Original Research Article

Lifestyle Behaviours and Dietary Habits in an Italian Sample of Premenopausal and Postmenopausal Women

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ABSTRACT

Objective: Menopause is the period when significant changes occur in women and influence their life quality. The aim of this study was to investigate lifestyle behaviours and dietary habits in an Italian sample of pre-menopausal and postmenopausal women.

Materials and Methods: A cross-sectional online survey was conducted May to July 2021 by online platforms. A total of 250 women (130 pre-menopausal and 120 post-menopausal) completed a self-reported questionnaire, comprising questions on demographic characteristics, anthropometrics data, lifestyle behaviours and dietary habits.

Results: Overweight/obesity prevalence was 22.4% with higher values of post-menopausal than pre-menopausal women (25.9% vs 19.2%). Pre-menopausal women were slightly more physically active (67.7% vs 65.8), but with significantly lower percentages when exercised for 60+ minutes (36.2% vs 54.7%; p=0.0130). As to sedentary activities, higher and significant percentage of pre-menopausal women was found compared to post-menopausal women (89.2% vs 67.5%; p <0.0001). Regarding the dietary habit of having breakfast regularly, a significantly higher percentage of post-menopausal than pre-menopausal women (90.0% vs 80.0%) emerged. Multiple logistic regression model showed that smoking, physical activity and sleep duration affected significantly the ponderal status, whereas age, marital status, alcohol consumption, breakfast habit, and sweet consumption were not significant.

Conclusions: Not many differences in lifestyle and eating habits exist between pre-menopausal and post-menopausal women. The only significant differences relate to physical activity duration, sedentary behaviours and breakfast habit in favor of post-menopausal women. However, the prevalence of overweight/obesity was particularly linked to lifestyle behaviors such as smoking, sleep and physical activity in all participating women.

Keywords: Premenopausal women, postmenopausal women, lifestyle behaviours, dietary habits, overweight/obese

INTRODUCTION

Menopause is defined as the permanent loss of menstrual cycles and is a consequence of the cessation of ovarian activity.[1] The age of menopause onset is genetically predetermined, and on average it involves women around the age of 50 years old, although it can vary in relation to eating habits and lifestyle, as well as to other environmental factors.[2] Menopause is also one of the most critical stages of life in a woman.[3]

WHO defined postmenopausal women as those who naturally stopped menstruating a year before or those who stopped having periods as a result of some medical or surgical intervention.[1]

From menarche to menopause there are many biological changes in women's body and its effect on mind and health in totality needs to be examined carefully.[4]

The aging of society, the growing trend of a longer life expectancy and the longevity of women compared to men, make postmenopausal women one of the fastest growing sections of the population.[5,6] Also, despite the rise of life expectancy, age of onset of menopause or end of menstruation has not changed, and women live for about 30 years (more than one third) of their lives in menopause or perimenopause.[7]

With a good nutrition and optimal intake of specific nutrients, together with lifestyle changes it is however possible to improve maintaining a healthy menopause.[8] In fact, positive lifestyle changes, such as physical activity and dietary modifications, have clear benefits on many aspects of life in postmenopausal women, including physical and emotional changes, sleep, and cardiovascular health.[9] Therefore, it is important to identify modifiable, lifestyle-related risk factors that can improve or prevent menopausal symptoms.[10] Several risk factors for these symptoms, such as Body Mass Index (BMI), physical activity, smoking, and alcohol consumption, have been identified.[11-13]

Some studies have shown that there are no substantial changes due to the period of menopause,[14-16] while other research studies have observed significant changes in the quality of life in postmenopausal women.[17,18]

In Italy, the average age of menopause is 51 years; however, the course of menopause symptoms can vary for each woman and often begins before menopause. Therefore, it is appropriate to identify the perimenopause complex period, in which some progressive mental and bodily changes may occur.[19]

The aim of this study was precisely to investigate lifestyle behaviours and dietary habits in an Italian sample of pre-menopausal and post-menopausal women.

