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Health behaviors of young adults in the context of preventing cardiovascular diseases caused by atherosclerosis

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Abstract: Introduction: Cardiovascular diseases caused by atherosclerosis are one of the leading causes of death in Poland and worldwide. Atherosclerosis develops from the earliest years of life and is influenced by modifiable risk factors resulting from health behaviors, which provides opportunities to reduce cardiovascular risk, especially in young people, by addressing these factors.
Aim of the study: assessment of health behaviors adopted by young adults in the context of preventing cardiovascular diseases caused by atherosclerosis.
Material and Methods: The study was conducted among 200 people aged between 18 and 35, with the application of a diagnostic survey method, a questionnaire technique using the Health Behavior Inventory (Inwentarz Zachowań Zdrowotnych — IZZ) and a self-designed questionnaire.
Results: The average score obtained by the respondents in the Health Behavior Inventory (IZZ) test was 80.44 ± 13.0 points, with the highest average score obtained in the area of positive mental attitude (3.43 ± 0.69 points) and the lowest in the category of preventive behaviors (3.26 ± 0.68 points). In the knowledge test, the respondents scored an average of 19.68 ± 2.60 points. Among the socio-geographic factors, gender had the most significant impact on the respondents' health behaviors — it significantly influenced the overall result, as well as all its components, except for positive mental attitude.
Conclusions: The largest percentage of respondents presented average or low levels of health behaviors, and the level of knowledge was also average among the largest percentage of respondents. Among the variables analyzed, gender had the most significant impact on health behaviors, while health behaviors did not differ significantly depending on the respondents' level of knowledge.

Keywords: young adults, health behaviors, cardiovascular disease, prevention.

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Introduction

Cardiovascular diseases (CVD) belong to the leading causes of death not only in Poland, but also worldwide [1, 2]. Atherosclerosis, which is an important pathomechanism of cardiovascular diseases, is a chronic, inflammatory disease of the arteries that develops from the earliest years of life, and is also influenced by modifiable, lifestyle-related risk factors [3, 4], which explains the rationale for implementing preventive measures already in the youngest people and continuing their implementation throughout the entire life [5, 6]. Modifiable risk factors for cardiovascular diseases of atherosclerotic origin include, for example, poor diet, insufficient physical activity, stress, smoking, as well as excessive body weight (overweight, obesity), hypertension, prediabetes and/or diabetes, and atherogenic dyslipidemia [3]. The potential modifiability of these factors through proper intervention means that it is possible to reduce the risk of developing the disease and influence the course of an existing one [3, 7]. In the prevention of cardiovascular diseases caused by atherosclerosis two strategies depending on the level of cardiovascular risk are considered important. The high-risk strategy includes people whose cardiovascular risk is higher than the average for the general population. In their case, the reduction or elimination of risk factors should be intensified through, for example, adequate physical activity, diet, giving up smoking, and pharmacotherapy in justified cases [3, 7]. In contrast, the population strategy involves eliminating lifestyle-related risk factors, i.e., promoting non-smoking, proper nutrition, and adequate physical activity, and consequently, reducing cholesterol levels and lowering blood pressure [3].

In young people, regardless of their cardiovascular risk level, eliminating modifiable lifestyle-related risk factors is associated with future health benefits in the form of reduced morbidity and mortality from cardiovascular issues [4, 5, 8, 9].

Therefore, it is among young people that the identification of modifiable risk factors for cardiovascular diseases caused by atherosclerosis, including the presented health behaviors and factors determining them, becomes particularly important, especially since early adulthood is the last period in which preventive measures can bring measurable and lasting effects [10, 11].

The aim of this study was to assess the health behaviors of young adults in the context of preventing cardiovascular diseases caused by atherosclerosis.

Material and Methods

The study was conducted by means of a diagnostic survey, using a questionnaire technique, between July and December 2022 in a group of 200 people aged 18 to 35 (146 women and 54 men). Their average age was 25.00 ± 3.09 years. Detailed socio-demographic characteristics of the respondents are presented in Table 1.

The survey questionnaire was distributed to the respondents in an electronic format using the Google Forms platform.

