Individual differences as predictors of dietary patterns among menopausal women with arterial hypertension

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Abstract

Introduction: The aim of this study was to analyze selected individual determinants of dietary choices, important for etiology and prevention of degenerative cardiovascular disorders, in a group of menopausal women diagnosed with arterial hypertension.

Material and methods: The study included a group of 160 women from the Małopolska region, aged between 45 and 60 years and diagnosed with arterial hypertension. A questionnaire assessing the frequency of food product consumption was used, along with standardized psychological tests (GSES, LOT-R, and SWLS). Spearman's coefficients of rank correlation and the Kruskal-Wallis and Dunn tests were used for statistical analysis.

Results: We revealed that higher levels of self-efficacy were associated with more frequent consumption of whole grains, oatmeal, raw vegetables, fruit, semi-skimmed milk, natural yoghurt, marine fish, legume seeds, soy products, nuts, plant oils, and fruit and vegetable juices, as well as with less frequent consumption of whole milk, high-fat cottage cheese, and sweetened carbonated beverages and alcoholic beverages. The levels of optimism and satisfaction with life correlated positively with the consumption frequency of brown rice, whole grains, oatmeal, fruit, marine fish, legumes, soy products, nuts, butter, and fruit juices, and were inversely correlated with the consumption of white bread, high-fat cottage cheese, pork meat and sausages, and sweets and pastries.

Conclusions: Postmenopausal women with arterial hypertension who were characterized by lower levels of self-efficacy, optimism, and satisfaction with life made less rational dietary choices which could negatively affect the efficacy of the secondary prevention of cardiovascular degenerative disorders.

Key words: women, menopause, arterial hypertension, dietary patterns, psychological traits.

Introduction

The results of epidemiological studies show that post-menopausal women constitute a high-risk group for degenerative disorders, including cardiovascular conditions [1-5]. The etiology of these disorders is complex, with the key role played by modifiable factors, such as improper nutrition. The dietary prevention of chronic circulatory conditions is based on limiting the supply of atherogenic fatty acids, cholesterol, and *trans* fatty acids, with a simultaneous increase in consumption of unsaturated omega-3 fatty acids, antioxidative vitamins, soluble dietary fiber, and some minerals, especially calcium, potassium, and magnesium [6]. Balanced diet, rich in products with high nutritional and low energetic density, is also vital for the prevention of metabolic syndrome, a condition developing secondarily to visceral obesity [3, 6, 7].

Active involvement in self-improvement of one's health and prevention of chronic diseases, which is consistent with health-oriented lifestyle and rational nutritional behaviors, is determined by an array of socio-economic, cultural, and personality-based factors [8]. This inspired us to conduct a study on some individual determinants of dietary choices in menopausal women diagnosed with arterial hypertension. We analyzed the level of general self-efficacy, optimism, and satisfaction with life, and their relation to individual differences in health-seeking behaviors [9].

Aim of the study

The aim of this study was to analyze selected individual determinants of nutrition, namely the consumption frequency of products important for etiology and prevention of degenerative cardiovascular disorders, in a group of menopausal women diagnosed with arterial hypertension and treated with hypotensive agents. The study was undertaken in view of the important role

dietary choices play in secondary prevention of cardio-vascular disorders in individuals suffering from arterial hypertension.

Material and methods

The study was conducted between 2010 and 2013 in a group of 160 women, aged between 45 and 60 years, who were diagnosed with arterial hypertension and treated with hypotensive agents. The group comprised professionally active employees of various offices and schools in the Małopolska region. All study subjects were white collar workers and had either secondary (60%), or higher education (40%); most of them were married (80%). Due to the principal objective of the study, a group homogeneous in terms of sociodemographic characteristics was selected.

The frequency of consumption of food products was analyzed using a 7-item scale with the following categories: several times a day (corresponding to 7 points), once a day (6 points), several times a week (5 points), once a week (4 points), several times per month (3 points), once a month (2 points), and rarer/never (1 point). The average frequencies of food product consumption were interpreted as follows: several times a day (7.00-6.50 points), once a day (6.49-5.50 points), 4-6 times a week (5.49-4.50 points), 2-3 times a week (4.49-3.50 points), several times per month (3.49-2.50 points), once a month (2.49-1.50 points), and rarer/never (1.49-1.00 points).

