

Menopausal age in Working Punjabi Women of Jalandhar and trend in other Indian populations

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ABSTRACT: Background & Objectives: Lots of variation has been observed in menopausal age among women the world over, what ever being the reasons. Present study was aimed to determine the age at onset of natural menopause in working Punjabi women of Jalandhar and compare it with other Indian populations.

Methods: 620 Punjabi working women were randomly selected and personally interviewed. A questionnaire was designed to note down the age at menarche, age at menopause, weight and height and other details. The age at menopause and menarche of each subject was obtained by retrospective method, whereas, height and weight were taken with standardized methods. Median menarcheal and menopausal age was determined by probit analysis, whereas, mean ages were computed by student's t-test. Three thirty premenopausal women, 16 perimenopausal women and 9 women, who had undergone hysterectomy, were excluded from the study. Pearson's correlation coefficient was computed to assess the association between menopausal age and BMI and age at menarche.

Results: The mean and median age at menopause in the present sample was observed as 46.55 ± 4.50 and 46.06 ± 4.85 years, respectively. Similarly, mean and median age at menarche was observed as 13.96 ± 1.21 and 13.98 ± 4.68 years, respectively. No association was observed between age at menopause and BMI and age at menarche. Menopausal age of the present sample occurred earlier than other Punjabi populations.

Conclusions: Lesser menopausal age among working women of Jalandhar may be due to work stress or poor eating habits. A thorough study is needed to evaluate the factors affecting age at menopause. Age at menopause has no association with BMI and age at menarche.

Key words: Menopausal age, Menarcheal age, BMI, Working Punjabi Women, Mean age, Median age

INTRODUCTION:

The term 'menopause' is used to define the permanent cessation of ovarian functions. There is no formation of ovarian follicles, release of hormones to build the uterine linings, release of ova, and subsequent shedding of uterine linings. This marks the termination of a woman's reproductive life. This transition is not sudden or abrupt but occurs gradually over a period of time. This period varies from woman to woman. Menopause is not a disease or illness but it is a natural event in the life of a woman. Millions of follicles are formed in the ovary of a female foetus and prenatally, more than 50% of them are lost. Cross-sectional, histological studies of ovaries have shown that with chronological aging, the follicular pool of ovaries declines from its peak of 500,000 - 1,000,000 non-growing follicles at birth to approximately 1000 at the age of menopause (Gougeon et al., 1994). So, there is progressive decline in ovarian function as the number of ovarian follicles decline with time. Ultimately, women after progressing through this transition phase, reach at a stage when they are left with essentially negligible number of oocytes and cease to have periods (Guyton and Hall, 2008). This marks the end of their reproductive life and a woman is said to have attained menopause.

Technically, menopause is defined to be achieved if a woman has not had her menstrual cycle for one year after her last menses (WHO, 1996). The production of hormones, estrogen and progesterone slows down in their body at this stage. This period comes somewhere between 45 years to 55 years in most of the women world over. The median age at menopause in Europe ranges from 50.1 to 52.8 years, in North America from 50.5 to 51.4 years, in Latin America from 43.8 to 53 years, and in Asia from 42.1 to 49.5 years (Palacios et al., 2010). According to U.S. Census data from 2000, there are about 37.5 million women reaching or currently at menopause (ages 40 to 59) (<http://www.cdc.gov/reproductivehealth/womensrh/menopause.htm>, updated on February 7th, 2012 and retrieved on February 29th, 2012). Age at the natural menopause may be an important risk indicator for subsequent morbidity and mortality. Literature reports that the risks of cardiovascular disease and osteoporosis tend to be higher for women with an earlier menopause (Cooper and Sandler, 1998; Rosano et al., 2007; Sharma et al., 2008; Toh et al., 2010), but women who experience an earlier menopause are protected against breast cancer (Kelsey et al., 1993).

