) as compared to the rural areas (45.08%). The odds of developing early menopause (≤ 45 years) among urban women were 3.39 times higher than the rural women [OR: 3.39; 95% CI: 2.12-5.43]. Among married females, odds of developing early menopause (≤ 45 years) were 4.19 times higher as compared to unmarried, widowed, divorcee and separated females. Among the low socio-economic status (Class IV and V) women, the odds of developing early menopause (≤ 45 years) were 2.08 times (95% CI: 1.27-3.41) higher as compared to high socio-economic status (Class I, II & III) according to modified BG Prasad classification [Table 2].

The odds of developing early menopause (≤ 45 years) among women with BMI ≤ 29.99 Kg/m² were 2.64 times (95% CI: 1.22-5.70) higher as compared to women with a BMI of ≥ 30 Kg/m². The odds of developing premature or early menopause among women with any kind of addiction were 64% lower than those with no addiction (0.36; 95% CI: 0.20-0.64). Vegetarian women (42.59%) and non-vegetarian women (42.10%) did not show any significant variation in developing early menopause (≤ 45 years). Exercise did not emerge as a predictor for early menopause (≤ 45 years) among women [Table 3].

The odds of developing early menopause among women who attained menarche at the age ≤ 13 years were 52% lower than those who attained menarche at age > 13 years (0.48; 95% CI: 0.31-0.77). The odds of developing early menopause among women whose age at first delivery was < 22 years were 85% lower than those whose age at first delivery was ≥ 22 years (0.15; 95% CI: 0.06-0.39). The odds of developing early menopause (≤ 45 years) among women with parity ≤ 3 were 3.14 times (95% CI: 1.68-5.85) higher as compared with women having parity > 5 . Age at last delivery and history of contraception were not found to be associated with the natural menopause age [Table 4].

Table 2: Distribution of postmenopausal women according to relationship with age of menopause and socio demographic factors

Socio demographic factors	Center alignment	Age at menopause (n=330)		Total	P value	OR (95% CI)
		≤45 years (n- 208) (%)	>45 years (n- 122) (%)			
Residing Locality	Urban	153 (73.56%)	55 (26.44%)	208 (100%)	χ^2 -26.76 df-1 <0.001*	3.39 (2.12-5.43)
	Rural	55 (45.08%)	67 (54.92%)	122 (100%)		1 (ref)
Marital Status	Married	172 (72.57%)	65 (27.42%)	237 (100%)	χ^2 -32.87 df- 1 <0.001*	4.19(2.53-6.95)
	Unmarried Widowed Divorcee/ Separated	36 (38.70%)	57 (61.29%)	93 (100%)		1 (ref)
Education	Illiterate	119 (58.91%)	83 (41.08%)	202 (100%)	χ^2 -3.79 df-1 0.051	0.63 (0.39-1.00)
	Literate	89 (69.53%)	39 (30.46%)	128 (100%)		1 (ref)
Occupation / Working Status	Housewife	103 (61.30%)	65 (38.69%)	168 (100%)	χ^2 -0.43 df-1 0.50	0.86 (0.55-1.34)
	Working	105 (64.81%)	57 (35.18%)	162 (100%)		1 (ref)
Family type	Nuclear/single	119 (62.30%)	72 (37.69%)	191 (100%)	χ^2 -0.10 df-1 0.74	0.93 (0.59-1.46)
	Joint	89(64.02%)	50 (35.97%)	139 (100%)		1 (ref)
Socio-economic class	Low (IV, V)	155(64.28%)	85 (35.41%)	240 (100%)	χ^2 -8.73 df-1 0.003*	2.08 (1.27-3.41)
	High (I, II III)	42(46.66%)	48 (53.33%)	90 (100%)		1 (ref)

*indicates statistically significant

Table 3: Distribution of study participants according to relation between age of menopause and life style factors

Factors	Group	Age at natural menopause (n-330)		Total	P value	OR (95% CI)
		≤45 years (n-208) (%)	>45 years (n-122) (%)			
BMI	≤ 29.99	177 (59.20%)	122 (40.80%)	299 (100%)	χ^2 -6.44 df-1 < 0.01*	2.64 (1.22-5.70)
	≥30	11 (35.48%)	20 (64.52%)	31 (100%)		1 (ref)
Exercise	Not doing exercise	87 (43.28%)	114 (56.72%)	201 (100%)	χ^2 -0.28 df-1 0.59	1.13 (0.72-1.77)
	Doing exercise	52 (40.31%)	77(59.68%)	129 (100%)		1 (ref)
Diet	Vegetarian	92 (42.59%)	122 (56.58%)	216 (100%)	χ^2 -.02 df-1 0.87	1.04 (0.65-1.64)
	Non- vegetarian	48 (42.10%)	66 (57.89%)	114 (100%)		1 (ref)
Addiction (any)	Addicted	21 (31.34%)	46 (68.65%)	67 (100%)	χ^2 -12.87 df-1 <0.001*	0.36 (0.20-0.64)
	Non- addicted	147 (55.89%)	116 (44.11%)	263 (100%)		1 (ref)

