

## ORIGINAL ARTICLE

## Age at natural menopause and factors affecting its onset: A cross-sectional study among postmenopausal females in District Dehradun

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### Abstract

**Background:** Menopause has become a popular topic of study as life expectancy rises around the world. The average age at menopause in both developed and developing countries ranges from 45 to 53 years. Factors influencing the extent of ovarian follicle reserve dwindling, such as sociodemographic, menstrual, reproductive, and dietary factors. **Aim and Objective:** The present study aimed to determine the mean age of menopause and to find out the various factors affecting menopause onset. **Methods:** A community based cross-sectional study conducted in rural and urban areas of District Dehradun for a period of 1 year starting 1st August 2020 to 31st July 2021. Data were collected using multistage stratified random sampling from 211 cases of natural menopause. Chi-square was applied as statistical test of significance and  $p < 0.05$  was considered statistically significant. **Results:** According to current study, average age menopausal age is 46 years. Variables like sociodemographic characteristics, lifestyle habits, reproductive and menstrual factors were found to have a significant relationship with onset of menopause. **Conclusion:** Menopause, whether it occurs early or late in life, several factors are responsible for deciding its onset. As a result, it is critical to identify the factors influencing the onset of menopause.

### Keywords

Menopause; Post-menopausal Females; Middle-aged Females.

### Introduction

The World Health Organization defined menopause as the permanent cessation of menstruation because of ovarian activity reduction. Menopause points

towards a physiological shift from the reproductive to the nonreproductive stage (1). Demographic change and growing life expectancy have elevated the importance of this physiological process in

addressing the health concerns of women in the menopausal age group (2). The most common age range for menopause in the Western world is between the ages of 40 and 61, with the average age for the last period being 51 years. In India, the average age of menopause is around 48 years (3). In India, over 12.6 million women are beyond the age of 45, accounting for approximately 10.4 percent of the entire population (4). Menopause affects women's physiological, physical, psychological, and behavioral health in a variety of ways. Sociodemographic factors, lifestyle habits, diet, reproductive, menstrual factors, and overall health are all elements that influence women's menopausal experiences (5). Menopause is becoming increasingly significant for health policymakers as life expectancy rises; women are expected to live for more than 20 years after menopause with diminished quality of life due to menopausal symptoms (6).

### Aims & Objectives

1. To determine the mean age of menopause in rural and urban areas of District Dehradun
2. To find out the various factors affecting the age of onset of natural menopause

### Material & Methods

**Study design:** Community-based Cross-sectional study.

**Place of study:** Households of selected villages of Nyay Panchayat Markham Grant (Doiwala block), and selected wards of Dehradun Municipality.

**Duration of study:** One year (1<sup>st</sup> August 2020 to 31<sup>st</sup> July 2021)

**Sampling Technique:** Multistage stratified systematic random sampling technique

**Study tool:** A pre-designed semi-structured questionnaire was used to carry out the survey

**Inclusion criteria:**

- Women between the age of 40-60 yrs.
- Women residing in District Dehradun for the last 1 year.
- Women who readily gave written informed consent.
- Women who attained natural menopause

**Exclusion criteria:**

- Women who were mentally challenged.
- Women with severe gynaecological problems.
- Previous history of hysterectomy or receiving chemotherapy or radiotherapy.

- Women who attained surgical menopause

**Methodology:** The study was conducted under the Department of Community Medicine, Himalayan Institute of Medical Sciences (HIMS), Dehradun, among women aged 40 – 60 years, in rural & urban areas of district Dehradun, over a period of 12 months. The study area was chosen by using multistage stratified random sampling technique.

Separate lists of blocks for rural areas and municipalities for urban areas were made and 10% of each was selected randomly in the first phase. In this way, one block and one municipal area were chosen randomly.

In the next phase, 10% of the villages from the selected Nyaypalika in the rural area and 10% wards from the selected municipal area (urban) were chosen by random sampling technique for the study. A pilot study was conducted and the data collecting tool was modified accordingly. Study households were selected by systematic random sampling . In rural areas every 7th house, while in the urban area every 26th house was selected.

In the selected household, one woman fulfilling the inclusion criteria was chosen for the interview (In case there was more than one female in the selected household, respondent of higher in age group was included in the study). Informed written consent was taken before interviewing. The participants were interviewed face-to-face by the researcher herself using the data collection tool.

