



Nutritional Habits of the 50+ Population with Cardiovascular Diseases

Izabela Gąska¹

Katarzyna Sygit²

<https://orcid.org/0000-0001-7173-2266>

Elżbieta Cipora¹

Marian Sygit²

<https://orcid.org/0000-0002-7902-7761>

Jan Krakowiak³

<https://orcid.org/0000-0002-3435-9658>

¹ Jan Grodek State Vocational Academy in Sanok, Poland

² State Vocational Academy in Kalisz, Poland

³ Medical University of Lodz, Poland

Address for correspondence

Katarzyna Sygit
State Vocational Academy in Kalisz
4 Nowy Świat Str., 62-800 Kalisz, Poland
e-mail: ksygit@poczta.onet.pl

Abstract

Introduction: Cardiovascular diseases are the leading cause of death in Poland and worldwide. The main factors of cardiovascular disease are improper diet, obesity, and lack of physical activity. According to numerous specialists, effective prevention (particularly focused on the principles of proper nutrition) reduces the incidence by as much as 80%.

Objective: The aim of this paper is the assessment of nutrition habits of the 50+ population with cardiovascular diseases.

Materials and methods: The study was carried out among 411 individuals aged over 50 with cardiovascular diseases. The method used in the study was a diagnostic survey. The study involves: authors' questionnaire, and Inventory of Health-Related Behavior (IHB). A detailed statistical analysis was carried out in the R program, version 3.5.1.

Results: As a result of the conducted research, it was found that 38.20% of subjects were overweight, while 30.41% suffered from class 1 obesity. It was found that 69.10% ate 4-5 meals per day. Interestingly, breakfast was consumed by 92.21% of subjects, lunch by 98.05%, and dinner by 90.27%. The respondents relatively often snacked between meals (67.64%). It was found that vegetables were consumed usually once a day by 74.70% of subjects, while fruit by 32.85%; often the respondents chose, however, sweets and fast-food. The analysis of the study results (according to the IHB Questionnaire) showed that correct nutrition habits were the least common amongst subjects. Statistical relationships were found between health behaviours in each of the areas studied (including proper eating habits) and gender, age and Body Mass Index (BMI) of respondents.

Conclusions: Subjects displayed correct eating habits in terms of frequency and number of meals. However, subjects often chose unhealthy products and snacked between meals. The analysis of the study results (according to the IHB

Questionnaire) showed that correct nutrition habits were the least common amongst subjects.

Key words: nutrition, health behaviours, cardiovascular diseases, people aged 50+.

CC-BY-SA 3.0 PL

Introduction

Key health behaviours include, above all, rational nutrition and: physical activity, avoidance of psychoactive substances and personal hygiene [1,2,3,4].

An important manifestation of healthy behaviours is healthy nutrition, as per recommendations of nutritionists, which takes into account genetic, social and cultural conditions [5,6,7]. Proper nutrition is necessary for good health, proper development, physical fitness, intellectual development, as well as general well-being. Food must be matched to the actual needs of the body, taking into account age, gender, physiological condition and the type of work performed by an individual [1,5,6].

Proper nutrition is particularly important for patients with diagnosed cardiovascular diseases because it constitutes a part of the treatment and prevention [7]. Cardiovascular diseases (CVD) are the leading cause of death in Poland and worldwide. [8,9] They include: diseases of the brain, peripheral vessels, and heart vessels; they are usually caused by atherosclerosis of blood vessels. The main factors of CVD are improper diet, obesity, and lack of physical activity. According to numerous specialists, effective prevention (particularly focused on the principles of proper nutrition) reduces the incidence of CVD by as much as 80% [7,10,11].

The first method of treatment in the strategy of CVD therapy is a change in lifestyle, including a balanced diet, increased physical activity, and quitting smoking [11,12,13]. Non-pharmacological methods of CVD treatment are very safe, but are underestimated. Additionally, they are considered inefficient, because patients must follow dietary recommendations. Meanwhile, difficulties in implementing lifestyle recommendations result from the lack of systemic solutions in the treatment of cardiology patients. Increasingly often planners of diet-therapy take into account ethnic, socioeconomic and cultural factors. Hence, there is a need for creating therapeutic teams which would include a dietitian in addition to medical professionals [7,11,14,15,16].

