

Evaluation of nutritional status and eating habits of Polish women during the menopause transition – a pilot study

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ABSTRACT

Introduction: The menopause is a natural biological process in a woman's life when the hormonal activity of the ovaries ceases. It has an impact on the woman's further life. In this study we analysed nutritional status and nutrition of women during the menopause transition.

Material and methods: The study was carried out in 2018 using an online questionnaire survey. Data were obtained from 90 women from Poland aged between 40 and 55 years. The subjects were selected using the snowball method. The questionnaire included questions about demographic and social situation, lifestyle, and health as well as questions related to the menopausal period, diet, and eating habits of the respondents. The Food Frequency Questionnaire (FFQ) was used to obtain data related to the diet. The results were analysed using STATISTICA version 13 (StatSoft, Inc.).

Results: Almost half of the respondents were overweight and over 20% were obese. Abdominal obesity was found in 71% of the women. Older age was significantly associated with higher waist circumference. Most women did not follow any special diet. The most consumed products during the day were fruit and vegetables but also wholegrain products, dairy products, meat, and cereal products. Women who often consumed whole grains, buckwheat, fatty fish, legumes, soy products, and green leafy vegetables more frequently reported a significantly lower intensity of vasomotor symptoms, fatigue, and insomnia.

Conclusions: The study suggests that the excessive body weight among women during the menopausal transition is a common problem. Women should be encouraged to maintain a healthy lifestyle during the lifespan, also because a proper diet improves the quality of life associated with the symptoms of menopause.

KEY WORDS: menopause, perimenopause, food frequency questionnaire, diet, nutrition.

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INTRODUCTION

The menopause is the transitional state between a woman's reproductive age and old age. Menopause is defined as the last menstrual period followed by no menstruation for the next 12 months. It occurs as a result of physiological inhibition of the menstrual cycle caused by the hormonal function of the ovaries [1]. The age of the menstrual period depends on many factors; therefore, every woman undergoes menopause

in a way peculiar to her body time. On average, women undergo menopause at the age of 51 years, usually between the ages of 40 and 55 [2]. The term premenopause is defined as the years before the onset of the last menstruation, during which the hormonal activity of the ovaries is gradually expiring. Changes related to this period are noticed by women on average 5–6 years before the last menstruation [1]. Postmenopause is the period that begins after the last menstrual bleeding

in a woman's life. It is associated with the loss of gonadal function and consequently the loss of reproductive capacity. The transitional years, known as perimenopause, are described as a period with noticeable symptoms related to the subsequent hormonal changes. Perimenopause covers several years preceding and one year following the last menstruation and can last from a few to more than 10 years. During this period, due to fluctuations in hormone levels in the body, women may notice changes that are characteristic for the menopausal period. The most common symptoms are hot flashes, mood changes, insomnia, general weakness, or problems with concentration. The process related to menopause is different for every woman and changes associated with it may vary in intensity [3]. About 85% of women during the menopause declare at least one of the symptoms typical of the perimenopausal period. Most often they show vasomotor symptoms, such as hot flashes or night sweats, as well as symptoms of depression, which are usually caused by sleep disorders and mood swings. [4]. A study by Yoshany *et al.* showed a relationship between severity of menopausal symptoms and lifestyle factors [5]. Most women experience specific or non-specific symptoms of menopause that significantly affect their quality of life, notably by increasing the risk of obesity, osteoporosis, metabolic syndrome, and cardiovascular disease [6]. A recent study by Zimny *et al.* showed that over 74% of perimenopausal women in Poland had excessive weight [7]. Previous research conducted by Dąbrowska *et al.* showed that around 60% of women after menopause in Poland were overweight or obese [8]. Nevertheless, weight gain is not directly related to menopause, but it is the result of a gradual increase in body weight during the reproductive period. However, there is a change in the distribution of adipose tissue in peri- and postmenopausal women [9]. As has been previously reported in the literature, changes in the body composition during the menopausal transition are associated with higher risk of coronary heart disease, which may affect women's overall health [10].

Results of the National Multicentre Health Survey (WOBASZ II) indicated improper dietary habits among 60.2% of Polish women [11]. Nutritional habits are a crucial part of lifestyle adaptation to the postmenstrual period because they can be modified and influence health as well as quality of life [10]. Proper nutrition and physical activity play an important role in the prevention and alleviation of symptoms associated with menopause. Hence, promotion of a healthy lifestyle, including a well-balanced diet, is important for all women's wellbeing and quality of life [10].

The aim of the study was to analyse selected parameters of the nutritional status and nutrition of women during menopause transition.

MATERIAL AND METHODS

The study was carried out in the spring of 2018 via an online questionnaire. Data were obtained from 90 women.