*indicates statistically significant

Table 4: Distribution of postmenopausal women according to relationship with age of menstrual and reproduction factors

Menstrual/ Reproductive factors	Group	Age at natural menopause (n-330)		Total	P Value	OR (95% CI)
		≤45 years (n-208) (%)	>45 years (n-122) (%)			
Age at menarche	≤13 years	76 (53.52%)	66 (46.47%)	142 (100%)	χ^2 -9.67 df- 1 0.001*	0.48 (0.31-0.77)
	>13 years	132 (70.21%)	56 (29.78%)	188 (100%)		1 (ref)
Age at First delivery	<22 years	162 (58.06%)	117 (41.93%)	279 (100%)	χ^2 -19.10 df-1 0.001*	0.15 (0.06-0.39)
	≥22 years	46 (90.19%)	5 (9.80%)	51 (100%)		1 (ref)
Age at Last delivery	<25years	42 (65.62%)	22 (34.37%)	64 (100%)	χ^2 - 0.23 df-1 0.63	1.15 (0.65-2.04)
	≥25 years	166 (62.40%)	100 (37.59%)	266 (100%)		1 (ref)
H/O contraception	Yes	50 (71.43%)	20 (28.57%)	70 (100%)	χ^2 -2.69 df-1 0.10	1.61 (0.91-2.87)
	No	158 (60.76%)	102 (39.23%)	260 (100%)		1 (ref)
Parity	≤ 3	102 (73.38%)	37 (26.62%)	139 (100%)	χ^2 _ 14.04 df-2 <0.001*	3.14 (1.68-5.85)
	4-5	77 (59.68%)	52 (40.31%)	129 (100%)		1.68 (0.91-3.10)
	>5	29 (46.77%)	33 (53.22%)	62 (100%)		1 (ref)

*indicates statistically significant

Discussion

In this study, the mean age of the study participants was found to be 52.71±5.27 years. Vinker S *et al.* (2003), Moon-Soo Lee *et al.* (2010), Rahman SA *et al.* (2010), and Dutta R *et al.* (2012) in their study reported the mean age of women as 60.4 years, 51.04 years, 50.83 years and 50.20 years, respectively.⁵⁻⁸ In the present study, majority (61.21%) of the study participants were illiterates, while the remaining 38.79% were literates. Geeta R *et al.* (2013) and Khan S *et al.* (2016) reported 30% and 80.6% of their study participants to be illiterates, respectively.⁹⁻¹⁰ In terms of occupation, in the present study, majority of the participants were house makers (50.91), which is similar to the findings of Rahman SA *et al.* (2010) and Geeta R *et al.* (2013) who reported

46.1% and 59% of the respondents to be housemakers, respectively.^{7,9} Khan S *et al.* (2016) concluded that 35.8% of the participants were from low socio-economic class.¹⁰ In the present study, majority of the females were married or living as married (87.88%), followed by widowed (9.39%), separated (2.12%) women. A study conducted by Vinker S *et al.* (2003) found 75% percent of the women participants to be married, and 17% were widows.⁵ Rahman SA *et al.* (2010) and Geeta R *et al.* (2013) reported that 71.9% and 78% of the study participants respectively were married.^{7,9}

In the present study, the mean age at natural menopause was found to be 45.65±4.44 (SD) years. Dutta R *et al.* (2012) found the mean age at menopause to be 44.49 years.⁸ Chuni N *et al.* (2011) conducted a study among

the Nepalese women and reported the mean age of premenopausal women as 45.1 years.¹¹ The variation in menopausal age could be due to the differences in methodology, race, lifestyle. The probable reason for relatively higher age at menopause reported in developed countries could be attributed to contrasting socio-cultural, climatic and geographical factors. Also, racial and genetic differences could be a contributing factor in deciding the average age at menopause.¹²

In our study, among 64.28% of the women belonging to lower socio-economic class, menopause occurred before the age of 45 years. Kapoor P *et al.* (2009)¹³ found that women who belonged to middle class families had a late onset of menopause (45.47 years) compared to women from poor socioeconomic status (42.13 years). This study concluded that socioeconomic status affects the age of onset of menopause. The reason behind low socio-economic status being associated with early menopause could be due to lack of proper nutrition, and also, poor socio-economic conditions predispose to stress and other physical and psychological problems which might result in early menopause.¹³

In present study, statistically significant association was found between residence of participants and age of menopause. Urban women were found to attain menopause at an early age.