Specialists propose an interdisciplinary approach to the treatment of cardiovascular diseases wherein the dietitian responsible for planning and monitoring dietary treatment would play a significant role [7,11,17].

The aim of this paper is the assessment of nutrition habits of the 50+ population with cardiovascular diseases.

Materials and methods

The research was carried out in 2018 among 411 individuals aged 50+ with cardiovascular disease. The method used in the study was a diagnostic survey. The research tools used in the study were: authors' survey questionnaire prepared for the purposes of this study. The survey questionnaire consisted of three parts. The first part concerned social information, the second part - health of the subjects, and the third - their lifestyle. The second tool was the Inventory of Health-Related Behavior (IHB) by Z. Juczyński [18]. The questionnaire consists of 24 statements describing various types of health-related behaviours. It helps determine the intensity of behaviours in four different health categories: eating habits, preventive behaviours, positive mental attitude, and health practices. The study was approved by the Bioethics Committee of the Medical University of Lodz, under number RNN/156/18/KE.

A statistical analysis was carried out in the R program, version 3.5.1.

The analysis of quantitative variables (i.e. expressed in numbers) was performed by calculating the mean, standard deviation, median, quartiles, minimum and maximum values. The analysis of qualitative variables (i.e. not expressed in numbers) was performed by calculating the number and percentage of occurrences of each value.

The comparison of the values of quantitative variables in two groups was made using the Student's t test (when the variable had normal distribution in these groups) or the Mann-Whitney test (otherwise).

The comparison of quantitative variable values in three or more groups was performed by ANOVA analysis of variance (when the variable had normal distribution in these groups) or Kruskal-Wallis test (otherwi-

se). After detecting statistically significant differences, post-hoc analysis was carried out with Fisher's LSD test (normal distribution) or Dunn's test (non-normal distribution) to identify statistically significant differences between groups.

Correlations between quantitative variables were analyzed using the Pearson correlation coefficient (when both variables had normal distribution) or Spearman correlation coefficient (otherwise) [19].

Results

The overview of the subjects

Men dominated in the subject group – there were 223 men (54.26%) and 186 women (45.26%); 2 people (0.49%) did not provide gender information (Table 1).

Table 1. Subjects' gender

Gender	N	%
Women	186	45.26%
Men	223	54.26%
No answer	2	0.49%

The age structure of the subjects was as follows: the average age of the subjects was 69.2 (SD=9.45 and ranged from 50 to 93); the median was 69. The first and third quartiles were 62 and 76, respectively, hence the group in the study group was dominated by people aged 62-76 (Table 2).

Table 2. Subjects' age

Age [in years]							
N	Mean	SD	Median	Min	Max	Q1	Q3
411	69.2	9.45	69	50	93	62	76

As a result of the conducted research, it was found that 157 subjects (38.20%) were overweight, 125 (30.41%) suffered from class 1 obesity, and 100 individuals (24.33%) had correct body mass. Worryingly, 15 persons (3.65%) suffered from class 2 obesity, and further 8 persons (1.95%) had class 3 obesity (Table 3).

Table 3. Subjects' BMI (body mass index)

BMI		n	%
17 - 18.5	Underweight	2	0.49%
18.5 - 25	Correct weight	100	24.33%
25 - 30	Overweight	157	38.20%
30 - 35	Obesity	125	30.41%
35 - 40	Class 2 obesity	15	3.65%
> 40	Class 3 obesity	8	1.95%
No data available (weight and/or height)		4	0.97%

Nutritional behaviours

Rational, proper nutrition is an important factor that conditions human health. The study found that 284 subjects (69.10%) ate 4-5 meals a day, 82 individuals (19.95%) ate 3 meals a day, 19 persons (4.62%) had fewer than 3 meals per day, while 13 people (3.16%) consumed more than 5 meals per day; 3.16% of subjects did not respond (Table 4).