**Statistical analysis:** Data was refined, compiled and tabulated using Microsoft Excel and analysed using SPSS 26.0 version. Data was compared using cross tabulation and frequency along with percentages was calculated for qualitative and categorical variables categorical data were analysed using the chi-square test. The level of significance, usually denoted as alpha had the following criteria: if  $p < 0.05$  then the hypothesis was said to be significant.

### Results

In this study a total of 211 women attained menopause in the study, 105 from rural and 106 from urban area. The mean age of menopause of the total participants was  $46.54 \pm 1.99$  years. The mean age of menopause was almost similar in the rural area ( $46.18 \pm 1.62$ ) as well as urban area ( $46.91 \pm 2.25$ ). The difference was found to be significant among the two areas. ([Table 1](#))

([Table 2](#)) it is evident that locality, socio-economic status, education and marital status of females are

associated with onset of menopause. It can be concluded that maximum number of rural women attained early menopause (64.4%) and a greater number of urban women attained late menopause (55.9%). With regards to socioeconomic class, 22.0% of females in high socioeconomic class and 64.5% belonging to low socioeconomic class achieved menopause at age <45 years. Regarding educational status greater number of females who attained late menopause were found to be literate 116 (76.3%). A correlation between marital status and age at menopause was seen as unmarried/widowed/divorced women had an earlier menopause (97.4%) than married women."

(Table 3) shows that women who were addicted to tobacco attained menopause at an earlier age than women who were not addicted. It was also observed that caffeine consumption was found to be higher (92.8%) in women those who attained late menopause.

(Table 4) It was observed that women who had a parity of 2-3 attained menopause earlier and it can also be concluded that women having older age at last delivery attain menopause later. OCP intake did not show statistically significant association with age at natural menopause.

(Table 5) shows distribution between age of onset of menopause and menstrual factors it was observed that maximum women who had early onset of menopause, attained menarche between 12-14years (67.8%). Regarding menstrual cycle length it was seen that majority of females who attained late menopause had cycle length of more than 28 days (82.2%).

## Discussion

In the present study, statistically significant correlation was found between age of onset of menopause and factors such as socioeconomic class, locality, education, marital status, tobacco addiction, caffeine consumption, parity, age at last pregnancy, age at menarche, and menstrual cycle regularity.

The mean age of menopause of the middle-aged women was  $46.54 \pm 1.99$  years. However, it is slightly lower than the average age of menopause as found by Indian Menopause society which is around 47.5years (7). Our findings are similar to a study by Maninder Ahuja et al at Haryana (8) which states that natural age of menopause of Indian women was determined to be  $46.2 \pm 4.9$  years. Consistent findings were also noted by another study done by Kapur et

al in Uttarakhand (8), Kriplani et al in northern India (9) and Avin et al in Karnataka (10) where the mean age of onset of menopause was found out to be 46.82 years, 46.7 years and  $45.32 \pm 2.79$  years respectively. A pan India survey by IMS has reported the mean age of menopause in the northern region to be  $45.5 \pm 4.86$  years (11). This is almost comparable to the mean menopausal age reported in our study. The current study found a statistically significant relationship between respondents' residing location and their age at menopause. The majority of females who reached early menopause were found to be from rural areas.. Our findings are similar to study by Dasgupta & Ray et al as their study has clearly advocated the positive role of locality in determining menopausal age (1). Also it was observed that married women had late onset of menopause (97.4%) as compared to single women who attained early menopause (91.5%). Similarly, Singh et al (12), Gold et al (13) and Ahuja M et al (14) also revealed that women who were married attained menopause later than unmarried women.

Majority of literate females had late menopause (76.3%) as compared to illiterates who had attained early menopause (47.5%). Similar findings were observed by Singh et al at Bhopal (12) & Gold et al (13), that low level of education was significantly associated with early onset of menopause.

A higher no of females in the lower class had early menopause (64.5%) as compared to those who were of middle class. Corroborative findings were observed by Kapur et al at Uttarakhand (8) and Poomalar GK et al at Puducherry (14) and who stated that women who belonged to middle class had late onset of menopause compared to lower class who had early menopause. The possible explanation for the same, might be due to low social status, lack of adequate nutrition, the brunt of which is suffered mainly by females of the family in Indian set up. Also low social class predisposes to stress & other psychological conditions, all resulting in early onset of menopause.

Although a slightly higher number of females who attained early menopause were non vegetarian by diet (66.1%), but the association was not significant whereas Togerson et al (15) concluded that consumption of non-vegetarian diet was associated with early menopause.

