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Exploring menopausal dynamics: a cross-sectional analysis of age, symptomatology, and sociodemographic influences in a developing population of women aged 40-60

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ABSTRACT

Objectives: Menopause, a biological milestone, marks a pivotal phase in women's lives characterized by ovarian function cessation and age-related changes. Our objective was to investigate menopausal symptoms and knowledge among women aged 40-60 years.

Methods: This cross-sectional epidemiological study was conducted between June 1 and September 30, 2005, in the Nilufer Public Health Education and Research Area (NPHERA) region, aimed to assess menopausal symptoms and their correlates among 1013 women aged 40-60. The individuals included in the study were selected through a systematic sampling method, stratified by neighborhood weights and age groups based on the NPHERA 2004 Work Report and regional data, as well as information from the Health Centers Information System (HCIS), where the Electronic Health Records (EHR) are registered.

Results: The mean age of natural menopause was found to be 46.7±4.8 years, showcasing sociodemographic factors' influence. Postmenopausal women experienced higher rates of symptoms, with physical and mental exhaustion (82.8%), irritability (78.4%), and depressive mood (76.4%) prevailing. Logistic regression revealed that employment status significantly influenced menopausal status. Moreover, the age at menopause correlated positively with the age of the woman's mother.

Conclusion: This study contributes insights into menopausal experiences in developing countries, emphasizing the need for tailored healthcare approaches. Longitudinal investigations are warranted to comprehensively understand these associations and enhance women's quality of life during menopause.

Keywords: Menopause, mental symptoms, physical symptoms, perimenopausal, public health

Menopause, an inherent biological process, signifies a crucial life stage for women, marked by the cessation of ovarian functions and various age-related changes [1]. To diagnose menopause, a minimum of 12 consecutive months of amenorrhea is anticipated [2].

In developed countries, the average age of natural menopause is around 51-52, whereas in developing

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countries, this age tends to be lower [3]. Reviewing the literature reveals that genetic, demographic, reproductive, and sociocultural factors may exert influence on the age of menopause [4-6].

In today's context, considering the average life expectancy, it is evident that a significant portion of women's lives is spent during the menopausal period. The hormonal changes occurring during menopause lead to various physical and psychological alterations in women [7]. During this phase, women may experience somatic complaints such as hot flashes and night sweats, as well as psychological symptoms like fatigue, irritability, and difficulty concentrating, alongside urogenital issues. While these symptoms vary in intensity among individuals, they often have a collective impact, reducing the overall quality of life for most women during the menopausal transition [8, 9].

This study aims to evaluate menopausal complaints among women in a developing country, identify factors influencing menopausal age, and contribute to the development of policies enhancing the quality of life during this significant phase of a woman's life.

METHODS

This cross-sectional epidemiological study was conducted between June 1 and September 30, 2005, in the Nilufer Public Health Education and Research Area (NPHERA) region. The primary objective was to investigate menopausal symptoms and knowledge among women aged 40-60 years. Prior to the commencement of the research, ethical approval was secured from the Bursa Uludag University Faculty of Medicine Research Ethics Committee (Approval No: 2005-14/36). Data collection took place at three Public Health Education and Research Centers affiliated with NPHERA, namely Fethiye PHERC, Alaaddinbey PHERC, and Özlüce PHERC.

Study Population

The target population consisted of 2533 women aged 40-60 years residing in NPHERA. A sample of 1013 women, representing 40% of the total population, was included in the study. The individuals included in the study were selected through a systematic sampling method, stratified by neighborhood weights and age groups based on the NPHERA 2004 Work Report and regional data, as well as information from the Health Centers Information System (HCIS), where the Electronic Health Records (EHR) are registered.

The sampling process began with stratifying neighborhoods based on the female population aged 40-60, further stratifying by age groups. Samples were selected using a random number table, with a 10% backup for each group. Survey forms were created, and a pilot study involving 50 women (half from urban and half from rural areas) was conducted to address observed issues. Postmenopause was defined as the absence of menstruation for a duration exceeding one year. Women who reported having menstruated within the past year were categorized as premenopausal.

Data Collection

For each woman in the sample, two questionnaire forms (Form A and Form B) were administered through home visits. Form A was filled out through face-to-face interviews, while Form B, containing the Menopause Rating Scale (MRS), was self-administered by women. Illiterate participants had questions read aloud, and their responses were recorded. In cases of absence during the initial visit, two additional attempts were made to contact the woman. If three visits were unsuccessful, replacement women from the reserve list were selected.