Table 4. Number of respondents' daily meals

Number of daily meals	n	%
More than 5 meals	13	3.16%
4-5 meals	284	69.10%
3 meals	82	19.95%
Fewer than 3 meals	19	4.62%
No answer	13	3.16%

The frequency of daily meals was also analyzed. Interestingly, breakfast was consumed by 379 subjects (92.21%), second breakfast by 171 respondents (41.61%), dinner by 403 individuals (98.05%), afternoon tea by 115 persons (27.98%) and supper by 371 (90.27%). The respondents also reported infrequent consumption of some meals: 108 subjects ate second breakfast several times a week (26.28%), 100 individuals had afternoon tea once a week or less (24.33%), and 103 people never had afternoon tea (25.06%) (Table 5).

In terms of places where the meals were eaten, it was found that the most common place was the family home: breakfast was consumed at home by 393 people (95.62%), second breakfast by 229 respondents (55.72%), dinner by 405 people (98.54%), afternoon tea by 156 subjects (37.96%) and supper by 386 people (93.92%). The respondents also declared having afternoon tea with relatives – 112 people (27.25%) and second breakfast in other places – 83 people (20.19%) (Table 6).

According to the analysis, respondents also faced the problem of snacking: large proportion of subjects snacked between meals – 278 people (67.64%), while only 130 people (31.63%) did not (Table 7).

Providing the body with nutrients such as proteins, fats, carbohydrates, vitamins and minerals is the foundation of proper nutrition. It was found that vegetables were usually consumed once a day by 307 people (74.70%), fruits were also consumed mostly once a day by 135 people (32.85%), fish were consumed once a week by 206 people (50.12%), poultry several times a week by 225 people (54.74%), cereal products were consumed several times a day by 149 people (36.25%), sweets were consumed quite often: from several times a week – by 92 people (22.38%) – up to once a month: by 11 people (2.68%) (Table 8).

Table 5. Frequency of specific daily meals consumed by respondents

	Every day	Several times a week	Once a week or less	Once a month or less	Never	No answer
Breakfast	379 (92.21%)	13 (3.16%)	3 (0.73%)	1 (0.24%)	14 (3.41%)	1 (0.24%)
Second breakfast	171 (41.61%)	108 (26.28%)	32 (7.79%)	11 (2.68%)	82 (19.95%)	7 (1.70%)
Dinner	403 (98.05%)	7 (1.70%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (0.24%)
Afternoon tea	115 (27.98%)	71 (17.27%)	100 (24.33%)	14 (3.41%)	103 (25.06%)	8 (1.95%)
Supper	371 (90.27%)	17 (4.14%)	4 (0.97%)	2 (0.49%)	16 (3.89%)	1 (0.24%)

Table 6. Place of meal consumption

	At home	At immediate family	In bars, restaurants	In other places	I do not eat	No answer
Breakfast	393 (95.62%)	0 (0.00%)	0 (0.00%)	2 (0.49%)	16 (3.89%)	0 (0.00%)
Second breakfast	229 (55.72%)	4 (0.97%)	2 (0.49%)	83 (20.19%)	83 (20.19%)	10 (2.43%)
Dinner	405 (98.54%)	0 (0.00%)	3 (0.73%)	3 (0.73%)	0 (0.00%)	0 (0.00%)
Afternoon tea	156 (37.96%)	112 (27.25%)	2 (0.49%)	27 (6.57%)	101 (24.57%)	13 (3.16%)
Supper	386 (93.92%)	1 (0.24%)	0 (0.00%)	4 (0.97%)	20 (4.87%)	0 (0.00%)