Body mass index (BMI) was calculated on the basis of somatic parameters, i.e. body weight and height. The average BMI of the studied group was 27.30 ± 3.34 kg/m^2 (range: 21.50-35.90 kg/m^2).

The levels of individual traits were determined with the following standardized tests: i) General Self-Efficacy Scale (GSES) by R. Schwarzer, M. Jerusalem, and Z. Juczyński, ii) Life Orientation Test (LOT-R) by M. F. Scheier, Ch.S. Carver, and M. W. Bridges, adapted by R. Poprawa and Z. Juczyński, and iii) Satisfaction with Life Scale (SWLS) by Ed Diener, R.A. Emmons, R.J. Larson, and S. Griffin, adapted by Z. Juczyński. GSES was used to determine the level of general self-efficacy, while optimistic disposition and overall satisfaction with life were measured with LOT-R and SWLS, respectively. Studied women were classified into groups with low, moderate, and high levels of self-efficacy, optimism, and satisfaction with life on the basis of relevant provisional Polish *sten* (standard ten) norms for adults [9]. The average GSES score of the study group was 28.75 ± 5.01, and the average values of LOT-R and SWLS scales were 15.25 ± 3.61 and 20.40 ± 5.47, respectively; these results corresponded to a moderate level of normalized values (sten scores of 5-6).

Statistical analysis was conducted with PQStat ver. 1.4.2.324 software. The relation between BMI, the GSES, LOT-R, and SWLS scale values (levels of self-efficacy, optimism, and satisfaction with life), and the frequency of food product consumption was estimated based on Spearman's coefficients of rank correlation. The mean frequencies for consumption of the analyzed products, associated with various levels of studied individual traits, were compared with the Kruskal-Wallis test and with the Dunn test for multiple comparisons. Test probability was considered significant at $p < 0.05$ and highly significant at $p < 0.01$.

Results

Studied women considered fruit, usually consumed on a daily basis (5.90), to be the preferred carbohydrate product, followed by white bread (5.25), vegetables (4.90), and sweets and pastries (4.75), which were eaten 4-6 times a week on average. The list of the least frequently consumed carbohydrate products included whole grains (2.80) and oat meal (2.70), both chosen several times per month, and brown rice (2.20), consumed once a month on average. Pork and pork sausages (5.00), consumed with a frequency of 4-6 times a week, proved to be the most popular protein-rich products with high nutritional density, followed by low-fat cottage cheese (3.80), natural yoghurt (3.85), poultry meat and sausages (3.70), consumed with an average frequency of 2-3 times a week. Soy products (2.05) were chosen with the lowest frequency, once a month on average. Fats, both butter (4.95) and plant oils (4.75), were chosen with an average frequency of 4-6 times a week, while nuts (2.45) and fast food products (1.55) were consumed once a month, on average. Fruit juices (5.15) were the most popular beverages, chosen 4-6 times a week on average. Alcoholic beverages (2.25) were consumed the least often, approximately once a month (Table I).

Statistical analysis revealed that higher levels of self-efficacy were associated with more frequent consumption of whole grains ($p < 0.01$), oatmeal ($p < 0.01$), raw vegetables ($p < 0.01$), inter alia green vegetables ($p < 0.01$), fruit ($p < 0.05$), inter alia citrus fruit ($p < 0.01$), semi-skimmed milk ($p < 0.01$), natural yoghurt ($p < 0.01$), marine fish ($p < 0.01$), legume seeds ($p < 0.01$), soy products ($p < 0.01$), nuts ($p < 0.01$), plant oils ($p < 0.01$), and fruit ($p < 0.01$) and vegetable juices ($p < 0.05$), as well as with less frequent consumption of whole milk ($p < 0.01$), high-fat cottage cheese ($p < 0.01$), and sweetened carbonated beverages and alcoholic beverages ($p < 0.01$). The levels of optimism and satisfaction with life correlated positively with the consumption frequency of brown rice ($p < 0.01$), whole grains ($p < 0.01$), oatmeal ($p < 0.01$), fruit ($p < 0.01$), inter alia citrus fruit ($p < 0.01$), marine fish ($p < 0.01$), legumes ($p < 0.01$), soy products ($p < 0.01$), nuts ($p < 0.01$), butter ($p < 0.01$), and fruit juices ($p < 0.01$). These two variables were inversely correlated with the consumption of white bread