Questionnaire Content

Form A comprised 24 questions, designed to gather information on socio-demographic characteristics, fertility characteristics, age at menopause, factors influencing menopause, and women's knowledge and attitudes towards menopause. Form B contains the MRS, which has been translated into Turkish and validated [10]. This scale comprises 11 questions that assess psychological, somatic, and urogenital symptoms associated with the menopausal period. Each of the 11 items in the MRS employs a Likert-type scale with the following response options: 0: None 1: Mild 2: Moderate 3: Severe 4: Very severe.

Statistical Analysis

In this study, data analysis was performed using SPSS Version 13. The distribution of the data was assessed using the Kolmogorov-Smirnov test. Numerical variables were compared using the Student's t-test,

while categorical variables were analyzed using the chi-square and adjusted chi-square tests. For normally distributed data, the Pearson correlation coefficient was employed to conduct correlation analyses. To investigate the factors affecting menopausal status, logistic regression analysis was employed. The results were presented in the form of mean values, standard deviations for numerical variables, and percentages for categorical variables. A significance level of $P< 0.05$ was considered statistically significant.

RESULTS

A comprehensive examination was conducted on a total of 2533 women aged between 40 and 60 from the NPHERA. Out of this population, 1013 women, representing 40% of the entire cohort, were interviewed. The participants were drawn from three distinct PHERCs: Fethiye PHERC (n=676), Alaaddinbey PHERC (n=147), and Özlüce PHERC (n=190).

The mean age of the women was 48.2±5.9 years, with a median age of 48 years. Table 1 presents the sociodemographic characteristics of the women. Among different age groups, the 40-44 age group represented the highest proportion at 33.9% (n=343), while the 55-60 age group constituted the lowest at 16.1% (n=163). Notably, 42.3% (n=428) of the women were born in Bursa. In terms of education, a majority of the women were primary school graduates, accounting for 56.6% (n=573), while the illiteracy rate was 13.8% (n=140). Social security affiliation revealed that 17.1% of women (n=173) were not linked to any institution. Concerning marital status, 87.2% (n=883) of the women were married, 9.7% (n=98) were widowed or had a deceased spouse, and 1.3% (n=13) had never been married or were single. As per their self-perceived economic status, 89% (n=902) of the women considered it to be moderate (neither good nor bad). Employment statistics indicated that only 5.6% (n=57) of women were employed, while the majority, 94.4% (n=956), had no employment (see Table 1).

Within the total participant pool, 44.2% of women (n=448) were identified as being in the postmenopausal phase. Among these postmenopausal participants, 81.7% (n=366) had experienced natural menopause, 17.6% (n=79) had undergone surgical menopause, and the remaining 0.7% (n=3) had reached menopause due to chemo/radiotherapy. For those who underwent a natural menopausal transition, the mean age at menopause was 46.7±4.8 years. In the broader context, considering all women in the study, the overall mean age for menopause was 45.9±5.3 years.

Table1. Socio-demograhic characteristics of participants

	n	%
Age groups (years)		
40-44	343	33.9
45-49	279	27.5
50-54	228	22.5
55-60	163	16.1
Birth place		
Bursa	428	42,3
Other	585	57,7
Education level		
Illiterate	140	13.8
Literate	67	6.6
Elementary	573	56.6
Middle school	127	12.5
High school	92	9.1
University	14	1.4
Social security status		
No social security	173	17.1
Social security	840	82.9
Martial status		
Single	13	1.3
Married	883	87.2
Widowed	98	9.7
Divorced	8	0.8
Separated	11	1.0
Socio-economic status		
Low	59	5.8
Middle	902	89.0
High	52	5.2
Occupation		
Employed	57	5.6
Unemployed	956	94.4
TOTAL	**1013**	**100.0**

Table 2. The current somatic, psychological, urogenital complaints of premenopausal and postmenopausal women according to menopause rating scale