Table 7. Snacking between meals by respondents

Snacking between meals		n	%
Yes		278	67.64%
No		130	31.63%
No answer		3	0.73%

Table 8. Consumption of specific food products by respondents

	Several times per day	Once a day	Once a week	Several times a week	Once a month	Several times a month	I do not eat	No answer
Vegetables	42 (10.22%) 128 (31.14%)	307 (74.70%)	25 (6.08%)	33 (8.03%)	1 (0.24%)	0 (0.00%)	2 (0.49%)	1 (0.24%)
Fruit	0 (0.00%)	135 (32.85%)	80 (19.46%)	33 (8.03%)	29 (7.06%)	0 (0.00%)	5 (1.22%)	1 (0.24%)
Fish	0 (0.00%)	1 (0.24%)	206 (50.12%)	21 (5.11%)	97 (23.60%)	1 (0.24%)	85 (20.68%)	0 (0.00%)
Poultry	0 (0.00%)	2 (0.49%)	147 (35.77%)	225 (54.74%)	21 (5.11%)	4 (0.97%)	11 (2.68%)	1 (0.24%)
Beef/Pork	0 (0.00%)	0 (0.00%)	174 (42.34%)	142 (34.55%)	41 (9.98%)	20 (4.87%)	33 (8.03%)	1 (0.24%)
Cereals	149 (36.25%)	46 (11.19%)	142 (34.55%)	66 (16.06%)	3 (0.73%)	1 (0.24%)	0 (0.00%)	4 (0.97%)
Dairy products	75 (18.25%)	283 (68.86%)	19 (4.62%)	22 (5.35%)	0 (0.00%)	2 (0.49%)	8 (1.95%)	2 (0.49%)
Sweets	92 (22.38%)	64 (15.57%)	22 (5.35%)	78 (18.98%)	¹¹¹ (27.01%)	11 (2.68%)	31 (7.54%)	2 (0.49%)
Fast food	2 (0.49%)	0 (0.00%)	6 (1.46%)	3 (0.73%)	77 (18.73%)	41 (9.98%)	²⁸¹ (68.37%)	1 (0.24%)

Results analysis using the Inventory of Health-Related Behavior (IHB)

The analysis of the study results showed that amongst subjects the most common health behaviours were related to health practices, slightly less common in the area of positive mental attitude and the least common in the area of proper eating habits and preventive behaviours (Table 9).

Table 9. Degree of intensity of specific categories of health behaviours according to IHB amongst respondents

IHB sub-scales	N	Mean	SD	Median	Min	Max	Q1	Q3
Correct eating habits	411	3.28	0.75	3.17	1	5	2.83	4
Preventive behaviours	411	3	0.62	3	1.17	4.5	2.67	3.67
Positive mental attitude	411	3.59	0.52	3.83	1.33	4.67	3.33	4
Health practices	411	3.61	0.53	3.67	1.67	4.83	3.33	4

The analysis of research results showed that age correlated significantly and positively with health practices ($p < 0.05$). The group of elderly subjects had a greater intensity of health practices (Table 10).

Table 10. Categories of health behaviours according to IHB versus respondents' age

IHB	Correlation with age			
	Correlation coefficient	p *	Dependency direction	Strength of dependence
Correct eating habits	-0.089	p=0.07 NP	---	---
Preventive behaviours	-0.057	p=0.253 NP	---	---
Positive mental attitude	0.045	p=0.366 NP	---	---
Health practices	0.251	p<0.001 NP	positive	very weak

* P = Normal distribution of both correlated variables, Pearson correlation coefficient;
NP = No normal distribution of at least one of the correlated variables, Spearman's correlation coefficient

Statistical relationships were found between health behaviours in each of the areas studied and gender ($p < 0.05$). Women displayed more intense behaviours in each area than men (Table 11).

Table 11. Categories of health behaviours according to IHB versus respondents' gender

IHB		Women	Men	p*
Correct eating habits	mean \pm SD	3.59 \pm 0.63	3.03 \pm 0.74	<0.001
	median	3.83	3	NP
	quartiles	3-4	2.67-3.67	
Preventive behaviours	mean \pm SD	3.25 \pm 0.57	2.79 \pm 0.59	<0.001
	median	3.33	2.83	NP
	quartiles	2.83-3.67	2.5-3.08	
Positive mental attitude	mean \pm SD	3.7 \pm 0.5	3.5 \pm 0.52	<0.001
	median	4	3.67	NP
	quartiles	3.5-4	3.17-3.83	
Health practices	mean \pm SD	3.81 \pm 0.43	3.44 \pm 0.54	<0.001
	median	4	3.5	NP.
	quartiles	3.67-4	3.08-3.83	

* P = Normal distribution in groups, Student's t-test; NP = No normal distribution in groups, Mann-Whitney test

As a result of the research analysis, it was found that health behaviours in each area significantly depended on the body mass index BMI ($p < 0.05$). Overweight subjects had less intense behaviours than regular-weighting patients in each area. Obese subjects had the least intense behaviours in all areas (Table 12).