Several factors contribute for variation age at menopause among women across different countries and different ethnic groups. These can be genetic (Danker-Hopfe and Delibalta 1990; Kaprio et al. 1995; Treolar et al. 1998), socio-economic (Belmaker 1982; Luoto et al. 1994) medical (Parazzini et al. 1992; Brown et al. 1996), nutritional status (Osteria 1983; Simondon et al. 1997), physical activity (Malina 1983; Baker 1985), BMI (Hajikazemi et al., 2010) and bio-social (Pathak and Prashar, 2010).

The present study was aimed to determine the age at menopause among working women of Jalandhar (Punjab, India) and further compare it with menopausal age in other populations of India.

MATERIAL AND METHODS

For the present cross-sectional study, 620 women ranging in age from 30-60 years, working in various educational institutes and hospitals of Jalandhar were personally interviewed. A questionnaire was designed to gather the required information like; the age at menarche, history of menstruation, age at menopause, menopause was normal or induced, etc. The age at menarche and age at menopause of each subject was obtained by retrospective method. The study was approved by the Guru Nanak Dev University Ethical Review Committee. Consent was taken from the subjects after explaining them the purpose of the study. The menopausal status was assessed as per WHO (1996) guidelines. Out of these subjects, 330 premenopausal women (with regular menstruation), 16 perimenopausal women (with irregular menstrual periods) and 9 women, who had undergone hysterectomy, were excluded from the study. Finally, 265 women who had undergone natural menopause were finalized for the study. The anthropometric measurements like height and weight were taken on each subject using standard methodology (Weiner and Lourie, 1981) and were noted down in the questionnaire. BMI was calculated. The mean age at menarche and natural menopause was determined by recall method, whereas, median age at natural menopause and menarche was calculated by probit analysis (Finney, 1962). Pearson's correlation was performed to work out the degree of relationship between menopausal age and BMI and age at menarche. Data analyses were performed using SPSS 16.0 (Statistical Package for Social Sciences, SPSS Inc. Chicago, III) for Windows. For all statistical

tests, a p-value <0.05 was considered statistically significant. Age at menopause among the women under study was compared with other Indian populations from the data available on net.

RESULTS

Frequency distribution of females according to natural age at menopause is shown in **Table 1**. It is evident from this table that the youngest women to experience natural menopause was 34 years old and the oldest one was of 54 years. The median age at menopause in the present sample as computed by probit analysis was 46.06 ± 4.85 years. Similarly, the mean age at menopause calculated by 't-test' was observed as 46.55 ± 4.50 years. From the percentage distribution of age at menopause, it is apparent that 75 percent of women had experienced menopause upto the 48th year of age. It is further evident from the data that 5.28% women had undergone premature menopause (before 40 years), whereas, 11.32% women had their menopause at later stage (after 50 years-delayed menopause).

The median age at menarche among the women under study came out as 13.98 ± 4.68 years (**Table 2**), whereas, the mean menarcheal age was found as 13.96 ± 1.21 years. The lowest age at menarche in the studied sample was noticed as 11 years and the highest as 16 years. **Table 3** reveals that there is no association between age at menopause and age at menarche and BMI.

Age at menopause in the present sample is lesser as compared to not only many Indian populations but also other Punjabi populations (**Table 4**).

DISCUSSION:

The menopause is such a striking event in the life of a woman that it tends to over shadow, all the other aspects of life associated with reproductive decline, because it marks the termination of a women's reproductive cycle. The average age for the onset of menopause may begin as early as 40 or be delayed to the late 50s. The exact age at which menopause occurs varies from population to population. Various investigators have studied the age at menopause in different populations of India. According to Sharma *et al.* (2007), the mean age at menopause ranges in Indian women from 42.56 to 49.61 years.