	Premenapausal (n=565)	Postmenopausal (n=448)	P value
Hot flashes			
No	211 (37.3)	95 (21.2)	**<0.001**
Yes	354 (62.7)	353 (78.8)	
Heart disease			
No	239 (42.3)	175 (39.1)	0.29
Yes	326 (57.7)	273 (60.9)	
Sleep disorders			
No	239 (42.3)	131 (29.2)	**<0.001**
Yes	326 (57.7)	317 (70.8)	
Joint and muscle problems			
No	157 (27.8)	93 (20.8)	**0.009**
Yes	408 (72.2)	355 (79.2)	
Depressive mood			
No	147 (26)	92 (20.5)	**0.04**
Yes	418 (74)	356 (79.5)	
Irritability			
No	136 (24.1)	83 (18.5)	**0.03**
Yes	429 (75.9)	365 (81.5)	
Anxiety			
No	224 (39.6)	166 (37.1)	0.39
Yes	341 (60.4)	282 (62.9)	
Physical and Mental exhaustion			
No	112 (19.8)	62 (13.8)	**0.012**
Yes	453 (80.2)	386 (86.2)	
Sexual problems			
No	329 (58.2)	203 (45.3)	**<0.001**
Yes	236 (41.8)	245 (54.7)	
Urinary complaints			
No	366 (64.8)	271 (60.5)	0.16
Yes	199 (35.2)	177 (39.5)	
Vaginal dryness			
No	390 (69)	260 (58)	**<0.001**
Yes	175 (31)	188 (42)	

Values are given as n (%). Chi- square test was performed.

Table 3. The relationship between sociodemographic and clinical characteristics of women only entering menopause naturally and their menopasual age

	<45 y (n=100)	45-49 y (n=156)	>49 y (n=110)	P value
Education status*				
<5 years	33 (32)	28 (27.2)	42 (40.8)	**<0.001**
>5 years	67 (25.5)	128 (48.6)	68 (25.9)	
Marital status				
Unmarried	3 (50)	1 (16.7)	2 (33.3)	0.34
Married /other**	97 (26.9)	155 (43.1)	108 (30)	
Economic status				
Low	8 (47.1)	5 (29.4)	4 (23.5)	0.17
Middle/ High	92 (26.4)	151 (43.3)	106 (30.3)	
Occupation				
Occupied	3 (16.7)	10 (55.6)	5 (27.7)	**0.45**
Unoccupied	97 (27.9)	146 (42)	105 (30.1)	
Menarche age (years)				
<14	46 (30.1)	69 (45.1)	38 (24.8)	0.17
>14	54 (25.4)	87 (40.8)	72 (33.8)	
First pregnancy age (years)				
<20	41 (24.4)	70 (41.7)	57 (33.9)	0.27
>20	59 (29.8)	86 (43.4)	53 (26.8)	
Total child number				
<1	4 (30.8)	6 (46.2)	3 (23)	0.83
>1	96 (27.2)	150 (42.5)	107 (30.3)	
Mother's menopause age (years)				
<45	35 (40.2)	35 (40.2)	17 (19.6)	**<0.001**
45-49	24 (27.6)	49 (56.3)	14 (16.1)	
>49	20 (22.7)	32 (36.4)	36 (40.9)	
Tobacco use				
No	87 (26.5)	142 (43.3)	99 (30.2)	0.58
Yes	13 (34.3)	14 (36.8)	11 (28.9)	
Oral contraception				
No	77 (27)	123 (43.2)	85 (29.8)	0.92
Yes	23 (28.4)	33 (40.7)	25 (30.9)	

Values are given as n (%). Chi square test was performed.
*Elementary school (5 years in Turkey by law till year 1998)
**Other: widowed, divorced

Table 2 presents the menopausal complaints of pre/postmenopausal women as assessed by the MRS. Hot flashes, sleep disorders, joint and muscle problems, depressive mood, irritability, physical and mental exhaustion, sexual problems, and vaginal dryness were significantly higher in the postmenopausal group compared to the premenopausal group. Additionally, the remaining complaints exhibited a numerical increase in postmenopausal women, although these differences did not reach statistical significance (see Table 2).

Table 3 illustrates the relationship between the natural onset of menopause in women and their sociodemographic and clinical characteristics. A statistically significant difference was observed between the ages at which women experienced menopause and the ages at which their mothers underwent menopause (P<0.05) (see Table 3). Furthermore, a weak but statistically significant positive correlation was identified between the ages at which women naturally entered menopause and the ages at which their mothers experienced menopause among women who were aware of their mothers' menopausal ages (r=0.225, two-tailed P=0.01).