Table 12. Categories of health behaviours according to IHB versus respondents' BMI

IHB	Underweight, correct weight	Overweight	Obesity	p *
Correct eating habits	mean ± SD	3.42±0.74	2.96±0.63	<0.001
	median	3.67	3	NP.
	quartiles	3-4	2.83-3	Under-Norm.Over>0
Preventive behaviours	mean ± SD	3.09±0.63	2.8±0.51	<0.001
	median	3	2.83	NP.
	quartiles	2.67-3.67	2.67-3	Under-Norm.Over>0
Positive mental attitude	mean ± SD	3.6±0.56	3.52±0.48	<0.001
	median	3.83	3.67	NP.
	quartiles	3.33-4	3.17-3.83	Under-Norm.Over>0
Health practices	mean ± SD	3.62±0.53	3.47±0.49	0.001
	median	3.83	3.5	NP.
	quartiles	3.33-4	3.17-3.83	Under-Norm.Over>0

* P = Normal distribution in groups, ANOVA + results of post-hoc analysis (Fisher's LSD test); NP = No normal distribution in groups, Kruskal-Wallis test + post-hoc analysis results (Dunn's test)

Discussion

Despite the growing research interest on health behaviours among 50+ population, there is a need for continuous monitoring [10,20,21,22]. Scientific research is the basis for determining and predicting the types of needs and methods of achieving goals that are part of public health and social services [11]. Hence, the presented study aimed at presenting health behaviours of the 50+ population with cardiovascular diseases and determining relations between socio-demographic factors and nutritional habits of the population. This allows for an in-depth analysis of the implementation of actions aimed at improving the health of the population.

Nutrition experts emphasize the fact that regular nutrition is important for health, so one should eat at least 5 meals a day: 3 main meals and 2 light meals [5,6,23,24]. It has been shown that respondents ate regularly. Most of them ate between 4 and 5 meals per day (69.10%). The results of the research by Duda et al. confirm this regularity and indicate that the eating behaviours of Poles had been relatively stable for sixteen years and the fluctuations were small [11]. Most (81%) of the respondents said they were eating properly. Regular consumption of at least three meals a day was also shown by a study conducted in 2016 by Mossakowska [21]. The frequency of daily meals was also analyzed in authors' own studies. Breakfast is the first and most important meal of the day; it improves the quality of nutrition and cognitive abilities, helps obtain better results at work and improves functioning throughout the day. In authors' own research, the vast majority (92.21%) of subjects consumed breakfast every day. Almost identical results were obtained in a report *Od jedzenia humor się zmienia* [Food changes your mood], where 93% of respondents reported eating breakfast daily. The consumption of the other two main meals, i.e. dinner and supper, had a similar percentage value. This applies to both authors' own research and research from 2011 and 2016 [11,21]. Worse results were observed among older population, aged 65+. In the study by M. Bąk-Sosnowska, 69.1% of subjects declared daily breakfast consumption [13].

The obtained data on height and weight also allowed for characterizing the subjects in terms of their nutritional status. Positive evaluation of eating behaviours presented above in terms of regularity of basic meals, was not confirmed, however, by their BMI. This indicates a high prevalence of anomalies in adult nutrition in terms of nutritional recommendations. Normal BMI values, i.e. between 18.5 and 25, were displayed by 24.33% of the entire study population. Overweight was faced by 38.2% of subjects, while 30.41% of respondents had class 1 obesity. Class 2 obesity was observed in 3.65% of subjects, whereas class 3 obesity in 1.95%. Similar results were obtained by M. Bąk-Sosnowska [13] and W. Kulpa [22]. Worryingly, a vast majority of respondents did not notice the relationship between their health and body weight (54.74%). Only 10.95% acknowledged the relationship between these factors, and 18.49% were aware that their health was affected by overweight and obesity. In the research by M. Cybulski et al. overweight and obesity occurred in almost 75% of the respondents, who considered their diet as 'correct' [4]. Similar results were obtained by M. Tańska et al., where as many as 81.3% of subjects with normative body weight, 89.0% of overweight individuals and 85.0% obese ones declared that they followed a low-fat diet [24]. It can therefore be assumed that the declared attitudes translate into specific behaviours only to a small extent.

