

## Original Article

## Epidemiological Determinants of Age at Natural Menopause in Rural Women of Punjab

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### ABSTRACT

**Background:** Menopause is a reproductive milestone in a woman's life but it also is a critical juncture when women not only experience biological changes but concurring social and psychological changes. Menopause has also been listed as a disease in ICD-10.

**Objective:** To study the epidemiological determinants of age at natural menopause in rural women of Punjab.

**Material and Methods:** A total of 180 women aged 40-60 years were selected by proportionate sampling technique. Age, education, marital status, age at menarche, age at last pregnancy, weight and height were noted. The data was analyzed by using statistical software SPSS.

**Result:** Mean age at menopause was 45.9 ( $\pm 3.5$ ) years. Mean age at menopause of married women was 45.73 and that of widow was 47.5 years. There was positive non significant correlation between age at natural menopause and age at menarche ( $p=0.220$ ). The association between age at natural menopause and women's age at birth of their last child was not significant ( $p=0.430$ ).

**Conclusion:** Age at menopause showed a trend of later ages with taller women. Age at menarche and age at last pregnancy had no effect on the age at menopause. Married women reported natural menopause approximately 2 years earlier than widow women.

**Key Words:** BMI, Epidemiological determinants, Menarche, Menopause, Rural Women

### INTRODUCTION

Menopause is a reproductive milestone in a woman's life but it also is a critical juncture when women not only experience biological changes but concurring social and psychological changes [1]. It is the depletion of ovarian function followed by cessation of menstruation and is usually diagnosed when a woman does not have menstrual period for 12 consecutive months without any other biological or physiological cause [2]. Menopause has also been listed as a disease in ICD- 10 [3].

With the general increase in life expectancy, many females are likely to live for another 20-30 years after menopause and spend approx, one- third of their lives in a state of estrogen deficiency [4]. In 1990, there were estimated 467 million women aged 50 years and

above in the world. This number is expected to be 1200 million by year 2030 [5].

The age at which natural menopause occurs is between 45 and 55 years. Average age at menopause is about 55 years in industrialized countries [6]. In developing countries, it ranges from 43 to 49 years [7].

Factors that affect menopause timing have important clinical implications because early menopause is associated with an increased risk of cardiovascular disease and osteoporosis, whereas delayed menopause has been associated with increased risk of breast cancer and endometrial cancer [8].

A number of intrinsic & extrinsic factors also affect the age of menopause i.e. smoking, parity, age at menarche, oral contraceptives use, socio-economic

status, education, employment, length of menstrual life, & age at last child birth [9]. Most of the research on this aspect has been conducted in developed countries. However, little effort has been done to generate data in this part of world. Therefore, in present study, an attempt has been made, to study the epidemiological determinants of age at menopause.

## MATERIAL AND METHODS

The study was carried out in the field practice area of Rural Health Training Center (RHTC) located at village Pohir, Dehlon Block, District Ludhiana, Punjab, India. The field practice area is composed of fifteen villages. The subjects for the present cross-sectional study were those, with established menopause (i.e., cessation of menstruation for more than one year). Proportionate Sampling technique was used for selection of subjects. The highest proportion calculated was 12, so 12 women from each of 15 villages were randomly selected constituting a total of 180 women (40-60 years). A structured and pretested questionnaire was used to collect the data. Initially the questionnaire was prepared in English and then translated to local language. The written informed consent was taken from the subjects before administering the questionnaire. The ethical approval was taken from institutional ethics committee. The variables age, education, marital status, age at menarche, age at last pregnancy, weight and height were noted. BMI was computed by using Quetelet Index. A complete history was taken and a general systemic and gynecological examination was made. The age of menarche and age at menopause were determined as accurately as possible, with the help of a questionnaire, and was taken to the nearest complete year. The data was analyzed by using statistical software SPSS. Mean and Standard deviation were computed. ANOVA, Correlation and t test were applied. A p- value  $\leq 0.05$  was taken as significant.

## RESULTS

Out of 180 women, there were 45 premenopausal, 17 perimenopausal, 18 artificially induced menopausal women and 100 were those who has attained menopause naturally. In the present study, women who have attained menopause naturally were further analyzed. Table 1 shows demographic profile of the subjects. Among 100 subjects who attained natural menopause, 7 subjects were in age group 40-45 years, 36 in 46-50 years, 34 in 51-55 years and 23 were in age group 56-60 years. It was observed that

there were 45 illiterate subjects, 24 subjects had education upto primary level, 18 educated upto middle and 13 subjects received education upto high school. Majority of subjects (90%) were married, there were 10% widow subjects. Amongst the study subjects 28% had normal BMI, 15% overweight and 55% were obese.