The study group is not representative for the Polish population. The subjects were selected using the snowball method. Inclusion criteria for the study included female gender and age from 40 to 55 years. Each woman consented to participate in the study. The questionnaire and the methodology of this study were approved by the Human Nutrition Ethics Committee of the Faculty of Human Nutrition and Consumer Sciences of Warsaw University of Life Sciences (currently the Human Nutrition Ethics Committee operating at the Institute of Human Nutrition Sciences of Warsaw University of Life Sciences), and consent was obtained (No. 04/2018).

The study was conducted using a questionnaire survey. This questionnaire was designed based on the KomPan® questionnaire (dietary habits and nutrition beliefs questionnaire), which allows researcher to use any questions included in the questionnaire according to the purpose of the research [12]. The first part of the questionnaire included general questions about the demographic and social situation, lifestyle, health, declared body weight, height, and waist circumference (WC). Respondents were asked whether the physical activity they performed in their spare time was very low (less than 1 hour of walking/exercising per week), low (1-2 hour of walking/exercising per week), moderate 3-4 hour of walking/exercising per week, high (5-6 hours of walking/exercising per week), or very high (7 or more hours of walking/exercising per week). Physical activity was re-categorized prior to analyses into 3 categories: low, moderate, and high. The waist circumference values were interpreted based on the World Health Organization (WHO) classification. A waist circumference of 80 cm or more indicates abdominal obesity, which is associated with an increased risk of metabolic complications. When the WC value exceeds 88 cm, the risk is much higher than in women with a normal waist circumference [13]. On the basis of WC value and height, the WHtR (waist-to-height ratio) was calculated according to the formula:

$$\text{WHtR} = \text{waist circumference (cm)} / \text{height (cm)}.$$

The normal value was less than 0.5, while the values equal to or greater than 0.5 were interpreted as abnormal, indicating abdominal obesity and an increased risk of cardiometabolic diseases [14]. To assess the nutritional status, data on body weight and height were also used, on the basis of which the body mass index (BMI) was calculated for each respondent according to the formula:

$$\text{BMI} = \text{body weight (kg)} / [\text{height (m)}]^2.$$

The next part of the questionnaire included questions related to the menopausal period and concerning the time of the last menstruation and the severity of the occurrence of individual symptoms related to the climacteric period. The questions in the last part of the questionnaire were aimed at obtaining data related to the diet and eating habits of the respondents.

Respondents were asked if they used any kind of special diet (“Yes, I follow a diet”, “I followed a diet in the past”, “I don’t follow any diet”), such as a lactose free diet, gluten-free diet, dairy-free diet, vegetarian diet, vegan diet, or easily digestible diet. Next, the women were asked whether they had ever followed a low-calorie diet (“never and do not intend to”, “never but intend to”, “once”, “more than once”). Respondents were asked how many meals they consumed per day. A meal was defined as food items or sets of food items customarily eaten at specific times of the day, e.g. morning, noon, evening. Possible answers included “1 meal”, “2 meals”, “3 meals”, “4 meals”, or “5 or more meals”. Respondents were asked how often they consumed food between meals. Snacking was defined as an occasional consumption of food items or sets of food items between meals, usually in small amounts. In the Food Frequency Questionnaire (FFQ) women were asked about consumption of products that may be related to changes occurring in the body in the perimenopausal period, such as cereal products, milk and dairy products, meat, fish, eggs, vegetables and fruit, and in particular soy products, seeds and nuts, fats, sugar and sweets, as well as fast food.

The results were analysed using STATISTICA version 13 (StatSoft, Inc.). The mean values for BMI and WC were calculated for each sociodemographic variable, and associations with those variables were estimated by ANOVA. The level of significance was $p \leq 0.05$.

RESULTS

The study group consisted of 90 women aged between 40 and 55 years. The mean age was 49 years (SD = 4.15). The mean BMI was 26.4 kg/m² (SD = 4.42) and the mean WC was 85.3 cm (SD = 10.69). Most of the respondents lived in the city (66%) and had obtained higher education. Almost half of the women (44%) declared low physical activity. Most of the respondents (over three-quarters) were non-smokers. Moreover, 15% of the respondents did not consume alcohol at all. However, the majority declared consuming alcohol occasionally (70%). A significant association was noticed between age and WC. Older women had higher mean values for WC (Table 1).

Only 29% of the respondents had a waist circumference less than 80 cm. Abdominal obesity was found in 71% of women, and 44% of the entire group had waist circumference equal to or more than 88 cm. Moreover, the BMI of two-thirds of the respondents (66%) exceeded the value of 24.9 kg/m², and 44% of the respondents were overweight. None of the respondents were underweight. The majority of the women had a waist-height ratio of 0.5 or more (57%) (Table 2).