The application of the IHB questionnaire helped determine the intensity of correct eating habits among the studied population of people aged 50+ [25]. Authors' own studies showed that correct nutrition habits were the least common amongst subjects. Better results were obtained in this area by E. Smoleń et al., where a positive correlation between correct eating habits and age was revealed [26]. Obese subjects had the least intense behaviours in terms of proper eating habits. On the other hand, relatively high levels of correct eating habits were observed among Medicine students. In the studies by A. Baran and A. Stocka, this high level was obtained by 48.3% of respondents [27], while worse results were obtained by Baumgart et al. [28].

Overweight and obesity are currently a serious social problem and a risk factor for cardiovascular diseases [7,13,20]. It is especially dan-

gerous for people with recorded levels of overweight and obesity and it indicates the need to assess the amount of food they eat, including energy supply [7]. The health effects of the obesity epidemic result not only from this disease, but also from the consequences of diseases for which obesity is a proven risk factor. According to numerous studies, the risk of myocardial infarction is doubled for people with a BMI above 30 [7,12,13,29]. Authors' own research shows that 36.01% of respondents belong to this group. Research conducted in 2016 by S. Zanjani showed that only 48% of respondents improved health by proper nutrition, such as frequent consumption of vegetables and fruits, and reduction of animal fats [7]. In authors' own research, it was found that 74.70% of the respondents consumed vegetables only once a day and only 31.14% reported eating fruit several times a day. In the light of research by H. Hung et al. it may be stated that adults consumed fruit and vegetables even less frequently. This was especially true for men. Only every second adult man ate both fruit and vegetables (other than potatoes) every day, while for women it was almost 2/3. Better results were observed among children over 6 months of age. Almost 62% of children ate vegetables at least once a day [2]. These results are comparable to those obtained in authors' own research. 73% of the surveyed children consumed fruit once a day or more often. Generally, children under 15 years of age consumed fruit more often than vegetables. It is worrying that nearly 4% of children did not eat vegetables at all or less than once a week [2,7]. In authors' own research, 50.12% of subjects ate fish once a week, while meat products – poultry – were consumed several times a week, which is a product containing saturated fatty acids (54.74%). Worryingly, more than half of Poles (57%) believed that their meals were similar to those of their parents [1,5,23]. This may suggest that current anomalies in adult eating habits will be reproduced in future generations. In this situation, it is necessary to intensify health-promoting activities, especially through activities promoting proper nutritional habits. Nurses and doctors, as well as persons cooperating with them, should play an important role, as they have daily contact with patients. It is also worth implementing preventive programs,

because even a slight improvement of modified risk factors may lead to a significant reduction of cardiovascular incidents [1,13,7,21,29,30].

Conclusions

1. Most respondents ate rationally. The subjects consumed between
2. 3 and 5 meals daily; main meals were: breakfast, dinner and supper.
3. A high frequency of snacking between meals was revealed. Most of the respondents chose unhealthy snacks / products, such as sweets or fast food.
4. Analysis of the research according to the JHB Questionnaire showed that:
 - health behaviours in the area of proper eating habits were the least intense;
 - statistical relationships were found between health behaviours in each of the areas studied (including proper eating habits) and gender, age and BMI of the subjects.