Table 1: Median menopausal age in Working Women of Jalandhar (Punjab)

Age at menopause (Years.)	Frequency of menopausal women	Cumulative frequency	Percentage
34	1	1	0.37
35	0	1	0.37
36	2	3	1.13
37	2	5	1.88
38	3	8	3.01
39	6	14	5.28
40	6	20	7.55
41	7	27	10.19
42	10	37	13.96
43	12	49	18.49
44	18	67	25.28
45	28	95	35.85
46	34	129	48.68
47	34	163	61.51
48	36	199	75.09
49	20	219	82.64
50	16	235	88.68
51	13	248	93.58
52	9	257	96.98
53	6	263	99.25
54	2	265	100.00
Median Age: 46.06±4.85 years			

Table 2: Median Age at Menarche in Working Women of Jalandhar (Punjab)

Age at menarche	No. of Subjects	Cumulative frequency	Percentage
11	10	10	3.77
12	21	31	11.69
13	59	90	33.96
14	73	163	61.50
15	84	247	93.20
16	18	265	100.00
Median age= 13.98±4.68			

Table 3: Pearson's correlation co-efficient (r) of Menopausal age with Body Mass Index (BMI), Percent Body Fat (PBF) and Age at menarche

Variable	R	p-Value
BMI	0.070	0.635
Age at Menarche	0.223	0.472

The menopausal age in the present study was compared with menopausal age of other Punjabi populations. Among Punjabi population, the Gujar women attain menopause at the median age of 46.20 years (Sidhu, 1986) whereas, Bazigar women of Punjab attain menopause at the median age of 46.98 years (Sidhu, 2003). Similarly, Kaur and Talwar (2009) reported the mean and median menopausal age in rural Punjabi females as 48.22±2.47 and 48.98±1.12 years, respectively and in urban Punjabi females, the mean and median menopausal age was noted as 49.30±2.80 and 50.12±1.15 years, respectively. Sethi *et al.* (1996) studied the menopausal age among working and non-working Punjabi Khatri women and observed that non-working women attain menopause at the age of 46.86 years whereas, in working women, this age was observed as

Table 4: Trend of Age at Menopause in Various Indian Populations

Population	Number	Age Group (yrs.)	Age at menopause (yrs.)	Investigator
Rural South India	1841	≥40	Mean-43.4±3.9	Nirmalan <i>et al.</i> (2004)
Women of Delhi	201	-	Mean-46.70 Median-48.00	Kriplani and Banerjee (2005)
Rural Northern Indian	558	35-55	Mean-44.10	Singh and Arora (2005)
Women of Himachal	30	>35	Mean-44.59	Nagar and Dave (2005)
Urban Slum, Mumbai	174	>35	Mean-42.56	Pandit <i>et al.</i> (2005)
Women of Jammu	117	>40	Mean-47.35	Sharma <i>et al.</i> (2007)
Women of Southern Karnataka	352	>40	Mean -48.70	Bairy <i>et al.</i> (2009)
Punjabi Women				
Gujar women of Punjab	150	45-55	Median-46.20	Sidhu (1986)
Punjabi Khatri women	387	20-80	Working women-49.36 Non-working women-46.86	Sethi <i>et al.</i> , (1996)
Bazigar females of Punjab	-	-	Median -46.98	Sidhu (2003)
Working women of Punjab	539	40-50	Median -47.54±2.31	Sidhu <i>et al.</i> (2005)
Rural and Urban Punjabi Females	Rural -450 Urban -420	40-70	Mean - Rural-48.22±2.47 Urban-49.30±2.80 Median - Rural-48.98±1.12 Urban-50.12±1.15	Kaur and Talwar (2009)
Women of Jalandhar	265	30-60	Mean-46.55±4.50 Median- 46.06±4.85	Present study

49.36 years. Sidhu *et al.* (2005) noticed the median menopausal age of 47.54 ± 2.31 years in working women of Amritsar. The results of the present study go inline with other studies done by Sidhu (1986), Sidhu (2003) and Sethi *et al.* (1996 among non-working women).

Menopausal age among women of Jalandhar has been found to be lesser when compared with age at menopause observed in other Indian populations (Sharma *et al.*, 2007; Sethi, 1996; Kaur and Talwar, 2009; Sidhu *et al.*, 2005; Bairy *et al.* 2009; Kriplani and Banerjee, 2005). In comparison to other working Punjabi populations also, age at menopause is earlier in current study. As compared to some other studies, it has been noticed at later age (Nirmalan *et al.* 2004; Pandit *et al.*, 2005; Nagar and Dave, 2005; Singh and Arora, 2005).