Table 3 shows that a lactose-free diet as well as a gluten-free diet were followed by almost 7% of women. A dairy-free diet was followed by 5.5% of the respondents. Only 4 respondents declared being on a vegetarian diet. The survey results also showed that 30% of respondents

had never used nor intended to use a low-calorie diet, while 12% of the respondents intended to follow such a diet, even though they had not done it before. Over half of the respondents (58%) used the diet as a means to lower their body weight; 18% of the entire group admitted to doing so once, while nearly 40% of all subjects admitted to repeatedly following a slimming diet. It was noticed that women who used diets for weight reduction with an increased frequency had significantly higher BMI and WC when compared to women who did not use this type of diet. Most of the respondents (81%) consumed 3 or 4 meals a day, and 18% of the women declared eating 5 or more meals every day. More than three-quarters of the respondents declared eating between meals more often than a few times a week. Only 4% of the entire group declared that they never ate between meals (Table 3).

Whole-grain products were chosen more often than highly processed cereal products. As many as 71.1% of respondents consumed cereal products with a higher fibre content more often than several times in a week. In turn, highly processed cereal products were consumed with the same frequency by 55.6% of the respondents. Almost half of the respondents never consumed wheat bran. It was shown that an increased frequency of consumption of whole grains was associated with a lower intensity of vasomotor symptoms such as hot flashes ($p = 0.001$) and night sweats ($p = 0.039$). A similar relationship was also observed in the case of buckwheat and hot flashes ($p = 0.033$), fatigue ($p = 0.041$), and insomnia ($p = 0.004$).

Cakes or pastries as well as sugar and sweets were consumed more than a few times a week by, respectively, 20% and 45.5% of the respondents. Among the products that are sources of animal protein in the diet, meat and eggs were the most frequently consumed. The increased proportion of fatty fish in the diet of the subjects was associated with a milder occurrence of fatigue ($p = 0.004$) and insomnia ($p = 0.021$). Nuts and seeds were consumed several times a week or more by 42.2% of women. Flaxseed was used daily or several times a day in their diets by 12.2% of respondents, while 45.6% never or almost never did so. Over 50% of the respondents ate vegetables daily or several times a day. Green vegetables were consumed slightly less frequently, with 26.6% of the respondents consuming them at least once a day. The increased frequency of consumption of green vegetables was associated with a reduced occurrence of vasomotor symptoms, mainly night sweating ($p = 0.027$). Moreover, 42.2% of women declared rarely consuming legumes, and 63.4% of respondents declared that they did not eat soy or soy products at all. The effect of these products on the occurrence of menopausal fatigue was found to be lower in women reporting increased consumption of total legumes ($p = 0.015$), as well as soy and soy products ($p = 0.011$). In the study group, fruits

TABLE 1. Mean and standard deviation of body mass index and waist circumference according to the sociodemographics of women during menopausal transition

Variables	n (%)	BMI (kg/m ²), mean (SD)	p-value	WC (cm), mean (SD)	p-value
Age (years)					
40-45	20 (22.0)	25.66 (0.99)	0.472	80.20 (2.32)	0.029*
46-50	34 (37.4)	25.96 (0.76)		85.41 (1.78)	
51-55	36 (39.6)	27.00 (0.74)		88.02 (1.73)	
Place of residence					
Village	31 (34.1)	25.86 (0.81)	0.881	84.84 (1.94)	0.763
City up to 50,000 inhabitants	10 (11.0)	26.73 (1.42)		85.00 (3.42)	
City of 50,000-100,000 inhabitants	8 (8.8)	25.35 (1.59)		82.50 (3.83)	
City of 100,000-500,000 inhabitants	26 (28.6)	26.62 (0.88)		87.50 (2.12)	
City of 500,000+ inhabitants	15 (16.5)	26.94 (1.16)		84.13 (2.79)	
Education					
Primary	1 (1.1)	28.34 (4.40)	0.308	97.00 (10.4)	0.063
Secondary	27 (29.7)	27.54 (0.85)		89.30 (2.01)	
Vocational	12 (13.3)	25.12 (1.27)		84.67 (3.01)	
Higher	50 (54.9)	25.89 (0.62)		83.06 (1.47)	
Physical activity					
Low	40 (44.0)	26.69 (0.69)	0.088	85.05 (1.67)	0.137
Moderate	38 (41.8)	26.73 (0.7)		87.18 (1.71)	
High	12 (13.2)	23.70 (1.25)		80.17 (3.05)	
Smoking					
Never	56 (61.6)	26.58 (0.59)	0.259	85.89 (3.08)	0.173
Former	12 (13.2)	27.39 (1.27)		88.67 (3.06)	
Smoker	22 (24.2)	25.05 (0.94)		81.95 (2.26)	
Alcohol consumption					
Never	13 (14.3)	25.29 (1.23)	0.524	84.62 (2.99)	0.629
Occasionally	68 (69.3)	26.21 (0.56)		84.87 (1.36)	
1-2 times per week	8 (8.8)	28.12 (1.57)		85.63 (3.81)	
3-5 times per week	6 (6.6)	27.14 (1.81)		90.83 (4.40)	

p-value – ANOVA test, SD – standard deviation, BMI – body mass index, WC – waist circumference

*Statistically significant difference.

were consumed more often than vegetables. The frequency of consumption of apples, which are a source of phytoestrogens in the diet of Polish women, was also high – 41.1% of the respondents consumed apples daily or several times a day. The frequency of consumption of selected products by women during menopausal transition is presented in Table 4, and the intensity of menopausal symptoms depending on the frequency of consumption of selected products is shown in Table 5.