Table 1: Demographic characteristics of Subjects

VARIABLE	Number	Percentage
<b>AGE (Years)</b>		
40-45	7	7
46-50	36	36
51-55	34	34
56-60	23	23
<b>EDUCATION</b>		
Illiterate	45	45
Primary	24	24
Middle	18	18
High school +	13	13
<b>MARITAL STATUS</b>		
Married	90	90
Widow	10	10
<b>BMI</b>		
Normal	28	28
Overweight	15	15
Obese	57	55

Table 2 shows the factors affecting the age at menopause. The overall mean age at menopause in the present study was 45.9 ( $\pm 3.5$ ) years. The mean age at menopause was 45.28 ( $\pm 2.8$ ), 45.85 ( $\pm 3.5$ ) and 46.38 ( $\pm 3.6$ ) years for the women whose height was 130-145 cm, 146-160cm, and 161-175cm respectively. No significant relationship was observed between age at menopause and the respondent's height ( $p=0.750$ ). The mean age at menopause of the women with normal BMI was 45.32 ( $\pm 3.6$ ) years, whereas mean age at menopause of overweight and obese women were 46.00 ( $\pm 2.5$ ) and 46.13 ( $\pm 3.5$ ) years respectively. Women who were illiterate and those with primary, middle and high school level of education attained their average age at menopause at 45.97 ( $\pm 3.3$ ), 42.29 ( $\pm 4.2$ ), 46.61 ( $\pm 2.8$ ) and 46.25 ( $\pm 3.2$ ) respectively. Age at menopause does not vary significantly with women's level of education. There was positive non significant correlation ( $r=0.124$ ) between age at natural menopause and age at menarche ( $p=0.220$ ). Women whose first age at menarche was under 13 years, reached menopause relatively earlier (44 years) than women whose age at menarche was above 13 years (46.22 years). The

association between age at natural menopause and women's age at birth of their last child was not significant ( $r=.081$ ,  $p =0.430$ ). Mean age of menopause for women who have given birth to their last child between 26- 35years was 46 years , whereas it was 45 years for the women who delivered their last child before the age of 25 years. Married women reported age at natural menopause approximately 2 years earlier than widow women but with no significant association between marital status and age at natural menopause.

Table 2: Determinants of Age at Menopause

Determinants	No of cases	Mean age at menopause	SD	p value
<b>Height (cm)</b>				0.750
130-145	7	45.28	2.81	
146-160	75	45.85	3.51	
161-175	18	46.38	3.66	
<b>Education</b>				0.468
Illiterate	45	45.97	3.32	
Primary	24	42.29	4.24	
Middle	18	46.61	2.83	
High school +	13	46.25	3.25	
<b>Marital Status</b>				0.128
Married	90	45.73	3.54	
Widow	10	47.5	2.32	
<b>BMI</b>				0.577
Normal	28	45.32	3.62	
Overweight	15	46.00	2.56	
Obese	57	46.13	3.58	
<b>Age At Menarche (Years)</b>				0.220 ( $r=0.124$ )
Under 13	2	44	1.41	
13	26	45.19	3.72	
Over 13	72	46.22	3.40	
<b>Age At Last Pregnancy ( Years)</b>				0.430 ( $r=0.081$ )
≤ 25	31	45.09	3.93	
26-30	43	46.11	3.08	
31-35	24	46.63	3.27	
36-40	2	44.5	6.36	

The most frequently reported age of menopause was 45 years (12%) and 48 years (12%). It was observed that more than half (56%) of women attained menopause by 46 years, 89% had attained menopause by 50 years and all attained menopause by 53 years (Table 3)

Table 3: Distribution of subjects according to age at menopause

Age (in years) at menopause	Number		Cumulative Number	
	N	%	N	%
<40	1	1.0	1	1.0
40	7	7.0	8	8.0
41	2	2.0	10	10.0
42	6	6.0	16	16.0
43	10	10.0	26	26.0
44	10	10.0	36	36.0
45	12	12.0	48	48.0
46	8	8.0	56	56.0
47	9	9.0	65	65.0
48	12	12.0	77	77.0
49	7	7.0	84	84.0
50	5	5.0	89	89.0
51	4	4.0	93	93.0
52	5	5.0	98	98.0
53	2	2.0	100	100.0