References

1. Jarosz M. Żywnienie osób w wieku starszym [Elderly nutrition]. Warszawa: Wydawnictwo Lekarskie PZWL; 2011.
2. Hung HC, Joshipura KJ, Jiang R, Hu FB, Hunter D, Smith-Warner SA et al. Fruit and vegetables intake and risk of major chronic disease. *Journal of the National Cancer Institute* 2014; 96: 1577-1584. doi: 10.1093/jnci/djh296.
3. Prakash SJ, Bihari GS, Kumar SA. Lifestyle habits and diseases amongst rural geriatrics population. *Int J Community Med Public Health* 2016; 3(4): 957-961. doi: 10.18203/2394-6040.ijcmph20160936.
4. Cybulski M, Krajewska-Kulak E, Jamiolkowski J. Preferred health behaviors and quality of life of the elderly people in Poland. *Clin Interv Aging* 2015; 10: 1555-1564. doi: 10.2147/CIA.S92650.
5. Wądołowska L. Żywieniowe podłoże zagrożeń zdrowia w Polsce [Nutritional background to health threats in Poland]. Olsztyn: Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego; 2011.
6. Roszkowski W. Żywnienie osób starszych [Nutrition of the elderly]. In: Grzymiśławski M, Gawęcki J, eds. Żywnienie człowieka zdrowego i chorego [Nutrition of a healthy and ill person]. Warszawa: Wydawnictwo Naukowe PWN; 2011.
7. Zdrojewski T. Choroby układu krążenia i ich prewencja u osób w wieku starszym [Diseases of the circulatory system and their prevention in the elderly]. Warszawa: Wydawnictwo Naukowe Scholar; 2014. p. 43-54.
8. Cierniak-Piotrowska M, Marciniak G, Stańczak J. Statystyka zgonów i umieralności z powodu chorób układu krążenia [Statistics of deaths and mortality due to cardiovascular diseases] In: Strzelecki Z, Szymborski J,

eds. Zachorowalność i umieralność na choroby układu krążenia a sytuacja demograficzna Polski [Morbidity and mortality of cardiovascular diseases and the demographic situation of Poland]. Rządowa Rada Ludnościowa; 2015; Warszawa. p. 45-74 (in Polish).

9. Roth G, Forozanfar M, Moran A. Demographic and epidemiologic drivers of global cardiovascular mortality. *N Engl J Med* 2015; 372: 1333-1341. doi: 10.1056/NEJMoa1406656.

10. Zanjani S, Tol A, Mohebbi B, Sadeghi R, Keramat Nouri Jalyani KN, Moradi A. Determinants of healthy lifestyle and its related factors among elderly people. *J Educ Health Promot* 2015; 4: 103-115. doi: 10.26444/aaem/86459.

11. Duda G, Józwiak A, Chmielewska Z. Wybrane elementy stylu życia i nieprawidłowości stanu odżywienia osób w wieku podeszłym z niedokrwinną chorobą serca. Badania wstępne [Selected elements of the lifestyle and nutrition disorders of the elderly with ischemic heart disease. Preliminary research]. *Nowiny Lekarskie* 2011; 70: 1028-1036.

12. Aaron K, Sanders P. Role of diet ary salt and potassium intake in cardiovascular health and disease: a review of the evidence. *Mayo Clin Proc* 2013; 88(2): 987-995. doi: 10.1016/j.mayocp.2013.06.005.

13. Bąk-Sosnowska M, Skrzypulec-Plinta V. Health behaviors, health definitions, sense of coherence, and general practitioners' attitudes towards obesity and diagnosing obesity in patients. *Arch Med Sci* 2017; 13(3): 433-440. doi: 10.5114/aoms.2016.58145.

14. Chomistek A, Chiuvè S, Eliassene A, Mukamal K, Willet W, Rimm E. et al. Healthy lifestyle in the primordial prevention of cardiovascular disease among young women. *Journal of the American College of Cardiology* 2015; 65(1): 43-51. doi: 10.1016/j.jacc.2014.10.024.