MATERIALS AND METHODS
Study design and data collection
The survey was conducted from May to July 2021, among an Italian sample of pre-menopausal and post-menopausal women, by using an online platform, accessible through any device with an Internet connection. The survey was disseminated through private social networks (e.g., WhatsApp, Twitter, Facebook). A total of 250 women completed the questionnaire. The survey was carried out in agreement with the Declaration of Helsinki (2000) and national and international regulations. All women were informed about the study and agreed to participate in the data collection. They also provided consent to the fact that these data were analyzed for research purposes only and possible publication, in accordance with current privacy regulations. Participants' personal information was anonymous to maintain and protect confidentiality. Given the anonymous nature of this survey and the fact it was carried out via the web, which does not allow any tracking of sensitive personal data, this study did not require the approval of the ethics committee. The final response database was downloaded as a Microsoft Excel sheet.

Questionnaire
The questionnaire was built *ad hoc* by using Google Form and consisted of personal data and anthropometrics information (such as questions on age, place of residence, marital status, household, self-reported weight and height, and education level); lifestyle factors (e.g., questions about smoke and alcohol habits, time sleep, type, frequency and duration of physical activity, time spent in sedentary activity such as reading, watching tv, using social networks); dietary habits information (such as questions on breakfast habits, daily consumption of certain foods as fruit and vegetable, sweet and eating between meals).

Anthropometric data

Height and weight information obtained in the questionnaire was all self-reported by the respondents' women. BMI was calculated as the weight in kilograms divided by the square of the height in meters (kg/m^2). Weight status was classified according to WHO [20] categories as follows: underweight (BMI < 18.5), normal weight (BMI between 18.5–24.9), overweight (BMI between 25 and 29.9) and obese (BMI ≥ 30).

Statistical analysis

The descriptive analyses were presented as means ± standard deviations for quantitative variables, and as percentages for categorical variables. Chi-square test and T-tests were used to test for significant proportion and mean differences.

A multiple logistic regression model was employed to evaluate the association of selected lifestyle and dietary variables and overweight/obese ponderal status (dependent variable). Analyses were conducted with unadjusted and adjusted covariates.

For all the tests, *p*-values < 0.05 were considered to be statistically significant. All statistical analyses were performed using MedCalc Software version 19.4.0 for Windows.

RESULTS

Characteristics of the study sample are shown in Table 1. Out of the 250 participants, 130 (52%) were pre-menopausal and 120 (48%) were post-menopausal women. The mean age was 42.4±16.5 years (28.4±9.6 for pre-menopausal and 57.6±4.2 for post-menopausal women) and BMI was 23.3±3.8 kg/m^2 with higher and significative percentage in post-menopausal than pre-menopausal women (24.0±4.1 *vs* 22.7±3.4; p=0.0052). The prevalence of overweight/obesity was 22.4% with higher value of post-menopausal than pre-menopausal women (25.9% vs 19.2%). Interestingly, there were 13% of underweight women with higher pre-menopausal than post-menopausal values (6.9% vs 3.3%).

Table 1. Study sample parameters (means ± standard deviation, n. and %)

Parameter	All sample n=250	Pre-menopausal women n=130 (52%)	Post-menopausal women n=120 (48%)	*p-value*
Age (years)	42.4±16.5	28.4±9.6	57.6±4.2	*<0.0001^a*
Weight (kg)	62.8±10.5	61.6±9.9	64.1±10.9	*0.0531^a*
Height (cm)	163.8±8.7	164.1±10.6	163.6±6.1	*0.6760^a*
BMI	23.3±3.8	22.7±3.4	24.0±4.1	*0.0052^a*
Nutritional status				
Underweight	13 (5.2)	9 (6.9)	4 (3.3)	*0.3631^b*
Normal weight	181 (72.4)	96 (73.9)	85 (70.8)	
Overweight	38 (15.2)	18 (13.8)	20 (16.7)	
Obese	18 (7.2)	7 (5.4)	11 (9.2)	
Education				
Less than middle school	10 (4.0)	4 (3.1)	6 (5.0)	*<0.0001^b*
High School	161 (64.4)	110 (84.6)	51 (42.5)	
University degree	79 (31.6)	16 (12.3)	63 (52.5)	
Marital status				
Married/cohabiting	117 (46.8)	44 (33.8)	73 (60.8)	*<0.0001^b*
Divorced/widowed	28 (11.2)	3 (2.4)	25 (20.8)	
Single	105 (42.0)	83 (63.8)	22 (18.4)	