Tab. I. Average consumption frequency of analyzed products and Spearman's coefficients of rank correlation between psychological traits, BMI, and the consumption frequencies in the group of hypertensive women

Products	X ± SD	GSES	LOT-R	SWLS	BMI
White bread	5.25 ± 1.82	–0.1440	–0.2488**	–0.2378**	0.2458**
Wholegrain bread	4.05 ± 2.04	0.0661	–0.0120	–0.0028	–0.2870**
White rice	3.65 ± 0.79	0.1116	0.0975	0.1594	-0.1616
Brown rice	2.20 ± 1.44	0.0327	0.3525**	0.2820**	–0.4197**
Whole grains	2.80 ± 1.29	0.2433**	0.6290**	0.6607**	–0.3032**
Oatmeal	2.70 ± 1.79	0.3702**	0.5322**	0.5420**	–0.1885*
Raw vegetables	4.90 ± 1.59	0.3643**	0.2900**	0.2828**	–0.3968**
Green vegetables	4.75 ± 1.22	0.2627**	0.1017	0.0939	–0.3694**
Raw fruit	5.90 ± 1.38	0.1852*	0.2796**	0.2242**	–0.6092**
Citrus fruit	4.90 ± 1.55	0.3488**	0.2899**	0.2880**	–0.2428**
Whole milk	2.90 ± 1.58	–0.3402**	–0.0604	–0.0456	0.3081**
Semi-skimmed milk	3.70 ± 1.96	0.4520**	–0.0477	–0.0988	–0.1985*
High-fat cottage cheese	3.05 ± 1.66	–0.3164**	–0.2552**	–0.2757**	0.0148
Low-fat cottage cheese	3.80 ± 1.44	–0.1277	–0.1005	–0.1095	–0.0847
Natural yoghurt	3.85 ± 1.53	0.3013**	0.1493	0.1299	–0.2394**
Pork meat and sausages	5.00 ± 1.18	–0.0801	–0.4595**	–0.4229**	0.2932**
Poultry meat and sausages	3.70 ± 1.59	–0.0692	–0.0310	–0.0289	0.2057**
Marine fish	3.25 ± 1.14	0.2686**	0.3174**	0.2953**	–0.2450**
Legume seeds	3.20 ± 1.51	0.4119**	0.4466**	0.4567**	–0.3912**
Soybeans and soy products	2.05 ± 1.51	0.4760**	0.3288**	0.3760**	–0.2936**
Nuts	2.45 ± 1.16	0.4859**	0.5412**	0.5109**	–0.3420**
Butter	4.95 ± 1.91	–0.1348	0.4056**	0.3940**	–0.0986
Plant oils	4.75 ± 1.09	0.5287**	0.0496	0.0037	0.2662**
Sweets and pastries	4.75 ± 2.00	–0.0696	–0.2598**	–0.2120**	0.0514
Fast food products	1.55 ± 0.81	0.1565	–0.0986	–0.0670	0.4019**
Fruit juices	5.15 ± 1.43	0.3333**	0.2764**	0.2081**	–0.1911*
Vegetable juices	3.00 ± 1.57	0.1827*	0.1066	0.0877	–0.4833**
Sweetened carbonated beverages	2.85 ± 1.74	–0.3115**	–0.1480	–0.1026	0.2247**
Alcoholic beverages	2.25 ± 1.04	–0.2925**	0.0672	0.0762	–0.0539