DISCUSSION

The aim of the study was to evaluate selected parameters of the nutritional status and diet of women during the menopause transition. It was found that women who often consumed whole grains, buckwheat, fatty fish, legumes, soy products, and green leafy vegetables more frequently reported a significantly lower inten-

TABLE 2. Values of the nutritional status indicators

Characteristic	Number of respondents (n = 90)	% of respondents
WC (cm)		
< 80	26	29
80-87	24	27
≥ 88	40	44
BMI (kg/m²)		
18.5-24.9	31	34
25-29.9	40	44
≥ 30.0	19	22
WHtR		
< 0.5	39	43
≥ 0.5	51	57

WC – waist circumference, BMI – body mass index, WHtR – waist-to-hip ratio

TABLE 3. Mean and standard deviation of body mass index and waist circumference according to the dietary habits of women during menopause transition

Variables	n (%)	BMI (kg/m ²), mean (SD)	p-value	WC (cm), mean (SD)	p-value
Lactose free diet					
Not following a diet	80 (87.9)	25.45 (0.50)	0.583	85.40 (1.20)	0.682
Followed a diet in the past	4 (4.5)	24.12 (2.22)		81.00 (5.28)	
Following a diet	6 (6.6)	25.96 (1.81)		86.83 (4.39)	
Gluten-free diet					
Not following a diet	81 (89.0)	26.42 (0.49)	0.737	85.67 (1.19)	0.621
Followed a diet in the past	3 (3.4)	24.54 (2.57)		82.67 (6.21)	
Following a diet	6 (6.6)	25.76 (1.82)		81.67 (4.39)	
Dairy-free diet					
Not following a diet	81 (89.1)	26.50 (0.49)	0.303	85.80 (1.19)	0.341
Followed a diet in the past	4 (4.4)	26.22 (2.20)		83.25 (5.34)	
Following a diet	5 (5.5)	23.34 (1.97)		78.80 (4.78)	
Vegetarian diet					
Not following a diet	79 (86.7)	26.69 (0.49)	0.085	86.08 (1.19)	0.142
Followed a diet in the past	7 (7.7)	23.33 (1.64)		78.00 (4.00)	
Following a diet	4 (4.4)	24.23 (2.17)		82.75 (5.29)	
Low-calorie diet					
Never and do not intend to	27 (29.7)	23.57 (0.76)	< 0.000*	81.22 (1.99)	0.034*
Never but intend to	11 (12.1)	27.08 (1.20)		88.00 (3.12)	
Once	16 (17.6)	25.59 (0.99)		83.13 (2.59)	
More than once	36 (39.6)	28.45 (0.66)		88.50 (1.72)	
Meals per day					
2	1 (1.1)	29.02 (4.48)	0.942	100.00 (10.69)	0.398
3	36 (39.6)	26.36 (0.75)		85.83 (1.78)	
4	37 (40.7)	26.21 (0.74)		83.78 (1.76)	
5+	16 (17.6)	26.26 (1.12)		86.69 (2.67)	
Eating between meals					
Never	4 (4.4)	28.48 (2.23)	0.598	97.25 (5.17)	0.059
1-3 times in a month	6 (6.6)	23.99 (1.82)		75.50 (4.22)	
Once per week	7 (7.7)	24.79 (1.68)		84.29 (3.91)	
Several times during a week	24 (26.4)	26.52 (0.91)		84.63 (2.11)	
Once per day	28 (30.8)	26.35 (0.84)		86.14 (1.95)	
Several times during a day	21 (23.1)	26.77 (0.97)		85.81 (2.26)	

WC – waist circumference, BMI – body mass index, SD – standard deviation

*Statistically significant difference.

sity of vasomotor symptoms, such as hot flashes, night sweats, fatigue, and insomnia.