Maximum no of females with early menopause were tobacco consumers (44.1%) as compared to those with late menopause (9.2%). Our findings match with

study by Midgette & Baron (16), Luoto et al (17) & Bromberger et al (18) and Gold et al (13) who reported that smoking tobacco increases the risk of early menopause. Contradictory findings were reported by Singh N et al (12) where women who were addicted to tobacco chewing attained late menopause.

In our study, Caffeine consumption was noted to be higher among those with late menopause (92.8%). Our findings are supported by study by Nagata et al (19) whereas Singh et al (12) observed that Caffeine intake has no association with age of onset of menopause. In our study physical activity did not play any key role in onset of menopause whereas some studies report that heavy physical activity is associated with early menopause (12).

Our study found a positive association between Parity & onset of menopause, it was observed that women with Parity less than 2 had late menopause whereas women with parity between 2-3 had early menopause. Synonymous findings were reported by Ahuja et al (20). Age at last pregnancy less than 30 years had late menopause, whereas pregnancy after 30 years had early menopause. Contradictory findings were reported by Syamala et al (5) who observed that majority of women who conceived early in life had early menopause and the proportion decreases at increase in age at last birth. Reason being longer fertile period in women who had late pregnancies.

Our study reported that early menopause is associated with history of OCP intake, but the association found was not significant. Singh et al (12) and Gold et al (13) also reported that women who consumed OCP experienced menopause at an early age than women who did not use OCP, in contrast Palmer et al & other studies reported a contrasting relationship between history of intake of OCP & menopause onset (21). Syamala et al also reported that proportion of women who are in menopause is significantly higher among women who never used OCP than among women who ever used contraception (5).

## Conclusion

Natural menopause age is important in women's health because it is a sign of declining ovarian function and thus ageing. Menopause, whether it occurs early or late in life, is responsible for adverse health effects in women. As a result, it is critical to

identify the factors that influence the onset of menopause.

## Recommendation

The population of postmenopausal women is increasing rapidly and accordingly, there is need for substantial enhancement in attention to their menopausal health problems. As the knowledge, awareness and perception regarding menopause among middle-aged females is very less, IEC activities need to be conducted at healthcare facilities to raise awareness on menopause. Also there is a huge need to create effective policy and national awareness programme for menopausal females too. The health personnel trained in managing menopausal problems should provide services through special clinics organized at PHC or health subcenters on weekly or fortnightly basis.

## Limitation of the study

There are limitations in this study, as the study was conducted during the COVID 19 pandemic there were difficulties faced in data collection. Study subjects were apprehensive to talk to the health care workers. As women were asked to recall symptoms from the past years, hence the chances of recall bias cannot be ruled out. Another limitation is the small sample size in comparison to other studies on this topic. Thus, the result cannot be extrapolated to the population at large.

## Relevance of the study

There is already a huge lack of research work not only in our region of Uttarakhand but also in India. "This study highlights the issues related to menopause, which has been neglected for long and helps to identify the factors which could influence the age at natural menopause and thus can help in regulating women's health in a better way. Hence, this study will act as a beacon for future studies for women in Uttarakhand.

## Authors Contribution

All authors contributed equally.

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**Tables**

**TABLE 1 DISTRIBUTION OF POST-MENOPAUSAL WOMEN AS PER THEIR MEAN AGE OF ONSET OF MENOPAUSE.**

Rural (n=105)	Urban (n=106)	Total (N=211)	T-test,
Mean ± SD	Mean ± SD	Mean ± SD	p-value
46.18± 1.62	46.91 ± 2.25	46.54 ± 1.99	1.65
			p-value = 0.003

**TABLE 2 DISTRIBUTION OF POST-MENOPAUSAL WOMEN ACCORDING TO AGE OF ONSET OF MENOPAUSE AND SOCIODEMOGRAPHIC FACTORS.**

Factors	Age of onset of menopause				Total (N=211)	
	< 45 years (n=59)		> 45 years (n=152)		N	%
	n	%	n	%		
<b>Area</b>						
<b>Rural</b>	38	64.40%	67	44.10%	105	49.80%
<b>Urban</b>	21	35.60%	85	55.90%	106	50.20%
$\chi^2 = 7.03; \delta\phi = 1; \pi\text{-value} = 0.00$						