*$p < 0.05$, **$p < 0.01$, X – average frequency of consumption, SD – standard deviation
Ranges of the average frequencies of food product consumption: several times a day (7.00-6.50 points), once a day (6.49-5.50 points), 4-6 times a week (5.49-4.50 points), 2-3 times a week (4.49-3.50 points), several times per month (3.49-2.50 points), once a month (2.49-1.50 points), and rarer/never (1.49-1.00 points)

($p < 0.01$), high-fat cottage cheese ($p < 0.01$), pork meat and sausages ($p < 0.01$), and sweets and pastries ($p < 0.01$). BMI correlated positively with the consumption frequency of white bread ($p < 0.01$), whole milk ($p < 0.01$), pork meat and sausages ($p < 0.01$), poultry meat and sausages ($p < 0.01$), plant oils ($p < 0.01$), fast food products ($p < 0.01$), and sweetened beverages ($p < 0.01$), and showed an inverse correlation with the consumption of wholegrain bread ($p < 0.01$), brown rice ($p < 0.01$), whole grains ($p < 0.01$), oatmeal ($p < 0.01$), fruit and vegetables ($p < 0.01$), natural yoghurts ($p < 0.01$), marine fish ($p < 0.01$), legumes and soy products ($p < 0.01$), nuts ($p < 0.01$), and fruit ($p < 0.05$) and vegetable juices ($p < 0.01$) (Table I).

Comparing how the average consumption frequencies corresponded with various levels of analyzed individual traits (Kruskal-Wallis and Dunn tests) revealed that women with high levels of self-efficacy chose non-wholegrain noodles ($p < 0.01$), whole grains ($p < 0.01$), oatmeal ($p < 0.01$), raw vegetables ($p < 0.01$), green vegetables ($p < 0.01$), fruit ($p < 0.01$), inter alia citrus fruit ($p < 0.01$), semi-skimmed milk ($p < 0.01$), natural yoghurt ($p < 0.05$), marine fish ($p < 0.01$), legume seeds ($p < 0.01$), soy products ($p < 0.01$), nuts ($p < 0.01$), plant oils ($p < 0.01$), fast food products ($p < 0.01$), and fruit ($p < 0.01$) and vegetable juices ($p < 0.05$) more frequently than women with low levels of self-efficiency. Furthermore, the former group was less inclined to choose sweetened carbonated beverages ($p < 0.01$) and alcoholic beverages ($p < 0.01$). Women characterized by high levels of optimism and satisfaction with life consumed white rice ($p < 0.01$), brown rice ($p < 0.01$), wholegrain noodles ($p < 0.01$), whole grains ($p < 0.01$), oatmeal ($p < 0.01$), raw vegetables ($p < 0.01$), inter alia green vegetables ($p < 0.05$), fruit ($p < 0.01$), inter alia citrus fruit ($p < 0.01$), marine fish ($p < 0.01$), legume seeds ($p < 0.01$), soy products ($p < 0.01$), nuts ($p < 0.01$), and butter ($p < 0.01$) more frequently than women with lower levels of these traits. The former group was less likely to consume white bread ($p < 0.01$), high-fat cottage cheese ($p < 0.01$), low-fat cottage cheese ($p < 0.01$), and pork meat and sausages ($p < 0.01$). Additionally, the values of the SWLS scale influenced the consumption frequency of fruit juices, which were more frequently consumed by women with high levels of life satisfaction ($p < 0.01$), and sweets, consumed by women displaying low levels of this trait ($p < 0.01$) (Tables II and III).

Discussion

Our study revealed nutritional mistakes in regards to the quality of the diet, pertaining to too low consumption frequency of recommended food products. Moreover, we identified several relations between the analyzed individual characteristics and BMI and dietary choices of menopausal women diagnosed with arterial hypertension. Nutritional mistakes mentioned above could adversely affect the efficacy of the secondary prevention of chronic cardiovascular disorders in women from a high-risk group.