In our study two-thirds of the women were overweight or obese. Furthermore, older age was significantly associated with higher WC. Previous research showed a relationship between menopausal transition and

decrease in lean body mass and increase in fat mass [10]. Changes in the body composition are associated with aging and hormonal changes that occur during the menopausal transition [15]. Dmitruk *et al.* noted that the highest percentage of obese women was seen after the menopause, and as many as 40% of this group were diagnosed

TABLE 4. Frequency of consumption of selected products by women during menopausal transition

Variables	Number of respondents (%)					
	Never	Once per month	Several times in a month	Several times in a week	Once per day	Several times per day
Wholegrain products	5 (5.6)	11(12.2)	10 (11.1)	31 (34.5)	29 (32.2)	4 (4.4)
Highly processed cereal products	9 (10.0)	11 (12.2)	20 (22.2)	28 (31.1)	19 (21.1)	3 (3.4)
Buckwheat	9 (10.0)	33 (36.7)	32 (35.5)	14 (15.6)	0 (0.0)	2 (2.2)
Oat flakes	23 (25.5)	16 (17.8)	25 (27.8)	17 (18.9)	8 (8.9)	1 (1.1)
Wheat bran	42 (46.7)	25 (27.8)	15 (16.7)	5 (5.5)	2 (2.2)	1 (1.1)
Cakes and pastries	11 (12.2)	25 (27.8)	36 (40.0)	15 (16.7)	3 (3.3)	0 (0.0)
Fast food	36 (40.0)	42 (46.7)	10 (11.1)	2 (2.2)	0 (0.0)	0 (0.0)
Sugar and sweets	4 (4.4)	19 (21.2)	26 (28.9)	20 (22.2)	17 (18.9)	4 (4.4)
Dairy products without flavouring additives	8 (8.9)	10 (11.1)	19 (21.1)	28 (31.1)	21 (23.3)	4 (4.5)
Dairy products with flavouring additives	28 (31.1)	14 (15.6)	22 (24.4)	15 (16.7)	8 (8.9)	3 (3.3)
Cottage cheese	6 (6.7)	11 (12.2)	31 (34.5)	29 (32.2)	10 (11.1)	3 (3.3)
Cheese	7 (7.8)	9 (10.0)	32 (35.5)	33 (36.7)	7 (7.8)	2 (2.2)
Meat	3 (3.3)	3 (3.3)	16 (17.8)	47 (52.2)	16 (17.8)	5 (5.6)
Lean fish	3 (3.3)	15 (16.7)	47 (52.2)	19 (21.1)	4 (4.5)	2 (2.2)
Fatty fish	11 (12.2)	24 (26.7)	39 (43.4)	12 (13.3)	3 (3.3)	1 (1.1)
Nuts and seeds	8 (8.9)	17 (18.9)	27 (30.0)	25 (27.8)	11 (12.2)	2 (2.2)
Flaxseed	41 (45.6)	14 (15.6)	7 (7.7)	17 (18.9)	10 (11.1)	1 (1.1)
Vegetables	0 (0.0)	1 (1.1)	10 (11.1)	32 (35.6)	32 (35.6)	15 (16.6)
Green vegetables	1 (1.1)	5 (5.6)	23 (25.6)	37 (41.1)	20 (22.2)	4 (4.4)
Legumes	13 (14.4)	25 (27.8)	31 (34.5)	12 (13.3)	8 (8.9)	1 (1.1)
Soy and soy products	57 (63.4)	19 (21.1)	9 (10.0)	2 (2.2)	2 (2.2)	1 (1.1)
Fruit	2 (2.2)	0 (0.0)	6 (6.7)	25 (27.8)	38 (42.2)	19 (21.1)
Apples	2 (2.2)	4 (4.4)	15 (16.7)	32 (35.6)	26 (28.9)	11 (12.2)

with abdominal obesity at the same time [16]. Another study showed that postmenopausal women had 36% more visceral fat compared to women who had not yet reached the menopause [17]. Prevention of obesity is particularly important in the context of changes in the lipid metabolism in the postmenopausal period. High values of BMI and other nutritional status indicators are significant risk factors for the development of coronary heart disease or the occurrence of heart attack. In a study by Grygiel-Górniak *et al.* a group of postmenopausal women with normal and excessive body weight were examined [18]. It was found that in obese patients the adipose tissue was present in the visceral form, while in women with normal body weight the adipose tissue accumulated mainly around the hips. What is more, women with excess body weight were characterized by higher parameters of total cholesterol, LDL-C, and triglycerides, and lower levels of HDL cholesterol, compared to patients with a normal body mass index.

