Original articles

The relationship between quality of life and anthropometric measurements in premenopausal and postmenopausal among turkish women

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Summary. The aim of this work was to investigate whether there is a relationship between anthropometric measurements and quality of life scores during pre and postmenopouse period. A descriptive study was carried out on 1276 women (40–64 years). Demographic features, socioeconomic attributes and anthropometric measurements were considered using a validated instrument the Turkish version of the EUROHIS (WHOQOL-8.Tr) was performed. Significant body mass index (BMI), height, waist circumference, hip circumference, waist/ height ratio differences were determined by comparing pre and postmenopausal women (p<0.05). Significantly lower quality of life scores were observed in premenopausal women (p<0.05). BMI was determined as significant predictor for quality of life for each group. The number of pregnancy, number of live birth, number of stillbirth and waist/height ratio did not show significant association with quality of life. The age of first pregnancy was stated as significant predictor for quality of life just for premenopausal women. In our study, quality of life increased as the BMI decreased in pre and postmenopausal women. Significantly lower WHO-8 EUROHIS scores were observed in premenopausal women. The age of first pregnancy affected the life quality in positive way in just premenopausal women. As the age of first pregnancy increased, quality of life score increased in premenopausal women.

Key words: Menopause, Quality of life, BMI

Introduction

Menopause is a physiological phenomenon, defined as the final menstrual period and reflecting loss of the ovarian follicular function (1). In women from European countries, it occurs, on average, at the age of 50–52, in our country the mean of the age is between 48-52 years, but the age of menopause may differ from 40 to 58 (2). Menopause is an important event in a women's life, in the aspect of psychological and physical point of view. In this period, women experience biological, social and cultural changes (3).

Most studies show that menopausal transformation in women leads to an increase of anthropometric measurements such as body weight, height, waist circumference, waist-height ratio and a change of adipose tissue distribution. The effect of the menopause transition on body fat distribution is unclear, but new studies suggest that the menopause transition is associated with an accumulation of central fat and, in particular, intra-abdominal fat (4,5). In the period of menopause, the changes in the hormonal milieu are associated with changes in body fat composition leading to abdominal obesity (6). In Turkey over 64.4% of women of more

than 51 years are overweight and obese (7). In another study, the prevalence of obesity in Turkey among pre and postmenopausal women is 43%, 64%, respectively (8). These transformations make a significant contribution to the shift of body pattern from the gynoid to the android pattern and hence, the type of body pattern might affect the quality of life. Poor quality of life was reported in especially abdominal obesity which is associated with multifactorial conditions such as metabolic, social, behavioral factors in menopause. Quality of life is a multidimensional health concept (9). Menopause symptoms affect the women's health and quality of life negatively. A different study shows that postmenopausal women evaluate quality of life as worse compared to premenopausal women (10). The aim of the study was to examine the relationship between anthropometric measurements and quality of life scores, using a validated instrument the Turkish version of the EUROHIS (WHOQOL-8.Tr) during pre/post menopause period (11).

Material and Methods

Participants

A total of 1276 Turkish volunteer women (459 premenopausal women, 817 postmenopausal women) participated in the study, in an urban area of Ankara, Turkey. The inclusion criteria of the participants were age between 40-64 years, diagnosis of any chronic diseases and ability to complete the questionnaire. This study was approved by Baskent University Institutional Review Board (Project no: 94603339/18.050.01.08.01-699).

Questionnaire

A questionnaire form was administered by face to face interview method. Pre and postmenopausal women's demographic features and socioeconomic attributes, including age, marital status, education and employment status were recorded. Menopausal status was categorized by the declaration of the participants.

Anthropometric Measurements

Body weight, height and waist circumferences, hip and thigh circumferences, waist/height ratio were measured and BMI was calculated. Anthropometric measurements on individuals wearing light clothing and without shoes were conducted by well-trained examiners. Height was measured to the nearest 0.1cm using the portable stadiometer. Weight was measured in the upright position to the nearest 0.1 kg using a calibrated balance beam scale. BMI was calculated by dividing weight (kg) by height squared (m²). The participants were grouped into four categories according to World Health Organization (WHO) standards; underweight, normal weight, overweight and obese in accordance with the cut-off points of <18.5 kg/m², 18.5 to 24.9 kg/m², 25.0 to 29.9 kg/m² and >30 kg/m², respectively (12). Waist circumference measurements were taken at the end of normal expiration to the nearest 0.1 cm, measuring from the narrowest point between the lower borders of the rib cage and the iliac crest. Waist/height ratio was calculated by dividing waist circumference (cm) by height (cm). It has been proposed that a cut-off value of 0.5 for both men and women (13). Hip circumference was measured at the level of the widest circumference over the buttocks. Thigh circumference was measured on the left leg directly below the gluteal fold.