^{a} Comparison between pre- and post-menopausal women based on t-test
^{b} Comparison between pre- and post-menopausal women based on chi-square test

In the total sample, the percentage of women who had attended high school was higher than the percentage of women who had university degree as well as than the percentage of those who had an education level lower than middle school (respectively 64.4% vs 31.6% and 4.0%). Compared to post-menopausal women, higher and significative values were observed for pre-menopausal women who had a high school level of education (84.6% vs 42.5%; p<0.0001), and percentage significantly

lower for university degree (12.3% vs 52.5%; p<0.0001). In addition, there was significantly higher rate of married and cohabiting post-menopausal than pre-menopausal women (60.8% vs 33.8%; p<0.0001) and significantly lower of single and divorced/widowed (respectively, 18.4% vs 63.8% and 20.8% vs 2.4; p<0.0001).

Lifestyle behaviours and dietary habits of total women' sample are given in Table 2.

Table 2 Lifestyle behaviours and dietary habits among total sample of women

Variable	Total sample n=250	P value
Smoking		
Yes	58 (23.2)	*<0.0001*
No	192 (76.8)	
Alcohol consumption		
Everyday	13 (5.2)	*<0.0001*
Not everyday	142 (56.8)	
Never	95 (38.8)	
Sleep time		
≥7h	165 (66.0)	*<0.0001*
<7h	85 (34.0)	
Physical activity (PA)		
Yes	167 (66.8)	*<0.0001*
No	83 (33.2)	
PA duration		
≥60	81 (45.0)	*<0.0001*
30-59 min	80 (44.4)	
<30	19 (10.6)	
PA frequency		
Everyday	26 (14.8)	*<0.0001*
4-6 times/week	46 (26.1)	
2-3 times/week	88 (50.0)	
1 time/week	16 (9.1)	
Sedentary activities		
>3h/day	109 (43.6)	*<0.0001*
2-3h/day	88 (35.2)	
1h/day	49 (19.6)	
Never	4 (1.6)	
Breakfast habits		
Yes	212 (84.8)	*<0.0001*
No	38 (15.2)	
Eating between meals		
Yes	181 (72.4)	*<0.0001*
No	69 (27.6)	
Fruit and vegetable consumption		
≥5 servings/day	22 (8.8)	*<0.0001*
2-4 servings/day	160 (64.0)	
1 serving/day	56 (22.4)	
Nothing	12 (4.8)	
Sweet consumption		
≥1 serving/day	85 (34.0)	*<0.0001*
4-6 servings/week	15 (6.0)	
1-3 servings/week	126 (50.4)	
Never	24 (9.6)	
Soft and sweet drinks consumption		
≥1 serving/day	17 (6.8)	*<0.0001*
4-6 servings/week	9 (3.6)	
1-3 servings/week	90 (36.0)	
Never	134 (53.6)	

*P values according to chi-square test; *statistical significance is expressed as p<0.05*

Table 3 Lifestyle behaviours and dietary habits in pre- and post-menopausal women