Dietary therapy, based on a Mediterranean-type diet with high contents of wholegrain cereal products, fruit and vegetables, fish, olive oil, and nuts, and low consumption of animal fat and red meat, is one of the components included in the complex management of patients with arterial hypertension [6]. The pivotal role of the Mediterranean-type diet in the prevention of coronary artery disease was previously confirmed by an Italian study [10]. Our study of dietary choices of women with arterial hypertension documented low consumption frequency of products recommended in the prevention and treatment of circulatory disorders, such as cereal products made from wholegrain flour, vegetables, low-fat dairy products, marine fish, legume seeds, soybeans, and nuts, along with frequent consumption of cereal products made of non-wholegrain flour, pork meat and sausages, sweets and pastries. Infrequent consumption of wholegrain cereal products and vegetables was reflected by low supply of dietary fiber, i.e. the nutrient known to decrease the energy value of the diet, and vitamin B complex, antioxidants, potassium, and magnesium, all involved in normalization of blood pressure. Low frequency of oatmeal consumption was consistent with reduced dietary supply of beta-glucans, a fraction of dietary fiber with established hypolipemic properties [6]. The cardioprotective role of wholegrain cereal products, associated with the normalization of blood lipid profile, was previously documented among Danish postmenopausal women [11]. Deficiency of dietary fiber, especially its non-soluble fractions, increases the risk of constipation [6]. Severe constipation was determined to be an independent risk factor for cardiovascular disease in the case of menopausal women [12]. Everyday consumption of fruit, including citrus fruit, is consistent with the supply of antioxidative carotenoids and vitamin C, as well as polyphenols, bioactive compounds with documented antioxidative and hypotensive properties [6]. Consumption of red meat, which proved higher than consumption of white meat and fish in our group, could be reflected by the unfavorable ratio of saturated fatty acids (displaying hyperlipidemic and hypertensive properties) to polyunsaturated omega-3 fatty acids (characterized by hypolipemic and hypotensive properties) [6]. Additionally, very low consumption frequency of legume seeds and soybeans, phytoestrogen-rich products shown to normalize lipid profile of blood in menopausal women [13-15], should also be considered a negative finding. Functional foods, rich in phytoestrogens, play a vital role in the prevention and treatment of circulatory disorders, as they improve the lipid profile, increase vascular elasticity, and prevent thrombosis [14, 16]. Relatively frequent consumption of animal fats, sweets, pastries, and fast food products could promote lipid profile disorders, similarly to less frequent ingestion of plant oils and nuts. Frequent consumption of sweets and fast food products was associated with greater supply of atherogenic monosaccharides and trans fatty acids. Normalization of body weight and composition plays a vital role in the prevention of cardiovascular disorders, as it decreases the risk of metabolic syndrome [3, 7]. Previous studies confirmed that menopausal women are biologically predisposed to weight gain and, subsequently, to increased risk of metabolic syndrome resulting from, inter alia, hormo-

Tab. II. Frequency of carbohydrate product and beverage consumption stratified according to the levels of self-efficacy (GSES), optimism (LOT-R), and satisfaction with life (SWLS) in the group of women with arterial hypertension