Our data showed that women who used slimming diets with an increased frequency had significantly higher BMI and WC. This is consistent with what was found in previous studies. The results of the systematic review indicated that people who perceived their weight as overweight were more likely to use weight control strategies, but over time to gain more weight [19]. Unfortunately, those diets are often used without the supervision of a doctor or dietitian and at the same time are very restrictive and impossible to maintain for a long time. It is worth emphasizing that fad diets are not recommended in weight management [20]. It is also highly likely that women who used diets that included excessive energy deficit on a repetitive basis experienced a slowed metabolism, which resulted in an unexpected increase in body weight [21]. On the other hand, Stefanska *et al.* concluded that a slimming diet alone might be enough in the prevention of metabolism syndrome during menopausal transition [14]. These findings suggest that

TABLE 5. Intensity of menopausal symptoms depending on the frequency of consumption of selected products (n = 90)

Food item	Symptom	Intensity of syndrome	Number of respondents					p-value*				
			Never	Once per month	Several times in a month	Several times in a week	Once per day		Several times per day			
Wholegrain products	Hot flashes	None	2	6	1	15	10	1	0.001			
		Minimally intense	1	4	0	9	3	1				
		Moderately intense	2	0	6	4	7	0				
		Intense	0	1	3	3	6	0				
		Very intense	0	0	0	0	3	2				
Buckwheat	Night sweats	None	4	5	1	19	15	2	0.039			
		Minimally intense	1	3	1	6	5	1				
		Moderately intense	0	1	6	4	3	0				
		Intense	0	2	2	2	3	0				
		Very intense	0	0	0	0	3	1				
Wholegrain products	Hot flashes	None	1	13	16	5	0	1	0.033			
		Minimally intense	6	7	4	1	0	6				
		Moderately intense	1	4	8	5	1	1				
		Intense	0	8	2	2	1	0				
		Very intense	1	1	2	1	0	1				
		Buckwheat	Fatigue	None	3	11	8	5		0	3	0.041
				Minimally intense	1	8	15	2		0	1	
				Moderately intense	2	3	4	5		0	2	
				Intense	3	9	4	2		1	3	
				Very intense	0	2	1	0		1	0	
Wholegrain products	Insomnia	None	4	19	14	7	0	4	0.004			
		Minimally intense	4	6	10	2	0	4				
		Moderately intense	0	5	6	2	0	0				
		Intense	0	1	2	3	2	0				
		Very intense	1	2	0	0	0	1				

TABLE 5. Cont.

Food item	Symptom	Intensity of syndrome	Number of respondents					p-value*	
			Never	Once per month	Several times in a month	Several times in a week	Once per day		Several times per day
Fatty fish	Fatigue	None	3	6	14	2	2	0	0.004
		Minimally intense	2	5	13	6	0	0	
		Moderately intense	2	4	6	2	0	0	
		Intense	4	8	5	2	0	0	
		Very intense	0	1	1	0	1	1	
Green vegetables	Insomnia	None	5	15	22	1	1	0	0.021
		Minimally intense	3	4	7	7	1	0	
		Moderately intense	2	3	5	3	0	0	
		Intense	1	2	3	1	0	1	
		Very intense	0	0	2	0	1	0	
Legumes	Night sweats	None	0	1	12	22	10	1	0.027
		Minimally intense	0	0	7	4	4	2	
		Moderately intense	0	4	1	5	3	1	
		Intense	1	0	2	4	2	0	
		Very intense	0	0	1	2	1	0	
Soy and soy products	Fatigue	None	6	6	8	3	4	0	0.015
		Minimally intense	2	6	13	3	2	0	
		Moderately intense	0	4	6	3	1	0	
		Intense	4	8	4	2	1	0	
		Very intense	1	1	0	1	0	1	
Soy and soy products	Fatigue	None	14	7	4	2	0	0	0.011
		Minimally intense	17	7	1	0	1	0	
		Moderately intense	9	1	3	0	1	0	
		Intense	14	4	1	0	0	0	
		Very intense	3	0	0	0	0	1	

* χ^2 Pearson test, statistically significant difference ≤ 0.05

there is a need for a dietary care aimed at women both at reproductive age and postmenopausal, to help them maintain weight control.

A healthy diet and lifestyle are essential to reduce the risk of developing diseases and improve the quality of life. Unfortunately, nutritional knowledge of menopausal women seems to be insufficient [22]. It needs to be highlighted that the assessment of the diet of a representative group of adult Polish women conducted in 2013-2014 indicated numerous deficiencies of essential nutrients and poor diet quality [11]. Because these inappropriate dietary habits are likely to persist in the menopausal years, early nutritional education is needed. Kozakowski *et al.* suggested that there is a need for lower calorie intake due to decreased lean body mass. A balanced and low-calorie diet is recommended by the authors [23]. Also, other authors of narrative reviews on nutrition in menopausal women concluded that a low-calorie diet should be recommended for postmenopausal women in order to prevent metabolic complications. Moreover, postmenopausal women can benefit from a Mediterranean diet together with other healthy habits that can prevent bone, metabolic, and cardiovascular disease [10]. Undoubtedly, supporting women in adhering to the principles of balanced nutrition can have a positive effect on their health.