In the logistic regression analysis modeling the relationship between menopausal status and sociodemographic variables, no significant associations were found between a woman's educational level (less than primary school/primary school and higher), social security status (yes/no), marital status (never married/married, widowed, separated, or divorced), and economic status (poor/medium and good) with menopausal status (P>0.05). However, in the case of employment status (working/not working), it was observed that the odds of being in menopause were 0.44 times higher for working women compared to non-working women (95% CI 0.20-0.93; P<0.05).

In the logistic regression analysis incorporating the "age" effect, the association between women's menopausal status and their complaints based on the MRS was investigated (see Table 4). In this model, it was revealed that only irritability exhibited a statistically significant relationship with women's menopausal status (OR: 1.76, 95 % CI 1.04-2.98, P<0.05). This indicates that women in menopause were 1.76 times more likely to experience irritability (Table 4).

DISCUSSION

In this study encompassing 1013 women aged between 40 and 60 in both urban and rural areas of Turkey, who are in the peri/postmenopausal period, the average age of menopause for women was calculated. Factors influencing the age of menopause were analyzed, and menopausal symptoms were assessed through a questionnaire.

In our study, the average age of the cohort was 48.2±5.9, while the natural menopausal age for

Table 4. Logistic regression analysis of menopause and menopausal symptoms

	OR	CI 95%	P value
Hot flashes	1.25	0.79-1.98	0.42
Heart disease	0.77	0.50-1.55	0.12
Sleep disorder	1.41	0.91-2.17	0.25
Malaise	0.90	0.55-1.49	0.11
Irritability	1.76	1.04-2.98	**0.02**
Anxiety	0.86	0.55-1.33	0.29
Physical fatigue	0.85	0.50-1.47	0.83
Sexual problems	1.42	0.97-2.09	0.17
Urinary problems	0.92	0.62-1.36	0.22
Vaginal dryness	1.48	0.99-2.21	0.14
Joint muscle disorders	1.03	0.66-1.63	0.55

women was calculated as 46.7±4.8. It's worth noting that the reported average age for menopause is approximately 51 years in developed nations and ranges between 43 and 48 in developing countries [3, 11]. A systematic review indicates that the average age of menopause varies in different regions, with values reported as 50.1-52.8 in Europe, 50.5-51.4 in North America, and 43.8-53 in Latin America [12]. When specifically considering Turkey, previous studies have reported, similar to our study, an average natural menopausal age of 47.8±4.0 for the urban region and 47.4±3.7 for the rural region [6, 13].

Additionally, the incidence of menopause in the women included in our study was 44.2%. While the exact prevalence of menopause in Turkey is not fully known, the Turkey Demographic and Health Survey (TDHS) reported that among women aged 30 and above, 42% cited menopause or hysterectomy as reasons for not using family planning [14]. On the other hand, Pirincci and colleagues, in their study conducted in a rural region, reported a higher menopausal rate of 64.4% among women aged 40 and above compared to our study [6].

However, it's noteworthy that the mean ages of the women included in this study were higher than those in our study (51.3±9.4 vs. 48.2±5.9) [6].

Menopause, although a normal physiological phase in a woman's life, can be associated with specific physical, psychological, and sexual symptoms due to hormonal changes during this period. In our study, we assessed women's menopausal complaints using a valid scale, the MRS. When focusing on women's menopausal symptoms, the most prevalent among all reported complaints was physical and mental exhaustion, at 82.8%. This was followed by irritability at 78.4% and depressive mood at 76.4%. When categorized into somatic, psychological, and urogenital subheadings, the most frequently reported somatic complaints were joint and muscle problems, while in the psychological category, physical and mental exhaustion took precedence. In the urogenital domain, sexual problems were prominent. The most pronounced complaint in terms of intensity was hot flashes. In the Pan-Asia Menopause (PAM) study, a randomized controlled trial involving Asian women and focusing on menopausal symptoms, similar to our findings, muscle and joint problems were reported as the most common symptoms, with percentages of 76% in Korean women and 96% in Vietnamese women [15]. In another dataset from Ecuador, where women were assessed using MRS similar to ours, muscle and joint problems were reported as the most common symptom, with a prevalence of 77% [16]. On the other hand, in a Spanish study, the predominant symptoms experienced by menopausal women were reported as hot flushes (51.4%), insomnia (45.7%), and irritability (42.2%), respectively [17]. Additionally, in studies conducted on Western and African–American populations, the overall prevalence of menopausal symptoms was found to be generally higher than in Eastern countries [18, 19]. In this context, it can be asserted that ethnicity plays a role in shaping the experience of menopausal symptoms. The prevalence of specific menopausal symptoms may vary across different geographical regions. Regional variations in sociodemographic features and cultural differences might contribute to distinct perceptions of menopausal symptoms among women.