Undernourished women appear to have menopause four years earlier compared with those who are well nourished. It has been observed that inadequate nutrition leads to delayed menarche and anovulatory cycles or amenorrhoea, so it is plausible that inadequate nutrition could lead to premature menopause (Beard, 1976; Frisch, 1982). Thus, the low menopausal age in the females of the present study may be due to poor nutrition. Being working, they might be skipping their meals, not taking their meals at proper times, taking junk at their work place, etc. Different researchers have reported different reasons for early age at menopause. Some studies have reported that non-use of oral contraceptives, shorter menstrual cycle length and irregular cycles leads to younger age at menopause (Stanford *et al.*, 1987; Whelan *et al.*, 1990; McKinlay *et al.*, 1992) whereas, others refer that lower income, education or manual occupation may have been related to earlier menopause (Stanford *et al.*, 1987; Do *et al.*, 1998) but this is not applicable in the present case as all subjects were self-dependent.

As the women under study were working women, possibility is that the work stress might have played some role in bringing earlier menopause. Literature reports that work stress causes the early occurrence of menopause. Fenster *et al.* (1999) found that the risk of short cycles (≤ 24 days) more than doubled among women in stressful jobs compared with women without stressful jobs. Cassou *et al.* (2007) also observed that high-strain jobs leads to earlier menopause. But in our studies, we didn't consider this parameter in detail like the hours of their work, their working

conditions, etc. This is the limitation of our study. So, scope is there to consider this parameter critically and correlate it with the age at menopause.

Previous reports indicate that women of developing countries like Indonesia, Pakistan, Chile, Peru and India experience menopause earlier than those in developed countries (Wasti et al., 1993; Kato et al., 1998; Yahya and Rehan, 2002; Talwar and Pande, 2004). Age at menopause varies substantially even between the Asian women. Present study was compared with studies outside India also. Age at menopause is lower than reported among women of Thai (49.30 years; Kono et al., 1990), Malaysia (50.70 years; Ismael, 1994), Turkey (51.00 years; Neslihan et al., 1998) and Pakistan (50.00 years; Yahya and Rehan, 2002).

The variation in age at menopause in different populations may be because of regional, community and ethnic variations. The influence of genetic and environmental factors can't be ruled out (McKinlay et al., 1972). Other than this, socio-economic factors, education, nutrition, occupation, rural- urban residence and family size may be attributing to the possible reasons for deciding the menopausal age of women (Majumdar, 2001; Biswas and Kapoor, 2004). So, the age at which a woman may attain menopause depends upon a combination of factors. Obesity however has been associated with reduced ovarian functions and less depletion of follicles (Garner, 1990). As adipose tissue also produces estrogen, obese subjects have higher levels of estrogen which may lead to less follicular loss and long reproductive life (Palmer et al., 2003). But in present study, we didn't observe any association of age at menopause with BMI. There are studies which report no association between BMI and age at menopause (Gold et al., 2001, Hardy et al., 2000). No association was observed between age at menopause and age at menarche among the subjects under study. We couldn't find much literature related to association between age at menarche and age at menopause. Otero et al. (2010) also couldn't confirm the same in their studies although in one of the earlier studies such association has been reported (Reis et al., 1998). Some large scale study is needed to evaluate the factors affecting the age at menopause so that necessary measures be taken to make the postmenopausal phase comfortable for women. As menopause sets a new mile stone in a woman's life, it needs to be given main concern. The life of a woman take a compulsory change after menopause, the health of women should be kept at

priority. A healthy life style, nutritional food, necessary work out should be the main considerations for women before and after menopause for different reasons.

Conclusion: Lesser menopausal age among working women of Jalandhar may be due to work stress or poor eating habits. A thorough study is needed to evaluate the factors affecting age at menopause. Age at menopause has no association with BMI and age at menarche.

Declaration of interest: The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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