Quality Of Life

The quality of life level of the pre and postmenopausal women was examined by WHO-8 EUROHIS Quality Of Life. WHO-8 EUROHIS index is composed of eight items (overall QOL, general health, energy, daily life activities, esteem, relationships, finances, and home). All answer scales have a 5-point response format on a Likert scale, ranging for instance from 'not at all' to 'completely' (11,14).

Statistical Analysis

Data were presented as mean and standard deviation (SD) or frequency (f) and percent (%). Continuous data were tested for normality using the One Sample Kolmogorov–Smirnov test. Comparisons between the groups were made using the independent groups (Student t) test. Chi-square test was used for categorical variables. The Pearson's correlation coefficient was used to evaluate the strength of linearity between variables. Multiple linear regressions were used to explore risk factors for quality of life, which were the outcome

variables in the regression. Data were analyzed using SPSS statistics software version 17.0 (SPSS Inc.). All statistical tests were two-sided and p<0.05 was considered statistically significant.

Results

Data were obtained from 1276 Turkish women in this study. More than half of the women were postmenopausal (64%) and the rest were premenopausal (36%). The mean age of the study population was 52.3±7.30 years. Demographic characteristics; life style, age group and BMI status were shown categorized by menopausal status in Table 1. Significant differences were determined comparing pre and post menopause among marital status, educational background, age groups, age (year), working status, and BMI status (p<0.05).

Anthropometric measurements showed a number of differences between pre and postmenopausal women (Table 2). The mean BMI was 29.4±5.41 kg/m² in postmenopausal women. Postmenopausal women had highly significant differences than premenopausal women (p=0.000). Similarly, significant height, waist circumference, hip circumference, waist/ height ratio differences were determined comparing pre and postmenopausal women (p<0.05). Significantly lower WHO-8 EUROHIS scores were observed in premenopausal women (p<0.05). According to items analysis, postmenopausal women's score were higher than premenopausal women's score in last four items that have been shown in Table 2 (p<0.05).

The WHO-8 EUROHIS score showed strong association with the age of first pregnancy, the number of pregnancy, the number of live birth, weight, waist circumference, waist/height ratio and BMI for each group (p<0.05). Nevertheless, there was a negative significant correlation between the WHO-8 EUROHIS score and the number of stillbirth just in premenopausal women (p<0.05). Also, the age of menopause and the number of abortion were determined to have moderate association with quality of life. No associations were observed for age of first menstruation (Table 3).

Using the WHO-8 EUROHIS as the dependent variable, age of first pregnancy was identified as significant predictor quality of life among premenopausal women. However, BMI was determined as significant predictor quality of life for each groups. The number of pregnancy, number of live birth, number of stillbirth and waist/height ratio did not show any significant association with quality of life. Table 4 below summarized the predictors quality of life in pre and postmenopausal women. The partial regression coefficient of BMI ( )

Table 1. Demographic and other characteristics of the study population according to menopausal status

Demographic Characteristics	Premenopausal Women (n=459)		Postmenopausal Women (n=817)		p
	f	%	f	%	
Marital status					
Married	375	81.7	594	72.7	
Single	34	7.4	52	6.4	0.000*
Divorced	35	7.6	60	7.3	
Widowed	15	3.3	111	13.6	
Educational Background					
Illiterate	12	2.6	26	3.2	
Literate	3	0.7	29	3.5	
Primary school	134	29.2	225	27.5	
Secondary school or equivalent	39	8.5	65	8.0	0.021*
High school or equivalent	104	22.6	210	25.7	
University and higher	167	36.4	262	32.1	
Age Groups (years)					
40-50	381	83.0	91	11.1	
50-60	71	15.5	469	57.4	0.000*
60-64	7	1.5	257	31.5	
Age (year) ($\bar{C}$±SD)	45.4±4.59		56.3±5.36		0.000*
Working Status					
Retired	45	9.8	250	30.6	
Housewife	238	51.9	422	51.7	
Self-employment	37	8.1	36	4.4	0.000*
Officer	98	21.4	87	10.6	
Worker	41	8.8	22	2.7	
BMI Status					
Underweight	1	0.2	2	0.2	
Normal	145	31.5	178	21.7	
Overweight	170	37.1	295	36.2	0.000*
Obese	143	31.2	342	41.9	