Products	Level	GSES			LOT-R			SWLS		
		X	SD	p	X	SD	p	X	SD	p
White bread	L	4.83	2.22		5.40	2.27		5.48	2.24	
	M	6.20	0.76	0.0013	5.89	1.00	< 0.0001	5.78	1.09	< 0.001
	H	5.00	1.78		4.17	1.88		4.22	1.91	
Wholegrain bread	L	4.00	2.33		4.60	2.09		4.43	2.18	
	M	4.20	1.18	0.9272	3.78	1.89	0.0459	3.89	1.84	0.1729
	H	4.00	2.23		4.00	2.18		3.96	2.22	
White rice	L	3.33	0.48		3.40	0.50		3.43	0.50	
	M	4.20	0.76	< 0.0001	3.56	0.84	0.0018	3.56	0.84	0.0037
	H	3.56	0.84		4.00	0.83		4.00	0.84	
Brown rice	L	2.00	0.83		1.80	0.76		1.76	0.76	
	M	2.40	1.98	0.8659	1.56	0.84	< 0.0001	1.58	0.83	< 0.0001
	H	2.22	1.41		3.50	1.73		3.57	1.73	
Whole grains	L	1.67	0.75		1.40	0.50		1.48	0.59	
	M	3.80	0.76	< 0.0001	2.89	0.88	< 0.0001	2.89	0.88	< 0.0001
	H	3.00	1.26		3.83	1.23		3.87	1.24	
Oatmeal	L	1.33	0.75		1.60	0.81		1.57	0.80	
	M	3.80	0.99	< 0.0001	2.22	1.32	< 0.0001	2.22	1.32	< 0.0001
	H	3.00	2.07		4.33	1.91		4.48	1.81	
Raw vegetables	L	3.67	1.62		4.60	1.03		4.62	1.01	
	M	5.40	1.03	< 0.0001	4.67	1.42	0.0005	4.61	1.45	0.0001
	H	5.44	1.17		5.50	1.82		5.61	1.78	
Green vegetables	L	4.17	0.69		4.40	1.03		4.43	1.02	
	M	5.00	1.43	0.0002	4.67	1.06	0.0347	4.64	1.07	0.0246
	H	5.00	1.26		5.17	1.48		5.22	1.49	
Raw fruit	L	5.67	0.95		6.00	0.64		6.05	0.66	
	M	5.60	1.88	0.0003	5.67	1.57	0.0023	5.64	1.56	0.0014
	H	6.22	1.24		6.17	1.48		6.17	1.51	
Citrus fruit	L	3.50	1.62		4.40	1.22		4.48	1.23	
	M	5.40	1.37	< 0.0001	4.89	1.67	0.0024	4.81	1.69	0.0026
	H	5.56	0.84		5.33	1.51		5.43	1.46	
Pastries and sweets	L	4.17	2.36		4.60	1.98		4.71	1.77	
	M	5.60	1.52	0.0025	5.56	1.78	< 0.0001	5.31	2.00	< 0.0001
	H	4.67	1.84		3.67	1.81		3.57	1.78	
Fruit juices	L	4.50	1.52		4.60	1.65		4.57	1.61	
	M	5.00	1.43	0.0002	5.22	1.32	0.0566	5.22	1.32	0.0203
	H	5.67	1.16		5.50	1.27		5.57	1.26	
Vegetable juices	L	2.50	1.40		3.00	1.43		3.05	1.41	
	M	3.40	2.09	0.0257	2.44	1.17	0.0002	2.42	1.15	0.0001
	H	3.11	1.30		3.83	1.88		3.87	1.92	
Sweetened carbonated beverages	L	3.17	1.79		2.30	1.74		3.14	1.72	
	M	3.60	1.77	0.0001	2.67	1.71	0.2093	2.72	1.72	0.3084
	H	2.22	1.48		2.83	1.79		2.78	1.81	
Alcoholic beverages	L	2.67	1.26		2.00	1.28		1.95	1.27	
	M	2.20	0.99	0.0026	2.22	0.92	0.0901	2.31	0.94	0.0860
	H	2.00	0.82		2.50	0.97		2.43	0.93	

H – high, M – moderate, L – low level of self-efficacy (GSES)/optimism (LOT-R)/satisfaction with life (SWLS); X – arithmetic mean, SD – standard deviation, p – significance of differences determined with the Kruskal-Wallis test

Tab. III. Frequency of protein product and fat consumption stratified according to the levels of self-efficacy (GSES), optimism (LOT-R), and satisfaction with life (SWLS) in the group of women with arterial hypertension