Sarkar Amrita *et al.* (2014) conducted a cross-sectional study and found that the mean age at menopause was higher in rural areas compared to urban and urban slums of the district.¹⁴ Reason behind this could be that urban women are educated and more aware of menopausal symptoms, and thus can easily recognize the symptoms.

The present study concluded that heavier women attained menopause at a later age than women with normal BMI. Maru L *et al.* (2016) conducted a cross sectional study and found that as the BMI increased, the age of menopause also increased. Thus, higher the BMI, higher was the age of menopause and these values also showed a definite statistical correlation. The possible explanation for this could be that the production of estrogen in adipose tissues is greater in more obese women resulting in higher levels of circulating estrogens, thereby making a larger reproductive span.¹⁵

Suggestions/Recommendation

Poor socio-economic status and BMI were found to be significantly associated with early menopause. Thus, it can be recommended that eating a nutritious diet rich in

fruits, vegetables, and protein, drinking plenty of water, getting regular physical activity and yoga may provide relief from menopause symptoms. Calcium and vitamin D are linked to good bone health, and therefore it is important to have a diet rich in calcium and vitamin D. It is recommended to maintain a healthy BMI. The trigger foods such as caffeine, alcohol, and sugary or spicy foods can be excluded from the eating habits to avoid problems related to menopause such as hot flashes, night sweats, and mood changes.

Conclusion

The present study established that area of residence, marital status, socio-economic class, BMI, history of addiction, age at menarche, age at first delivery and parity are associated with the natural menopause age, thus suggesting the possibility of social, lifestyle, and reproductive factors impacting the menopausal age.

Conflict of interest

Nil

Source of funding

None

References

1. World Health Organization. Menopause. Geneva: WHO; 2022. [Cited 2023 Jan 20]. Available from: [<https://www.who.int/news-room/fact-sheets/detail/menopause#:~:text=This%20means%20that%20the%20ovaries,55%20years%20for%20women%20worldwide>].
2. Peacock K, Ketvertis KM. Menopause. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [Cited on 25 March 2023] Available from: <https://www.ncbi.nlm.nih.gov/books/NBK507826/>
3. Hyvärinen M, Karvanen J, Aukee P, *et al.* Predicting the age at natural menopause in middle-aged women. *Menopause* 2021;28(7):792-99.
4. Pallikadavath S, Ogollah R, Singh A, *et al.* Natural menopause among women below 50 years in India: A population-based study. *Indian J Med Res* 2016;144(3):366-377.
5. Vinker S, Yogevev Y, Kitai E, *et al.* Awareness of personal healthcare and menopause in menopausal women in Israel. *Isr Med Assoc J* 2003;5(1):31-4.
6. Lee MS, Kim JH, Park MS, *et al.* Factors influencing the severity of menopause symptoms in

- Korean post-menopausal women. *J Korean Med Sci* 2010;25(5):758-65.
7. Rahman SA, Zainudin SR, Mun VL. Assessment of menopausal symptoms using modified Menopause Rating Scale (MRS) among middle age women in Kuching, Sarawak, Malaysia. *Asia Pac Fam Med* 2010;9:1-6.
 8. Dutta R, Dcruze L, Anuradha R, *et al.* A population-based study on the menopausal symptoms in a rural area of Tamil Nadu, India. *J Clin Diagn Res* 2012;6(4):597-601.
 9. Geeta R, Parida L. Prevalence of menopausal problems and the strategies adopted by women. Maharashtra (India). *IJSR* 2015;4:1-6.
 10. Khan S, Shukla MK, Priya N, *et al.* Health seeking behavior among postmenopausal women: a knowledge, attitude and practices study. *Int J Community Med Public Health* 2016;3:1777-82.
 11. Chuni N, Sreeramareddy CT. Frequency of symptoms, determinants of severe symptoms, validity of and cut off score for Menopause Rating Scale (MRS) as a screening tool: A cross-sectional survey among midlife Nepalese women. *BMC Womens Health* 2011;11(1):30.
 12. Hardy R, Kuh D. Social and environmental conditions across the life course and age at menopause in a British birth cohort study. *BJOG* 2005;112:346-54.
 13. Kapur P, Sinha B, Pereira BM. Measuring climacteric symptoms and age at natural menopause in an Indian population using the Greene Climacteric Scale. *Menopause* 2009;16(2):378-84.
 14. Amrita S, Pradeep P, Kakoli G, *et al.* A study on health profile of postmenopausal women in Jamnagar district, Gujarat. *Journal of Research in Medical and Dental Science* 2014;2(2):25.
 15. Maru L, Verma R, Verma M, *et al.* Correlation of body mass index and age of menopause in women attending medicine and gynaecology department of a tertiary care centre. *Int J Res Med Sci* 2016;4:2206-9.