## DISCUSSION

Analysis of the present study revealed a mean age of 45.9 ( $\pm 3.5$ ) years and a median age of 46 years at natural menopause. The median age at menopause reported from Western countries (50.3 years) is higher as compared to the present study. However, a lower mean age at menopause has been reported in Mexico (45.50 years) and Pakistan (44.5 years) as compared to the present study [10].

A study conducted among rural and urban women from eastern India, reported higher mean age at menopause (rural and urban combined) as 46.14 ( $\pm 4.47$ ) years [11]. Mean age at menopause was reported to be 43.55 years in Himachal Pradesh [12].

The variation regarding the age of attaining menopause could be because of various biological (e.g., genetic, nutritional, and reproductive history); Sociocultural (e.g., educational, occupational, smoking habit and rural-urban difference); and lifestyle (e.g., smoking and use of tobacco and dietary habits) factors.

In the present study relationship between the women height and age at menopause could not be established. This is in accordance with the observations of Noord et al.,[13] research in the Netherlands and Fistonc et al. ,[14] study in Croatia.

Heavier women had menopause at later age (46.13 years) than women with normal BMI (45.32). The production of estrogen in adipose tissue which is greater in more obese women may be resulting in higher levels of circulating estrogens and thereby making larger reproductive span. Similar findings have been reported in other studies [14-16].

Similar to the present study, the studies done by, Fistoncic et al., [14] in Croatia, Meschia et al., [17] in Italy and Johnston [18] among blackfoot Native American women found that educational level did not have any significant influence on the age at natural menopause.

In contrast, Stanford et al., [19] reported an inverse association between respondents educational status and age at natural menopause. The variation in the findings of these studies might be due to the interaction between intrinsic (biological/genetic) and extrinsic (environment, diet and culture) factors that determined age at menopause. Moreover, methodological problems also might be attributed to the variation in the study findings such as sample size, data gathering techniques etc. Therefore, it is difficult to identify education alone as a factor that determines age at natural menopause.

Women's age at birth of their last child does not have any correlation with age at natural menopause ( $r=0.081$ ,  $p=0.430$ ). In the present study, it was found that Women who gave birth to their last child at age less than 30 year reported earlier age at menopause than women who gave birth to their last child after age 30. On the contrary, Ayatollahi et al [20] demonstrated a significant relationship between age at last pregnancy and age at menopause. Women who gave birth to their last child at around 28 years old reported later age at menopause than women who gave birth to their last child before age 28.

In present study, women whose first age at menarche was above 13 years attained menopause at 46.22 years of age, whereas those whose age at menarche was 13 years attained menopause at age of 45.19 years and their relationship was non significant ( $r=0.124$ ,  $p=0.220$ ). The observations are in accordance with the studies done by Fistoncic et al., [14] Kato et al., [16] Malacara et al., [15] whereas some studies revealed age at menarche is inversely related to age at menopause [18].

The insignificant relation may be due to recall bias of age at menarche. Also women's reproductive history like irregular bleeding due to endocrinological

fluctuations, sex-linked genetic diseases etc. may also contribute towards the insignificant association.

In the present study, the relationship between the marital status and age at menopause could not be established ( $p>0.05$ ). This is in conformity with the observations of Fistoncic et al., [14] Johnston [18], Meschia et al [17]. On the contrary, Whelen et al, [8] showed a significant relationship between respondents ages at natural menopause and their marital status. The authors attributed these differences in the age at menopause could be more due to genetic differences than to demographic factors [21].

## CONCLUSIONS

Mean age at menopause shows a trend of later ages with taller women. Heavier women had a later age at menopause than leaner women. Age at menopause did not vary significantly with women's level of education. Age at menarche and age at last pregnancy had no effect on the age at menopause. Women who gave birth to their last child at age less than 30 year reported earlier age at menopause than women who gave birth to their last child after age 30. Married women reported age at natural menopause approximately 2 years earlier than widow women. Therefore, it can be concluded that menopause is a complex event in women life and an outcome of the interactions of different factors that varied depending on their type of population.

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