Chi-square test; *p<0.05

Table 2. Mean and standard deviations of anthropometric measurements and WHO-8 EUROHIS score by menopausal status

	Premenopausal Women (n=459)	Postmenopausal Women (n=817)	Total (n=1276)	p
	Ҫ±SD	Ҫ±SD	Ҫ±SD	
Weight (kg)	72.7±13.57	73.9±13.34	73.5±13.43	0.124
Height (cm)	161.1±6.29	158.9±6.23	159.7±6.34	**0.000***
Waist circumference (cm)	94.2±13.43	98.3±13.32	96.8±13.49	**0.000***
Hip circumference (cm)	107.9±10.94	109.8±11.00	109.1±11.01	**0.003***
Thigh circumference (cm)	37.8±3.98	37.8±3.97	37.8±3.97	0.739
BMI (kg/m²)	28.1±5.43	29.4±5.41	28.9±5.45	**0.000***
Waist /height ratio	0.5±0.09	0.6±0.09	0.6±0.09	**0.000***
WHO-8 EUROHIS	28.7±4.43	29.2±4.37	29.0±4.40	**0.048***
1 How would you rate your quality of life	3.4±0.76	3.5±0.74	3.5±0.75	0.090
2 How satisfied are you with your health	3.4±0.87	3.4±0.91	3.4±0.89	0.553
3 Do you have enough energy for everyday life	3.5±0.86	3.5±0.86	3.5±0.86	0.799
4 How satisfied are you with your ability to perform your daily activities	3.6±0.84	3.6±0.84	3.6±0.84	0.952
5 How satisfied are you with yourself	3.6±0.95	3.7±0.91	3.7±0.93	**0.032***
6 How satisfied are you with your personal relationships	4.1±0.74	4.2±0.72	4.2±0.73	**0.004***
7 Have you enough money to meet your needs	3.1±0.85	3.2±0.86	3.2±0.86	**0.046***
8 How satisfied are you with the conditions of your living place	3.6±0.81	3.7±0.83	3.7±0.82	**0.005***

Independent Groups t Test; *p<0.05

Table 3. Correlations between WHO-8 EUROHIS score with some parameters in pre and postmenopausal women

	Premenopausal Women (n=459)		Postmenopausal Women (n=817)	
Parameters	WHO-8 EUROHIS (0-40)		WHO-8 EUROHIS (0-40)	
	r	p	r	p
Parity				
Age of first menstruation	0.001	0.988	0.031	0.370
Age of first pregnancy	0.198	**0.000***	0.095	**0.010***
Age of menopause	0.095	0.816	0.074	**0.036***
Number of pregnancy	-0.172	**0.000***	-0.150	**0.000***
Number of live birth	-0.180	**0.000***	-0.129	**0.000***
Number of stillbirth	-0.111	**0.018***	-0.046	0.195
Number of abortion	-0.061	0.195	-0.089	**0.012***
Anthropometric Measurements				
Weight (kg)	-0.298	**0.000***	-0.221	**0.000***
Waist circumference (cm)	-0.308	**0.000***	-0.254	**0.000***
Waist / height ratio	-0.288	**0.000***	-0.231	**0.000***
BMI (kg/m²)	-0.307	**0.000***	-0.250	**0.000***

*p<0.05

Table 4. Multiple linear regressions predicting quality of life in premenopausal and postmenopausal women (WHO-8 EUROHIS)

| Parameters | Premenopausal Women (n=459) | | | | | Postmenopausal Women (n=817) | | | | |
| | β§ | Std. Error | 95%CI for β | | p | β§ | Std. Error | 95%CI for β | | p |
			Lower Bound	Upper Bound				Lower Bound	Upper Bound	
Age of first pregnancy	0.112	0.050	0.013	0.211	**0.027***	-0.011	0.038	-0.085	0.064	0.778
Number of pregnancy	0.053	0.161	-0.264	0.370	0.742	-0.140	0.089	-0.315	0.035	0.117
Number of live birth	-0.027	0.304	-0.625	0.572	0.930	-0.071	0.140	-0.346	0.204	0.613
Number of stillbirth	-0.853	0.731	-2.291	0.585	0.244	-0.026	0.249	-0.514	0.463	0.918
BMI (kg/m²)	-0.200	0.073	-0.344	-0.056	**0.007***	-0.158	0.047	-0.251	-0.066	**0.001***
Waist / height ratio	-2.055	4.463	-10.829	6.720	0.645	-3.420	2.849	-9.014	2.173	0.230

*p<0.05; §: β is the partial regression coefficient

in pre and postmenopausal woman has been found as -0.20 and -0.251, respectively. The coefficients indicate that women's quality of life scores 0.20 (premenopausal) and 0.251 (postmenopausal) points decrease is caused for every increase one unit (kg/m²) in BMI while holding other predictors in the model constant. These results were statistically significant (p <0.05).

