Original Research Article

FACTORS AFFECTING AGE OF ONSET OF MENOPAUSE

ABSTRACT

Background: Menopause is a process in the climacteric period, characterized by a reduction in ovarian activity, a fall in the fertility rate, and a range of symptoms including irregular menstruation intervals. Most women enter menopause in their 40s, but this can vary from one individual to another. Although there are many factors affecting the age of menopause onset, there is no general agreement on them.

Objectives: To determine the factors affecting age of onset of menopause among ~~a~~ Pakistani ~~cohort of~~ women.

Methodology: This cross-sectional ~~analysis~~ was carried out on a sample of 139 women (aged 42 to 57 years) presenting to the Outpatient Department of Obstetrics – Gynecology at Jinnah Medical College Hospital, Karachi – Pakistan from Nov 2020 to May 2021. Data was collected using a structured interview-based questionnaire containing inquiries pertaining to basic biodata, sociodemographic details, menstrual history, and probable factors affecting age of onset of menopause. Data was analyzed using SPSS v. 21.0. Chi-square applied as statistical test of significance for the association between age at natural menopause and qualitative variables. $P < 0.05$ was considered to be statistically significant.

Results: The mean age of the sample stood at 43.23 ± 4.11 SD years, and the mean age of onset of menopause was recorded to be 49.21 ± 3.83 SD years. Statistically significant correlation was found between age at natural menopause and factors such as marital status, living alone, socioeconomic status, tobacco addiction, body mass index, psycho-social problems, body mass index (BMI), OCP intake etc.

Comment [U1]: Mention it in some other language or it needs reference.

Comment [U2]: Mention the factors that affecting menopause

Comment [U3]: A Pakistani cohort of women is not clear.

Comment [U4]: Study is more preferable than analysis

Conclusion: Menopause whether occurring early or late in life, both are responsible for causing adverse health effects among women. Thus, it becomes utmost important to identify the factors influencing the onset of menopause.

Keywords: Menopause, Menarche, Post-Menopausal Women, Pakistani and Menopausal Age.

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INTRODUCTION

Menopause is a crucial stage in the life of a woman marked by her last menstrual period. [1] It is a normal physiological event where there is amenorrhea consecutively at least for 12 months and the main cause for this is deprivation of ovarian function that happens invariably to all women in their midlife. [2, 3] The word "menopause" has Greek origins: "Meno" means month and "pause" means to end. [4] The permanent cessation of menstruation is not due to pathological or any other physiological cause, [5] and it signifies the end of reproductive phase of a woman's life where the ovaries gradually cease to function passing through the phase known as menopausal transition or perimenopause. [4]

This ovarian function depletion causes a variety of somatic, sexual, vasomotor, and psychological manifestations that are responsible for deteriorating the quality of life of women. [3, 6, 7] Menopause can also be surgically induced by hysterectomy with or without oophorectomy, and this is referred to as surgical menopause. Menopause can also happen due to treatment with cytotoxic chemotherapeutic agents and the gonadotrophic-releasing hormone agonist. [8]

Menopause has now become a predominant subject of study as the life expectancy is globally on an increase due to the provision of better nutrition and advancement of health-care systems, [9] which has led to a rise in the population including postmenopausal females. The average age at natural menopause ranges from 45 to 53 years both in the developed and developing countries. [10 - 16]

The influence of menopause can be very well seen in various domains of life such as physical, psychological, and sociocultural. [17] Age at natural menopause is determined by factors which influence the extent of dwindling of ovarian follicle reserve, [18] and it comprises of genetic and

modifiable factors which can enhance or reduce the follicular atresia. The modifiable factors can be both intrinsic and extrinsic such as tobacco addiction, parity, age at menarche, socioeconomic class, and occupation. [19] These factors can be grouped into various categories such as sociodemographic factors, lifestyle factors, environmental/familial factors, menstrual/ reproductive factors, and miscellaneous.

OBJECTIVES

To determine the factors affecting age of onset of menopause among ~~a~~ Pakistani ~~cohort of~~ women.

METHODOLOGY

This cross-sectional analysis was carried out on a sample of 139 women (aged at or above 40 years) presenting to the Outpatient Department of Obstetrics – Gynecology at Jinnah Medical College Hospital, Karachi –Pakistan from Nov 2020 to May 2021. Data was collected using a structured interview-based questionnaire containing inquiries pertaining to basic biodata, sociodemographic details, menstrual history, and probable factors affecting age of onset of menopause.

Inclusion criteria

1. Consenting individuals
2. Aged above 40 years

Exclusion Criteria

1. Women on hormone replacement therapy
2. Women with artificial/induced menopause

Statistical Analysis

Comment [U6]: Not clear.

Comment [U7]: Study

Comment [U8]: In abstract it was mentioned as 42-57 Years which is nor related with this.

Data was analyzed using SPSS v. 21.0. Chi-square applied as statistical test of significance for the association between age at natural menopause and qualitative variables. $P < 0.05$ was considered to be statistically significant.