15. Chapman MJ, Ginsberg HN, Amarenco P, Andreotti F, Borén J, Catapano AL et al. Triglyceride-rich lipoproteins and high-density lipoprotein cholesterol in patients at high risk of cardiovascular disease: evidence and guidance for management. *Eur Heart J* 2016; 11(32): 1345-1361. doi: 10.1093/eurheartj/ehv112.
16. Kwok C, Pradhan A, Khan M. Bariatric surgery and its impact on cardiovascular disease and mortality: a systematic review and meta-analysis. *Int J Cardiol* 2014; 173(1): 20-28. doi: 10.1016/j.ijcard.2014.02.026.
17. Muller M, Smulders M, de Leeuw P, Stehouwer C. Treatment of hypertension in the oldest old: a critical role for frailty? *Hypertension* 2014; 63(3): 433-441. doi: 10.1161/hypertensionaha.113.00911.
18. Juczyński Z. Narzędzia pomiaru w promocji i psychologii zdrowia [Tools for health promotion and psychology of health]. Pracownia Testów Psychologicznych; 2009; Warszawa. p. 110-116.
19. Hinkle DE, Wiersma W, Jurs SG. *Applied Statistics for the Behavioral Sciences*. 5th ed. Boston: Houghton Mifflin; 2003.
20. Kotseva K, Wood D, De Bacquer B. Euroaspire IV: a European Society of Cardiology survey on the lifestyle, risk factor and therapeutic management of coronary patients from 24 European countries. *Eur J Prev Cardiol* 2016; 23(6): 636-648. doi: 10.1177/2047487315569401.
21. Mossakowska M. Problemy zdrowotne osób w wieku podeszłym – wnioski z projektu PolSenior [Health problems of the elderly – conclusions from the PolSenior project]. 2nd edition. Warszawa: Wydawnictwo Naukowe Scholiar; 2016, p. 54-78 (in Polish).
22. Kulpa W. Zachowania prozdrowotne osób czterdziestoletnich w aspekcie poziomu wykształcenia [Health-related behaviors of forty-

-year-old people in terms of their level of education] In: Maksymiuk T, Bartkowiak L., eds. Badanie stanu zdrowia populacji i funkcjonowanie opieki zdrowotnej. Zagadnienia wybrane [Examination of the population's health status and functioning of health care. Selected issues]. AM im. K. Marcinkiewicza w Poznaniu, Poznań; 2002, p. 57-64 (in Polish).

23. Tańska M, Babicz-Zielińska E, Komorowska-Szczepańska W, Zwyczajne żywieniowe osób starszych i ich wpływ na występowanie nadwagi i otyłości. *Family Medicine & Primary Care Review* 2013; 15(2): 178-180.

24. Piórecka B. Dieta kluczem do zdrowia seniora [Diet is the key to senior health]. *Głos Seniora* 2013; 6(4): 26.

25. Muszalik M, Zielińska-Więczkowska H, Kędziora-Kornatowska K, Kornatowski T. Ocena wybranych zachowań sprzyjających zdrowiu wśród osób starszych w oparciu o Inwentarz zachowań Zdrowotnych Juczyńskiego w aspekcie czynników socjo-demograficznych [Evaluation of selected behaviors conducive to health among older people based on the Inventory of Health behaviors of Juczyński in the aspect of socio-demographic factors]. *Probl Hig Epidemiol* 2013; 94(3): 509-513 (in Polish).

26. Smoleń E, Gazdowicz L, Żyłka-Reut A. Zachowania zdrowotne osób starszych [Health behaviors of older people]. *Piel XXI w.* 2011; 3(36): 5-9 (in Polish).

27. Baran A, Stocka A. Kierunek studiów jako wyznacznik zachowań zdrowotnych. *Przegląd Medyczny Uniwersytetu Rzeszowskiego* 2008; 4: 326-331.

28. Baumgart M, Weber-Rajek M, Radzimińska A, Goch A, Zukow W. Zachowania zdrowotne studentów fizjoterapii. *Journal of Education, Health and Sport* 2015; 5(6): 211-224.

29. Christopher P, Cannon MD, Michael A, Blazing MD, Robert P, Giugliano MD. Ezetimibe addend to statin therapy after acute coronary syndroms. *N Engl J Med* 2015; 372: 2387-2397. doi: 10.1056/NEJMoa1410489.
30. Selivanova A, Cramm JM. The relationship between healthy behaviours and health outcomes among older adults in Russia. *BMC Public Health* 2014; 14: 1183.

CC-BY-SA 3.0