Products	Level	GSES			LOT-R			SWLS		
		X	SD	p	X	SD	p	X	SD	p
Whole milk	L	2.67	1.39		2.20	1.62		2.38	1.78	
	M	4.20	0.99	< 0.0001	3.67	1.57	< 0.0001	3.58	1.53	< 0.0001
	H	2.33	1.57		2.33	0.95		2.30	0.96	
Semi-skimmed milk	L	2.50	2.16		3.80	2.34		3.90	2.34	
	M	3.40	1.65	< 0.0001	3.56	1.78	0.5886	3.42	1.78	0.1953
	H	4.67	1.42		3.83	1.88		3.96	1.83	
High-fat cottage cheese	L	3.17	2.06		3.60	1.98		3.57	1.94	
	M	4.00	1.28	< 0.0001	3.22	1.70	0.0025	3.22	1.70	0.0020
	H	2.44	1.27		2.33	0.95		2.30	0.96	
Natural yoghurt	L	3.50	1.13		3.80	1.18		3.76	1.16	
	M	3.60	1.77	0.0101	3.56	1.35	0.0127	3.56	1.35	0.0062
	H	4.22	1.56		4.33	1.91		4.39	1.93	
Pork meat and sausages	L	5.55	0.51		5.60	0.50		5.62	0.49	
	M	4.00	1.81	< 0.0001	5.00	0.82	0.0001	5.00	0.82	< 0.0001
	H	5.22	0.63		4.60	1.73		4.43	1.73	
Poultry meat and sausages	L	3.50	1.82		3.60	1.98		3.71	2.00	
	M	3.60	1.77	0.3983	4.00	1.42	0.1217	3.92	1.39	0.2710
	H	3.89	1.30		3.33	1.39		3.35	1.42	
Marine fish	L	3.00	1.01		3.00	1.11		3.05	1.10	
	M	2.80	1.49	0.0003	2.89	1.11	< 0.0001	2.86	1.09	< 0.0001
	H	3.67	0.82		4.00	0.83		4.04	0.82	
Legume seeds	L	2.00	0.83		2.00	1.11		2.14	1.26	
	M	3.80	1.96	< 0.0001	3.11	1.11	0.0001	3.06	1.06	< 0.0001
	H	3.67	1.06		4.33	1.51		4.39	1.51	
Soybeans and soy products	L	1.00	0.00		1.20	0.41		1.24	0.43	
	M	3.40	2.27	< 0.0001	2.00	1.57	< 0.0001	1.97	1.58	< 0.0001
	H	2.00	0.82		2.83	1.69		2.91	1.68	
Nuts	L	1.50	0.77		1.80	0.76		1.81	0.74	
	M	2.80	1.34	< 0.0001	2.22	0.79	< 0.0001	2.19	0.82	< 0.0001
	H	2.89	0.88		3.33	1.39		3.43	1.33	
Butter	L	5.17	1.97		3.80	2.34		3.86	2.30	
	M	4.80	1.62	0.4795	5.22	1.41	0.0001	5.25	1.41	0.0001
	H	4.89	2.04		5.50	1.82		5.48	1.86	
Plant oils	L	4.00	1.17		4.60	1.03		4.62	1.01	
	M	4.40	0.81	< 0.0001	5.11	0.57	0.0141	5.03	0.77	0.0665
	H	5.44	0.69		4.33	1.51		4.43	1.46	
Fast food products	L	1.17	0.38		1.20	0.41		1.24	0.43	
	M	1.80	0.99	0.0012	1.89	0.88	< 0.0001	1.86	0.89	0.0001
	H	1.67	0.82		1.33	0.75		1.35	0.77	

H – high, M – moderate, L – low level of self-efficacy (GSES)/optimism (LOT-R)/satisfaction with life (SWLS); *X* – arithmetic mean, SD – standard deviation, *p* – significance of differences determined with the Kruskal-Wallis test

nal disorders and decreased basal metabolic rate [17-19]. The increase in BMI in members of our study group suffering from hypertensive disorders was directly proportional to more frequent consumption of white (non-wholegrain) bread, which suggests that the preference for this product does not promote the maintenance of due body weight. This conclusion is consistent with the results of a Danish study, which confirmed the role of

wholegrain products in the reduction of body adiposity in postmenopausal women [11].