Factors	Age of onset of menopause				Total	
	< 45 years (n=59)		> 45 years (n=152)		(N=211)	
<b>Socio economic status</b>						
Upper	13	22.00%	23	15.10%	36	17.00%
Middle	8	13.50%	62	40.80%	70	34.20%
Lower	38	64.50%	67	44.10%	105	49.80%
$\chi^2= 7.02; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.00$						
<b>Education</b>						
Illiterate	28	47.50%	36	23.70%	64	30.30%
Literate	31	52.50%	116	76.30%	147	69.70%
$\chi^2= 11.36; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.001$						
<b>Occupation</b>						
Working	21	35.60%	50	32.90%	71	33.60%
Housewife	38	64.40%	102	67.10%	140	66.40%
$\chi^2= 0.13; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.71$						
<b>Marital status</b>						
Married	54	91.50%	148	97.40%	202	95.70%
Unmarried	0	0.00%	2	1.30%	2	0.90%
Divorced	5	8.50%	2	1.30%	7	3.30%
$\chi^2= 7.10; \delta\phi = 2; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.02$						

**TABLE 3 DISTRIBUTION OF POST-MENOPAUSAL WOMEN BETWEEN AGE OF ONSET OF MENOPAUSE AND LIFESTYLE FACTORS.**

Lifestyle Factors	Age of onset of menopause				Total	
	< 45 years (n=59)		> 45 years (n=152)		(N=211)	
	n	%	n	%	N	%
<b>Diet</b>						
Vegetarian	20	33.9	59	38.8	79	37.4
Non-vegetarian	39	66.1	93	61.2	132	62.6
$\chi^2= 0.44; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.51$						
<b>Tobacco consumption</b>						
Yes	26	44.1	14	9.2	40	19
No	33	55.9	138	90.8	171	81
$\chi^2= 33.61; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon< 0.00$						
<b>Alcohol consumption</b>						
Yes	11	18.6	4	2.6	15	7.1
No	48	81.4	148	97.4	196	92.9
$\chi^2= 16.50; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.00$						
<b>Caffeine consumption</b>						
Yes	44	74.6	141	92.8	185	87.7
No	15	25.4	11	7.2	26	12.3
$\chi^2= 13.01; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon <0.00$						
<b>Physical activity</b>						
Regular	8	13.6	23	15.1	31	14.7
Irregular	51	86.4	129	84.9	180	85.3
$\chi^2= 0.08; \delta\phi = 1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon= 0.77$						

**TABLE 4 DISTRIBUTION OF POST-MENOPAUSAL WOMEN BETWEEN AGE OF ONSET OF MENOPAUSE AND REPRODUCTIVE FACTORS.**

Reproductive Factors	Age of onset of menopause				Total	
	< 45 years		> 45 years		(N=211)	
	(n=59)		(n=152)			
	n	%	n	%	N	%
<b>Parity</b>						
<2	7	11.9	105	69.1	112	53.1
02-Mar	29	49.1	39	25.6	68	32.2
>3	23	39	8	5.3	31	14.7
$\chi^2=78.87; \delta\phi=2; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.001$						
<b>Age at last pregnancy</b>						
<30	27	45.8	114	75	141	66.8
>30	32	54.2	38	25	70	33.2
$\chi^2=19.33; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.001$						
<b>History of use of oral contraceptive</b>						
Yes	11	18.6	42	27.6	53	25.1
No	48	81.4	110	72.4	158	74.9
$\chi^2=1.76; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.184$						

**TABLE 5 DISTRIBUTION OF POST-MENOPAUSAL WOMEN BETWEEN AGE OF ONSET OF MENOPAUSE AND MENSTRUAL FACTORS.**

Menstrual factors.	Age at menopause				Total	
	< 45 years		> 45 years		(N=211)	
	(n=59)		(n=152)			
	n	%	n	%	N	%
<b>Age at menarche</b>						
<12	14	23.7	77	50.7	91	43.1
Dec-14	40	67.8	63	41.4	103	48.8
>14	5	8.5	12	7.9	17	8.1
$\chi^2=13.21; \delta\phi=2; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.00$						
<b>Cycle length</b>						
<28	15	25.4	27	17.8	42	20
>28	44	74.6	125	82.2	169	80
$\chi^2=1.56; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon<0.21$						
<b>Regularity</b>						
Yes	45	76.3	89	58.6	134	63.5
No	14	23.7	63	41.4	77	36.5
$\chi^2=5.75; \delta\phi=1; \pi\text{-}\omega\alpha\lambda\upsilon\epsilon=0.01$						