Discussion

The mean age of pre and postmenopausal women were 45.4±4.59, 56.3±5.36 years, respectively. In a Chinese study, the mean age of each group was determined similarly (46.502 ± 3.503, 55.15 ± 2.961 respectively) (10). In our study there was a significant association between the level of education and marital status depending on menopausal status alike the survey that was conducted in Arabian Qatari women (15). Obesity is known as a multi-factor metabolic change of epidemic proportions. Shobeiri et al. (16) reported that 41.3% of the menopausal women were overweight. Similarly, in the study of Ghorbani et al. (17) showed that 44.8% were overweight and 35.3% were obese among postmenopausal women. However, in our study we found that 36.2% of the postmenopausal women were overweight.

Obesity is a public health problem, with overweight individuals representing approximately 20% of the adult world population (18). Quality of life is in a relation with obesity (9). In our study, population, weight, waist circumference, waist/height ratio and BMI were signifi-

cantly related to scores in quality of life. Likewise, a survey of women in Spain found that obese respondents had a self-reported health-related quality of life lower than that of women of normal weight (19). Central adiposity in postmenopausal women has been recognized as an independent risk for developing metabolic syndrome, dyslipidemia, and cardiovascular diseases (20). In a cross-sectional study, the mean waist circumference of participants was 91.70±13.19 cm (21). In another study, postmenopausal women's waist circumference was 92.9+11.4 cm (22). In our study we determined that the mean waist circumference was 98.3±13.32 cm in postmenopausal women. The reason of this variation might be ethnicity and the population size which we observed. The waist/height ratio is an effective index for assessing central fat distribution. In this study, waist/height ratio was 0.6±0.09 in postmenopausal women. In a Spanish study, visceral fat area was evaluated in postmenopausal women and waist/height ratio was stated 0.56±0.1 alike our study (23).

Analysis of the results revealed that scores in quality of life were worse for premenopausal women than for postmenopausal women by contrast with Fuh et al. (24) who contradicted this outcome. In our study, the mean of WHO-8 EUROHIS score in pre and postmenopausal women were 28.7±4.43 and 29.2±4.37, respectively (p<0.05). However, in the other survey in Greece, it was found that there is no effect of menopause on the quality of life (25). Also, another study on Taiwanese women confirmed no significant effect of menopausal transition on quality of life (26). The hot flushes, joint pain, sleep disorder, depressive mood, irritability, fatigue and libido decrease as the most common

symptoms may arise and can prevail until post menopause. These symptoms affect the quality of life. In a cross-sectional population-based study has shown that earlier age at first childbirth and higher parity are risk factors for obesity in later life (27). In this study, the key predictors associated with quality of life among each group of women were age of first pregnancy, number of pregnancy, and number of live birth. When the data was analyzed using multiple linear regressions; the age of first pregnancy was determined as significant predictors' in quality of life for premenopausal women. A cohort study findings suggested that younger maternal age at first delivery was independently associated with a higher risk of central obesity and metabolic syndrome in postmenopausal women (28). Another study highlighted that young mothers, and particularly teenage mothers, are a vulnerable group at high risk of poor mental health outcomes compared to mothers aged 25 years and above (29). A significant reduction in menopausal quality of life as a result of high BMI levels has been reported in several studies (31,31). Also, in our study, WHO-8 EUROHIS score were negatively correlated with BMI for each groups (p<0.05).

As a conclusion, quality of life increased as the BMI decreased in pre and postmenopausal women in this study. But, the age of first pregnancy affected the quality of life in positive way in just premenopausal women. Number of pregnancy, number of live birth, number of stillbirth and waist/height ratio were not associated with changes in WHO-8 EUROHIS in both groups. Obesity is frequent in postmenopausal period. Especially abdominal obesity and related health problems can occur in this period. And these conditions may lead to a decrease in quality of life of women. Additional research about quality of life and anthropometric measurements in status of menopause with a longitudinal design seems necessary to confirm our results.

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