Our study revealed predictive value of the analyzed personality traits with regards to the dietary choices of women with arterial hypertension. We observed positive correlations between the level of self-efficacy, optimistic disposition, and satisfaction with life, and the consumption frequency of recommended products, such as whole grains, oatmeal, vegetables and fruit (including citrus fruit), fruit juices, marine fish, legume seeds, soybeans, and nuts. Moreover, the levels of optimism and satisfaction with life showed highly significant negative correlations with the consumption frequency of non-recommended, albeit relatively frequently consumed, products, such as white bread, pork meat and sausages, sweets, and pastries. The tendencies documented on correlation analysis were further confirmed during multiple comparisons between the average consumption frequencies of these products in subgroups characterized by various levels (high vs. moderate vs. low) of the analyzed personality traits. The tendency to bad eating habits among women who are less convinced of their efficacy, less optimistic, and less satisfied with life suggests that individuals with such a combination of personality traits are at greater risk of their cardiovascular disorder further deteriorating. In contrast, more favorable patterns of dietary choices were observed among women with higher levels of self-efficacy, optimism, and satisfaction with life. Based on the abovementioned relationships between the etiology of cardiovascular disorders and the frequent consumption of highly glycemic products with low contents of dietary fiber, antioxidants and phytoestrogens, and products rich in saturated and *trans* fatty acids [6, 10, 11, 15], it can be supposed that the risk of these disorders is higher in women characterized by lower levels of self-efficacy, optimism, and satisfaction with life. The relations documented in our study, pointing to the predictive role of the analyzed psychological traits, are consistent both with their characteristics and with the results of previous studies [9, 20]. A high level of self-efficacy was proved to promote faster reduction of excess body weight in postmenopausal women [21] and obese individuals participating in a Turkish study [22]. Another study conducted in New Zealand revealed a correlation between higher level of self-efficacy and more frequent consumption of fruit and vegetables among middle-aged Asian women [23]. Other authors have confirmed the role of higher self-efficacy in the rationalization of nutrition [24, 25]. A relation between the locus of control and health was confirmed by a French study; namely, lower risk of lipid disorders, arterial hypertension and excess body weight was documented among women with an internal health locus of control [26]. An American study [27] of the relation between the level of optimism/pessimism and the he-

mostatic system of 45- to 84-year-old persons showed lower concentrations of fibrinogen and homocysteine in more optimistic individuals. Therefore, optimism decreased the risk of cardiovascular disorders, which is consistent with our findings regarding more frequent consumption of some foods, such as oatmeal, vegetables (including green vegetables), citrus fruit, and vegetable juices, and less frequent consumption of sweets and pastries among more optimistic women.

Cognitive and behavioral activities promoting self-efficacy and optimism, and increasing the level of satisfaction with life, can be useful factors in the improvement of nutrition [28], including that in menopausal women. Previous studies of various female groups revealed that health-oriented education with resultant rationalization of lifestyle is one of the factors promoting the internal health locus of control and self-efficacy [29, 30]. Therefore, bearing in mind psychosocial variables can be an important aspect of nutritional rationalization and efficient dietary intervention, and can indirectly improve health potential, as well as the prevention and treatment of diet-related disorders. This issue is of vital importance in the case of menopausal women, due to their increased risk of chronic disorders, the complex etiology of which is significantly influenced by environmental factors, such as diet [31]. A health-seeking lifestyle, which includes recreational physical activity and rational nutrition, promotes improvement of health status and quality of life of menopausal women [32-34]. Furthermore, these factors constitute an important component of primary and secondary prevention of cardiovascular disorders. Therefore, menopausal women should be offered complex medical, dietetic, and psychological support [19, 35].

Conclusions

1. White bread, sweets and pastries, pork meat and sausages, and butter were the non-recommended products consumed by menopausal women with arterial hypertension the most frequently, 4-6 times a week on average. This could negatively affect the efficacy of the secondary prevention of cardiovascular disorders in this group.
2. Positive correlations observed between BMI and the consumption frequency of white bread, whole milk, meat and sausages, fast food products, and sweetened beverages confirmed the role of these food products in the complex etiology of overweight and obesity in menopausal women with arterial hypertension, and could potentially increase the risk of metabolic syndrome.
3. Statistically significant relations between analyzed individual traits of menopausal women with arterial hypertension and consumption frequencies of some foods were documented; these relations pointed to

less rational dietary choices of women character-
ized by lower levels of self-efficacy, optimism, and
satisfaction with life.

Disclosure

Author reports no conflicts of interest.

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