In the present study, higher consumption of selected products was linked to a lower intensity of some vasomotor symptoms of menopause. The results of a systematic review indicated an association between dietary intake and severity of menopausal symptoms. Greater amounts of consumed vegetables and whole grains are related to a lower intensity of menopausal symptoms. A more frequent intake of products such as refined grains, highly saturated fat foods, desserts, and sugar-sweetened beverages can cause more intense menopausal symptoms [24]. In a recent, study Noll *et al.* noted that higher vegetable consumption was associated with less intense vasomotor symptoms [25]. Meanwhile, in women who consumed more ultra-processed foods, these symptoms were stronger. In a study by Vetrani *et al.*, eating legumes ≥ 3 times/week was inversely correlated to the Menopausal Rating Scale score, a questionnaire for assessing symptoms of menopause. Legume intake was associated with lower menopausal severity symptoms [26]. In the present study, consumption of legumes was uncommon, but among women whose intake was higher, the occurrence of fatigue was lower. In another study, following a low-fat, plant-based diet and consuming whole soybeans was associated with reduced frequency and severity of hot flashes [27]. Interestingly, results from the Nurses' Health Study II indicated that women who consumed high amounts of protein from vegetables had a lower risk of early onset of natural menopause [28]. Results from the UK Women's Cohort Study also showed that frequent consumption of fatty fish and legumes was associated with later onset of natural

menopause. Separately, a high intake of refined pasta and rice was associated with an earlier onset of menopause [29]. The literature review shows that overall healthy dietary patterns during menopausal transition may mitigate symptoms such as hot flashes or urinary incontinence [30]. For this reason, women can benefit from making changes to their diet if they receive the right support from specialists, including a dietitian.

The first major limitation of this study is the small size of the study group, which does not allow us to draw general conclusions. Secondly, self-reported weight, height, and waist circumference could be underestimated or overestimated. Furthermore, the inclusion criteria were narrowed only to age. Notwithstanding the relatively limited sample, this work offers insights into the nutritional status and diet of women during the menopause transition.

CONCLUSIONS

Our data suggest that the excessive body weight among women during the menopausal transition is a common problem. To reduce the risk of obesity-related complications, women should be encouraged to maintain a healthy lifestyle during their lifespan. In our study, it was found that women who often consumed whole grains, buckwheat, fatty fish, legumes, soy products, and green vegetables more often reported a significantly lower intensity of vasomotor symptoms, such as hot flashes, night sweats, fatigue, and insomnia. The latter can suggest that a diet rich in such products may significantly affect the frequency of symptoms related to menopause, but more research is needed. All perimenopausal women should be educated on the impact of lifestyle, especially proper nutrition, on the reduction of the risk of menopause complications.

DISCLOSURE

The authors report no conflict of interest.

References

1. Pertyński T, Stachowiak G. Menopause – facts and controversies. *Pol J Endocrinol Polska* 2006; 57(5): 525-534.
2. Banaszkiwicz M, Wawrzonkowska I, Andruszkiewicz A. Zachowania zdrowotne i ich wybrane predyktory a jakość życia kobiet w okresie okołomenopauzalnym na przykładzie pacjentek Wielospcjalistycznego Szpitala Miejskiego im. Dr E. Warmińskiego w Bydgoszczy [Health behaviors and their selected predictors and the quality of life of women in the perimenopausal period on the example of patients of the patients of the Multidisciplinary Municipal Hospital Warminski in Bydgoszcz]. *Przedsiębiorczość i Zarządzanie* 2014; XV(12): 263-279.
3. Putyński L, Janicka K. The role of hormone therapy in the lives of menopausal women. *Menopause Rev* 2011; 6(10): 457-463.
4. Makara-Studzińska MT, Kryś-Noszczyk KM, Jakiel G. Epidemiology of the symptoms of menopause – an intercontinental review. *Menopause Rev* 2014; 13(3): 203-211.