Variable	Pre-menopausal n=130	Post-menopausal n=120	P value
Smoking			
Yes	32 (24.6)	26 (21.7)	*0.5818*
No	98 (75.4)	94 (78.3)	
Alcohol consumption			
Yes	78 (60.0)	77 (64.2)	*0.4986*
No	52 (40.0)	43 (35.8)	
Sleep time			
≥7h	87 (66.9)	78 (65.0)	*0.7489*
<7h	43 (33.1)	42 (35.0)	
Physical activity			
Yes	88 (67.7)	79 (65.8)	*0.7556*
No	42 (32.3)	41 (34.2)	
≥30 min	90 (95.7)	71 (82.6)	*0.0041**
<30 min	4 (4.3)	15 (17.4)	
≥60 min	34 (36.2)	47 (54.7)	*0.0130**
<60 min	60 (63.8)	39 (45.3)	
Every day	11 (11.7)	15 (18.3)	*0.2203*
No every day	83 (88.3)	67 (81.7)	
Sedentary activities			
≥2 h/day	116 (89.2)	81 (67.5)	*<0.0001**
<2h/day	14(10.8)	39 (32.5)	
Breakfast habits			
Yes	104 (80.0)	108 (90.0)	*0.0281**
No	26 (20.0)	12 (10.0)	
Eating between meals			
Yes	97 (74.6)	84 (70.0)	*0.4157*
No	33 (25.4)	36 (30.0)	
Fruit and vegetable consumption			
≥5 servings/day	11 (8.5)	11 (9.2)	*0.8444*
<5 servings/day	119 (91.5)	109 (90.8)	
Sweet consumption			
≥1 serving/day	86 (66.2)	79 (65.8)	*0.9575*
<1 serving/day	44 (33.8)	41 (34.2)	
Soft and sweet drinks consumption			
≥1 serving/day	9 (6.9)	8 (6.7)	*0.9360*
<1 serving/day	121 (93.1)	112 (93.3)	

*P values according to chi-square test; *statistical significance is expressed as p<0.05*

Most of the sample did not smoke (about 77%), 67% did physical activity (50% exercised 2-3 times a week, and 45% for more than 60 minutes each time), 66% slept seven or more hours per night (as per international recommendations). However, it was also observed that 62% consumed alcohol and about 44% spent more than 3 hours per day in sedentary activities, such as watching TV, reading, cooking, using social networks.

Regarding dietary habits, 85% of the sample had breakfast every day, 72.4% was used to eating between meals, and 64% had 2-4 servings of fruit and vegetables per day (only 8.8% ate the WHO recommended 5 servings a day).

Half of the participating women consumed sweets 1-3 times a week, while 34% consumed 1 or more times a day; about 54% did not consume soft and sweet drinks. All p-values of lifestyle and dietary habits variables were statistically significant.

Table 3 shows the differences in lifestyle behaviours and in food habits between pre-menopausal and post-menopausal women. It was observed that pre-menopausal women were slightly more physically active (67.7% vs 65.8) and with significantly higher percentages when exercised each time for 30 and more minutes (95.7% vs 82.6%; p = 0.0041) while they had significantly lower percentages when exercised each time for

60 and more minutes (36.2% vs 54.7%; p=0.0130) and for physical activity every day (11.7 vs 18.3) compared to post-menopausal women. Moreover, when participants spent two hours and more in sedentary activities, a higher and significant percentage of pre-menopausal was found compared to post-menopausal women (89.2% vs 67.5%; p <0.0001). On the other hand, there was a significantly higher percentage of post-menopausal than pre-menopausal women regarding the habit of having breakfast regularly (90.0% vs 80.0%). For all other lifestyle and dietary behaviours there were no significant differences between pre-menopausal and post-menopausal women.