In our study, we explored sociodemographic factors and fertility characteristics that could impact the natural menopausal status in women. The age of menopause was observed to be later in individuals with less than 5 years of education. Similarly, when assessing employment status, despite the small number of employed women (n=18), non-working women exhibited a higher age of menopause. Daily working stress is believed to be associated with an earlier onset of menopause On the other hand, in another study investigating factors affecting the age of menopause, it was reported that as the level of education increased, the age of menopause also increased [4].

In the current study, we did not observe a statistically significant relationship between menopausal age and marital status or economic situation. Conversely, previous studies have reported that unmarried women tend to experience early menopause compared to those who are married or widowed [4, 5]. Similarly, previous reports have indicated that a higher socioeconomic level, and therefore, better nutritional conditions, are associated with a delayed onset of menopause [20]. In our study, the limited representation of never-married individuals (n=6) and those with a low socioeconomic status (n=6) among menopausal women might have resulted in inadequate calculations.

Among fertility characteristics that can impact the age of menopause are menarche age, parity, and the woman's age during her first/last pregnancy. In a study involving 262 women, Özdemir *et al*. [21] reported an association between early menarche and early menopause, while they found no significant relationship between parity and the age of the woman during her first pregnancy with menopausal age. In a study conducted in Poland, both menarche and parity were reported as factors associated with the age of menopause [22]. Pirincci *et al*. [6] stated in their studies that a woman's age being >40 during her last pregnancy is associated with entering menopause at a later stage. In our study, we did not observe an association between menarche age, parity, and the woman's age during her first/last pregnancy with the age of menopause. However, there was a correlation between the age of menopause and the age of the woman's mother at menopause. This finding aligned with other studies. Pirincci *et al*. [6] demonstrated that a higher age at menopause in the mother is associated with a delayed onset of menopause in the daughter.

In the study conducted by Özdemir *et al*. [21], it was noted that experiencing early menopause in both the mother and sisters contributes to an individual's likelihood of undergoing early menopause themselves [21]. At that rate, it could be thought that there is a genetic correlation between family members for the age of menopause.

Smoking is known to be a dose-dependent factor that increases the age of menopause [23]. In the present study, the number of women who smoked or had previously smoked was very low, so no association between smoking and menopausal age was noted.

Limitations

Our study has notable strengths, including a robust participant cohort, the application of a validated survey for evaluating menopausal symptoms, and a deliberate focus on women experiencing natural menopause when exploring factors affecting the age of menopause. On the other hand, there are limitations to consider, such as the cross-sectional nature of the study, which prevented the sampling of the entire population, and the partially self-reported nature of the survey. Recall bias in individuals' self-reported histories is a potential consideration. However, previous studies on the reproducibility of the age reported by individuals themselves in natural menopause have shown that the recall of menopausal age through memory is quite reliable [24].

CONCLUSION

In conclusion, our study revealed that in a developing country, the average age of natural menopause is 46.7±4.8. Menopausal age was found to be significantly associated with education, employment status, and the age of the woman's mother. Additional longitudinal studies are required to elucidate and further understand these associations. Additionally, the most common complaint during the menopausal period was physical and mental exhaustion, with hot flashes identified as the most severe symptom. It is crucial for healthcare professionals to identify the challenges women face during menopause, and planning educational and counseling services is important for alleviating the severity of these issues. Thus, women can lead a higher quality of life during this period by adopting effective coping mechanisms for the health problems they experience in menopause.

Authors' Contribution

Study Conception: FTE, NTA; Study Design: FTE, NTA; Supervision: FTE, NTA; Funding: FTE, NTA; Materials: FTE, NTA; Data Collection and/or Processing: FTE, NTA; Statistical Analysis and/or Data Interpretation: FTE, NTA; Literature Review: FTE, AE, NTA; Manuscript Preparation: FTE, AE, NTA and Critical Review: FTE, AE, NTA.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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