5. Yashany N, Mahmoodabad SSM, Bahri N, et al. Association between lifestyle and severity of menopausal symptoms in postmenopausal women. *Electron J Gen Med* 2020; 17(5): em222.
6. Skowrońska-Jóźwiak E, Gałecki P, Głowacka E, et al. Bone metabolism in patients treated for depression. *Int J Environ Res Public Health* 2020; 17(13): 4756.
7. Zimny M, Starczewska M, Szkup M, et al. Body composition and biological functioning in Polish perimenopausal women with type 2 diabetes. *Int J Environ Res Public Health* 2021; 18(21): 11422.
8. Dąbrowska J, Naworska B, Dąbrowska-Galas M, et al. Analysis of overweight and obesity in menopausal women using bioelectrical impedance analysis system. *Menopause Rev* 2013; 12(3): 260-265.
9. Al-Safi ZA, Polotsky AJ. Obesity and menopause. *Best Pract Res Clin Obstet Gynaecol* 2015; 29(4): 548-533.
10. Silva TR, Oppermann K, Reis FM, Spritzer PM. Nutrition in menopausal women: a narrative review. *Nutrients* 2021; 13(7): 2149.
11. Waśkiewicz A, Szcześniewska D, Szostak-Węgierek D, et al. Are dietary habits of the Polish population consistent with the recommendations for prevention of cardiocascular disease? – WOBASZ II project. *Kardiol Pol* 2016; 74(9): 969-977.
12. Jezewska-Zychowicz M, Gawecki J, Wadolowska L, et al. KOMPAN® Dietary Habits and Nutrition Beliefs Questionnaire and the manual for developing of nutritional data. Technical Report. Gawecki J (ed.). The Committee of Human Nutrition, Polish Academy of Sciences, Olsztyn 2020, 4-21.
13. World Health Organization. Waist circumference and waist-hip ratio: report of a WHO expert consultation. Geneva, 8-11 December 2008. Available from: <https://www.who.int/publications-detail-redirect/9789241501491> (accessed: 14 February 2023).
14. Ashwell M, Gibson S. Waist-to-height ratio as an indicator of 'early health risk': simpler and more predictive than using a 'matrix' based on BMI and waist circumference. *BMJ Open* 2016; 6(3): e010159.
15. Stefanska A, Bergmann K, Sypniewska G. Metabolic syndrome and menopause: pathophysiology, clinical and diagnostic significance. *Adv Clin Chem* 2015; 72: 1-75.
16. Dmitruk A, Czeczulewski J, Czeczulewska E, et al. Body composition and fatty tissue distribution in women with various menstrual status. *Rocz Panstw Zakl Hig* 2018; 69(1): 95-101.
17. Godziejewska-Zawada M. Obesity and diabetes in menopause: prevention and therapeutic approach. *Menopause Rev* 2013; 1(12): 5-9.
18. Grygiel-Górniak B, Marcinkowska J, Szczepanik A, Przysławski J. Nutritional habits and oxidative stress in postmenopausal age. *Pol Arch Med Wewn* 2014; 124(6): 298-305.
19. Haynes A, Kersbergen A, Sutin M, et al. A systematic review of the relationship between weight status perceptions and weight loss attempts, strategies, behaviours and outcomes. *Obes Rev* 2018; 19(3): 347-363.
20. Olszanecka-Glinianowicz M, Mazur A, Chudek J, et al. Obesity in adults: position Statement of Polish Association for the Study on Obesity, Polish Association of Endocrinology, Polish Association of Cardiometabolism, Polish Psychiatric Association, Section of Metabolic and Bariatric Surgery of the Association of Polish Surgeons, and the College of Family Physicians in Poland. *Nutrients* 2023; 15(7): 1641.
21. Greenway FL. Physiological adaptations to weight loss and factors favouring weight regain. *Int J Obes (Lond)* 2015; 39(8): 1188-1196.
22. Tursunović S, Jašić M, Beganlić A, Hot N. Nutritional status and dietary habits of menopausal women. *Food in Health and Disease, Scientific-professional Journal of Nutrition and Dietetics* 2014; 3(2): 116-125.
23. Kozakowski J, Gietka-Czernel M, Leszczyńska D, Majos A. Obesity in menopause – our negligence or an unfortunate inevitability? *Menopause Rev* 2017; 16(2): 61-65.
24. Noll PRES, Campos CAS, Leone C, et al. Dietary intake and menopausal symptoms in postmenopausal women: a systematic review. *Climacteric* 2021; 24(2): 128-138.
25. Noll PRES, Noll M, Zangirolami-Raimundo J, et al. Life habits of postmenopausal women: association of menopause symptom intensity and food consumption by degree of food processing. *Maturitas* 2022; 156: 1-11.
26. Vetrani C, Barrea L, Rispoli R, et al. Mediterranean diet: what are the consequences for menopause? *Front Endocrinol (Lausanne)* 2022; 13: 886824.
27. Barnard ND, Kahleova H, Holtz DN, et al. The women's study for the alleviation of vasomotor symptoms (WAVS): a randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. *Menopause* 2021; 28(10): 1150-1156.
28. Boutot ME, Purdue-Smithe A, Whitcomb BW, et al. Dietary protein intake and early menopause in the nurses' health study II. *Am J Epidemiol* 2018; 187(2): 270-277.
29. Dunneram Y, Greenwood DC, Burley VJ, Case JE. Dietary intake and age at natural menopause: results from the UK women's cohort study. *J Epidemiol Community Health* 2018; 72(8): 733-740.
30. Yelland S, Steenson S, Creedon A, Stanner S. The role of diet in managing menopausal symptoms: a narrative review. *Nutr Bull* 2023; 48(1): 43-65.

AUTHORS' CONTRIBUTIONS

JP, DG prepared research concept and design. JP, PG, DG, WG collected data and wrote the article. CW, DG critically revised the article. All authors approved the final version of publication.