Table 4. Odds ratios (OR) and 95% Confidence Intervals (CI) from logistic regression analysis showing the association of ponderal status overweight/obese with selected behaviour variables[a]

Independent variable	Overweight/obese			
	cOR (95% CI)	*p-value*	aOR (95% CI)	*p-value*
Age				
≥50 years vs <50 years	1.45 (0.80-2.63)	*0.2231*	1.56 (0.81-3.00)	*0.1835*
Marital status				
Married/cohabiting vs single	1.08 (0.59-1.95)	*0.8097*	0.82 (0.42 -1.58)	*0.5511*
Alcohol consumption				
No vs yes	1.43 (0.78-2.61)	*0.2462*	1.25 (0.66-2.37)	*0.4901*
Smoking				
Yes vs no	0.48 (0.21-1.08)	*0.0774*	0.36 (0.15-0.88)	*0.0247**
Physical activity				
No vs Yes	2.08 (1.13-3.83)	*0.0182**	1.97 (1.02-3.81)	*0.0433**
Breakfast habits				
No vs Yes	2.04 (0.97-4.32)	*0.0615*	1.93 (0.83-4.46)	*0.1249*
Sweet consumption				
≥1 serving/day vs <serving/day	0.72 (0.38-1.39)	*0.3315*	0.74 (0.37-1.47)	*0.3906*
Sleep time				
<7 hours vs ≥7 hours	1.98 (1.08-3.64)	*0.0273**	2.01 (1.06-3.83)	*0.0333**

cOR= Crude odds ratio; aOR= Adjusted odds ratio; CI= confidence interval
*p-value according to Chi-square test; *statistical significance is expressed as p<0.05*

Crude and adjusted odd ratios for lifestyle and dietary factors associated with an overweight/obese ponderal status, obtained from a multiple regression model are shown in Table 4. Smoking, physical activity and sleep time had a significant effect on overweight/obese ponderal status, whereas age, marital status, alcohol consumption, breakfast habits, and sweet consumption had no significative association. The results show that women who were not physically active had a likely two-fold higher risk of being overweight/obese compared to those who exercised (aOR 1.97, 95% CI 1.02-3.81; p=0.0433). The women who slept less than

seven hours/night were about 2 times more likely to run the risk of having an overweight/obese status than those who slept 7 and more hours (aOR 2.01, 95% CI 1.06-3.83; p=0.0333). Moreover, it was observed that smokers had about half the risk of becoming overweight/obese compared to those who did not smoke (aOR 0.36, 95% CI 0.15-0.88; p=0.0247).

The remaining variables did not significantly affect the ponderal status of overweight and obesity.

DISCUSSION

This cross-sectional study examined lifestyle behaviours and dietary habits in an

Italian sample of pre-menopausal and post-menopausal women. A few studies have been so far conducted on post-menopausal women and on differences between them and pre-menopausal women. However, the results they present rarely refer to the whole general population. Our results showed that the mean of BMI and prevalence of overweight/obesity of post-menopausal women were higher than those of pre-menopausal women. Similar findings have been observed by the study of Bhurosy and Jeewon, where the mean anthropometric values of waist circumference, waist hip ratio and BMI were significantly higher among post-menopausal women,[21] and by the research study of Karunakaran and Urooj in which post-menopausal women had a significantly higher mean BMI compared with pre-menopausal women.[22] A similar trend of results has been reported by other studies.[23,24]

Regarding physical activity, it was observed that post-menopausal women are more prone to sedentary habits and loss of fitness in comparison with pre-menopausal women. This sedentary lifestyle leads to deterioration of health and lower quality of life.[25] It is known that physical activity for adult health, according to international recommendations,[26] includes all physical activity carried out in leisure or recreational time, such as frequent walking, jogging, cycling, and doing physical exercises. These recommendations suggest getting at least 150 minutes per week of moderate-intensity aerobic activity or at least 75 minutes of vigorous activity a week or an equivalent combination of moderate and vigorous activity. For additional health benefits, adults should increase their moderate-intensity physical activity to 300 minutes per week or engage in 150 minutes of vigorous activity per week, or an equivalent combination of the two.[26] The current study found that post-menopausal women were slightly less physically active and with lower percentages when exercised each time for 30 minutes and more, but at the same time they had significantly higher rates when exercising for 60 minutes and more each time. Increased motivation for lifestyle changes during the menopausal period could explain this increasing physical activity. Another explanation could be that post-menopausal women probably have more leisure time to devote to physical activity than pre-menopausal women. Our results are in line with previous studies showing that in leisure time peri- and post-menopausal women had mostly high physical activity levels, while pre-menopausal women had low physical activity levels.[27] Similar findings have been reported also in other studies.[28]