RESULTS

The mean age of the sample stood at 43.23 ± 4.11 SD years, and the mean age of onset of menopause was recorded to be 49.21 ± 3.83 SD years. Most of the women resided in urban areas and fell within the middle socioeconomic bracket.

Table 1 shows the distribution of study participants according to relation between age at natural menopause and factors.

Variables		Statistic
Age (years)		43.23 ± 3.52
BMI (kg/m^2)		*31.79 ± 4.11*
WHR		*0.91 ± 0.05*
Body fat (%)		*43.79 ± 6.72*
Visceral fat		*8.91 ± 1.75*
Triglycerides (mg/dl)		*195.10 ± 63.37*
Residential Status	*Urban*	*161 (57.9%)*
	Rural	*117 (42.1%)*
Marital Status	*Married*	*238 (85.6%)*
	Unmarried / Separated / Widowed	*40 (14.4%)*
Educational Status	*Educated*	*160 (57.6%)*
	Un-Educated	*118 (42.4%)*
Employment Status	*Employed*	*72 (25.9%)*
	Un-Employed	*206 (74.1%)*
Socioeconomic Status	*Low*	*53 (19.1%)*
	Middle	*213 (76.6%)*

Comment [U9]: In result section there was no any relationship between menopause and others factors. Include the factors on there.

Comment [U10]: Mention the category of BMI.

Comment [U11]: WHR?????

Comment [U12]: Mention the measuring process in methodology

Comment [U13]: How it was measured not clear

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	High	*12 (4.3%)*
Tobacco Use	*Yes*	*08 (2.9%)*
	No	*270 (97.1%)*
OCP Use	*Yes*	*104 (37.4%)*
	No	*174 (62.6%)*
Psychological Distress	*Yes*	*82 (29.5%)*
	No	*196 (70.5%)*

Comment [U15]: Mention the criteria for low, middle and high socio-economic status

DISCUSSION

The present study did not reveal a statistically significant correlation between residing locality of the respondents and age at menopause. This finding was dissimilar to the findings of Dasgupta and Ray [20] since their study has clearly advocated the positive role of rural/urban locality in determining menopausal age. The mean age of menopause for rural participants was 53.9 ± 4.37 years while that for urban participants was 51.39 ± 4.6 years, and the difference was statistically significant.

Comment [U16]: Mention the significant table

it was found that females with higher BMI attain menopause early than females having lower BMI, and this difference was found to be statistically significant. Similar findings were reported by Bromberger *et al.* [12] In their study, it was found that the median age of menopause was 50.9 years for women with highest BMI, 51.5 years for the middle group, and 53.4 years for women with lowest BMI. Gold *et al*., [21] however, reported a dissimilar finding that age at natural menopause was not related to BMI and physical activity. Afew studies, however, have reported findings which are dissimilar to the findings of the present study like Palmer *et al.* [22] who concluded an inverse association of BMI with early age at menopause.

Comment [U17]: BMI was not categorized

Comment [U18]: No significant relationship

Likewise, Bansal *et al.* [23] concluded that heavier women had menopause at later age (46.13 years) than women with normal BMI (45.32). Maru *et al* . [24] conducted a cross-sectional study and reported trends which showed 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 reproductive

span in obese women could be slightly longer than that in lean women due to greater production of estrogen in obese women on account of having more adipose tissue.

The present study revealed that women who were married or living as married attained menopause later than women who were unmarried/widowed/divorcee, and the difference is statistically significant. Similar finding reported by Gold et al. that separated/ divorced/ widowed women had an earlier menopause than women who were married. Likewise, Reynolds and Obermeyer [5] also reported that marital status was found to be statistically associated with age at menopause.

Comment [U19]: Include the relationship table

The present study also revealed that women who gave a history of oral contraceptive use attained menopause earlier than women who did not used oral contraceptives, and this difference was found to be statistically significant. This finding was similar to the findings of Gold *et al.* [21] who reported that the use of OCPs during reproductive span was associated with an earlier age at natural menopause. This finding was dissimilar to the findings of Palmer *et al.* [22] who reported an inverse association between OCP use and age at menopause. The most probable reason behind parity and OCP use leading to later age at natural menopause might be that they reduce ovulatory cycles in earlier life, thereby preserving oocytes for longer duration, resulting in later age at menopause. Dissimilar to this finding, Reynolds and Obermeyer [25] reported that oral contraceptive use was not statistically associated with at age menopause.

Comment [U20]: Mention the relationship table

The present study also reported that women who had their last delivery at age > 30 years attained menopause later as compared to women who had their last delivery at age ≤ 30 years, and this difference was also found to be statistically significant. Age at menarche and parity did not show statistically significant association with age at natural menopause. Palmer *et al.* [22] reported a similar finding as no association was found with parity. Reynolds and Obermeyer [25] also concluded that females with any number of children had a later age at menopause.

Comment [U21]: Not mentioned in the result

CONCLUSION

Age at natural menopause plays a critical role in women's health as it is a signal of declining ovarian function and thereby aging. Menopause whether occurring early or late in life, both are responsible for causing adverse health effects among women. Thus, it becomes utmost important to identify the factors influencing the onset of menopause.

REFERENCES

1. Malik HS. Knowledge and attitude towards menopause and hormone replacement therapy (HRT) among postmenopausal women. J Pak Med Assoc 2008;58:164-7.
2. Nisar N, Sohoo NA. Severity of menopausal symptoms and the quality of life at different status of menopause: A community based survey from rural Sindh, Pakistan. Int J Coll Res Int Med Public Health (IJCRIMPH) 2010;2:118-30.
3. Landgren BM, Collins A, Csemicky G, Burger HG, Baksheev L. Menopause transition: Annual changes in serum hormonal patterns over the menstrual cycle in women during a nine-year period prior to menopause. J Clin Endocrinol Metab 2004;89:2763-9.
4. Menopause a New Beginning! Available from: http://www. indiatoday.intoday.in/author/Dr-Sujata-Kelkar-Shetty-/1.html. [Last accessed on 2010 May 25].
5. Burger HG. The endocrinology of the menopause. J Steroid Biochem Mol Biol 1999;69:31-5.
6. Dennerstein L, Dudley EC, Hopper JL, Guthrie JR, Burger HG. A prospective population-based study of menopausal symptoms. Obstet Gynecol 2000;96:351-8.
7. Deeks AA, McCabe MP. Well-being and menopause: An investigation of purpose in life, self-acceptance and social role in premenopausal, perimenopausal and postmenopausal women. Qual Life Res 2004;13:389-98.
8. Dienye PO, Judah F, Ndukwu G. Frequency of symptoms and health seeking behaviours of menopausal women in an out- patient clinic in Port Harcourt, Nigeria. Glob J Health Sci 2013;5:39-47.
9. Lee MS, Kim JH, Park MS, Yang J, Ko YH, Ko SD, *et al.* Factors influencing the severity of menopause symptoms in Korean post-menopausal women. JKorean Med Sci 2010;25:758-65.
10. Aso T. Demography of the menopause and pattern of climacteric symptoms in the East Asian region. In: Proceedings of the First Consensus Meeting on Menopause in the East Asian Region, Geneva, 1997. Zeist, Netherlands: Medical Forum International BV; 1998. p. 24-32.
11. World Health Organization- World Health Statistics 2016: Monitoring health for the SDGs. Available from: http:// www.who.int/gho/publications/world_health_statistics/2016/ Annex_B/en. [Last accessed on 2018 June 11].
12. Bromberger JT, Matthews KA, Kuller LH, Wing RR, Meilahn EN, Plantinga P, *et al.* Prospective study of the determinants of age at menopause. Am J Epidemiol 1997;145:124-33.
13. 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.

14. Kakkar V, Kaur D, Chopra K, Kaur A, Kaur IP. Assessment of the variation in menopausal symptoms with age, education and working/non-working status in North-Indian sub population using menopause rating scale (MRS). Maturitas 2007;57:306-14.
15. Christian D, Kathad M, Bhavsar B. Socio-demographic characteristics of postmenopausal women of rural area of Vadodara district, Gujarat. NJCM 2011;2:419-22.
16. 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;9:5.
17. Thomas F, Renaud F, Benefice E, de Meeüs T, Guegan JF. International variability of ages at menarche and menopause: Patterns and main determinants. Hum Biol 2001;73:271-90.
18. Mishra GD, Cooper R, Tom SE, Kuh D. Early life circumstances and their impact on menarche and menopause. Womens Health (Lond) 2009;5:175-90.
19. Kaw D, Khummu B, Vasishta K. Factors influencing the age of natural menopause. J Obs Gynaecol India 1994;44:273-7.
20. Dasgupta D, Ray S. Menopausal problem among rural and urban women from Eastern India. J Soc Behav Health Sci. 2009;3:20-33.
21. Gold EB, Bromberger J, Crawford S, Samuels S, Greendale GA, Harlow SD, *et al.* Factors associated with age at natural menopause in a multiethnic sample of midlife women. Am J Epidemiol 2001;153:865-74.
22. Palmer JR, Rosenberg L, Wise LA, Horton NJ, Adams-Campbell LL. Onset of natural menopause in African American women. Am J Public Health 2003;93:299-306.
23. Bansal P, Chaudhary A, Soni RK, Gupta VK. Epidemiological determinants of age at natural menopause in rural women of Punjab. J Res Med Den Sci 2014;2:24-8.
24. Maru L, Verma R, Verma M, Shrimal M. 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.
25. Reynolds RF, Obermeyer CM. Age at natural menopause in Spain and the United States: Results from the DAMES project. Am J Hum Biol 2005;17:331-40.