From the current study it was observed that postmenopausal women spend much less time in sedentary activities, such as reading, watching TV, using various social networks, compared to pre-menopausal women. This is because younger women spend a lot of time using particularly social networks than older women. Conversely, other studies reported that old-aged women were more likely to increase time spent in sedentary activities because of their higher rate of retirement, compared to younger women.[29] Also, Duval and colleagues observed that during the menopausal transition women tend to shift to a more sedentary lifestyle.[30]

Regarding dietary habits, the results of this study showed that there were no significant differences between pre-menopausal and post-menopausal women excluding the breakfast habit. In fact, the results reported that there was a significantly higher percentage of post-menopausal women having breakfast daily than pre-menopausal women. Older women seem to be more attentive to healthy eating habits, such as having breakfast daily.

From multiple logistic regression model, it was observed that smoking, physical activity and sleep time had a significant effect on overweight/obese ponderal status of pre- and post-menopausal women. These results clearly show that smokers were less likely to be overweight or obese compared to women who had never

smoked. Most studies have indicated that smokers on average have lower body weights,[31-37] while a few have reported that smoking and body weight are positively correlated.[38,39] In our study, physical activity was inversely and significantly associated with overweight/obesity among pre- and post-menopausal women. Similar findings have been reported in the literature.[40-42] A 6-year follow-up study in 8352 postmenopausal women provided evidence for the protective impact of physical activity on weight development in older women. In fact, among participants aged 50–69 years, higher levels of physical activity were associated with less gain in fat mass, while, interestingly, in women aged 70–79 years, the loss in fat mass was not associated with physical activity. It was evidenced that efforts to encourage physical activity in post-menopausal women could be more effective at younger ages.[43]

In addition, a 13-year follow-up study in 34079 women found that participants aged 55–64 years with lowest physical activity gained significantly more weight than those with highest physical activity and this trend was not observed in women aged 65 years or older.[44]

Also, our results show that sleep duration was significantly correlated with overweight/obesity in pre-menopausal and post-menopausal women. In fact, women sleeping <7 hours/night were more likely to be overweight or obese than to women were used to sleep 7 or more hours. These findings support available descriptive literature that has documented the association between shorter sleep duration and risk for overweight and obesity.[45-50] In a previous study on female population, it was observed that the influence of short sleep duration on accumulation of abdominal fat was more pronounced in women < 50 years (most likely in pre-menopausal status). This finding indicates that the development of abdominal obesity may start early in life.[51] The results of this study found support from the NHANES cohort, in which younger population, but not older than 50 years,

showed an inverse association between reported short sleep duration and increased prevalence of overweight or obesity.[52]

The current study has however some limitations. First, the sample size of the survey is moderate; secondly, due to the cross-sectional design of this research, it is not possible to assess the causal relationship between lifestyle behaviours, dietary habits and pre- and post-menopausal women. Thirdly, because all information was collected by self-reported questionnaires, there is the possibility of information bias. Consequently, the findings should be cautiously generalized to other populations of women.

CONCLUSION

In conclusion, this research found that there are not many differences in lifestyle and eating habits between pre- and post-menopausal women. The only significant differences are given by physical activity duration, sedentary behaviours, and the healthy habit of having breakfast daily in favor of post-menopausal women who thus seem more virtuous. As for all women, however, we found that the prevalence of overweight/obesity was particularly linked to lifestyle behaviours, such as smoking, sleep time and physical activity.

A future longitudinal study design on a larger sample of women will be needed to further investigate these findings.

Conflict of interest statement
The authors have no conflict of interest to declare.

Ethical Approval: Approved

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