In assessing health behaviors of the respondents, the Health Behavior Inventory (IZZ) was used in the Polish adaptation by Z. Juczyński (with the consent of the Psychological Testing Laboratory), which consists of 24 statements allowing for the assessment of the overall intensity of health behaviors and their individual components such as proper eating habits, preventive behaviors, health practices, and a positive mental attitude. In each question, the respondent could choose one of five answer options, where 1 means almost never, 2 — rarely, 3 — occasionally, 4 — often, and 5 — almost always. The overall health behavior intensity index ranges from 24 to 120 points

Table 1. Socio-demographic characteristics of the studied group.

Variable	Total (n = 200)	
	n	%
Sex		
Female	146	73.0
Male	54	27.0
Place of residence		
Village	42	21.0
Small town (up to 20 thousand residents)	12	6.0
Medium city (from 20 thousand to 100 thousand residents)	40	20.0
Big city (from 100 thousand residents)	106	53.0
Education level		
Elementary education	2	1.0
Vocational education	0	0.0
Secondary education	82	41.0
Higher education	116	58.0
Have a medical related education		
Yes	53	26.5
No	147	73.5
Current employment situation		
Unemployed	0	0.0
Learner/student	103	51.5
Physical worker	24	12.0
Intellectual worker	53	26.5
Learner/student and worker at the same time	20	10.0
Material status		
Very good	26	13.0
Good	109	54.5
Average	65	32.5
Bad	0	0.0
Very bad	0	0.0
Family burden of atherosclerotic CVD		
Yes	163	81.5
No	37	18.5
I don't know	0	0.0
Self-assessment of health status		
Very good	31	15.5

Table 1. Cont.

Variable	Total (n = 200)	
	n	%
Good	125	62.5
Average	42	21.0
Bad	2	1.0
Very bad	0	0.0

Source: study based on the results of own research.
Legend: n — number of subjects; % — percentage of respondents, CVD — cardiovascular disease.

— the higher the score, the greater the intensity of the declared behaviors. The number of points obtained by the respondent was converted to a sten scale, which allowed to determine the level of health behaviors; a result of 1–4 sten scores indicated a low level, 5–6 sten scores — an average level, and a result in the range of 7–10 sten scores — a high level of health behaviors [12].

The questionnaire designed by the study authors consists of 28 questions and is divided into three thematic sections: a test of knowledge about cardiovascular disease prevention, health behaviors of young adults and stress, and finally, sociodemographic data. In the knowledge test, respondents received one point for each correct answer, with a maximum of 24 points. Based on the results obtained, a three-point scale was created to determine the respondents' level of knowledge: a score of 0 to 16 points meant a low level of knowledge, a score of 17 to 21 points meant an average level of knowledge, and a score of 22 to 24 points meant a high level of knowledge.

A statistical analysis of the data was performed using STATISTICA 13 PL. The results were presented graphically using Microsoft Excel. Descriptive and qualitative statistics were calculated for the collected material. The following tests and analyses were used in the statistical analyses: Shapiro-Wilk test, Student's t-test or Mann-Whitney U test, ANOVA analysis of variance or Kruskal-Wallis nonparametric test. In all calculations, $\alpha = 0.05$ was assumed as the level of statistical significance.

The study was conducted in accordance with the principles set out in the Declaration of Helsinki. Respondents were informed about the purpose, anonymity, and voluntary nature of their participation in the study, as well as the use of the results for scientific purposes only. Completing the questionnaire implied consent to participate in the study.

Results

Respondents' health behaviors according to the Health Behavior Inventory (IZZ)

The average value of the overall health behavior intensity index as measured by the Health Behavior Inventory (IZZ) in the group of study respondents was 80.44 ± 13.0 points. In the group of women, it was significantly higher than in the group of men ($p = 0.0038$), with both groups obtaining 5 sten scores, which indicated an average level. When analyzing particular categories of health behaviors in the study group as a whole, it was observed that the highest average score was obtained in the area of positive mental attitude (3.43 ± 0.69 points). In terms

of health practices, the average score was 3.40 ± 0.73 points, and in the category of proper eating habits — 3.32 ± 0.72 points. The lowest average score was obtained in the category of preventive behaviors (3.26 ± 0.68 points).

The highest percentage of respondents (43.5%, including 64 women and 23 men) obtained average values for declared health behaviors (5–6 points). A low level of health behaviors (1–4 points) was found in 35.5% of respondents (51 women and 20 men). The smallest percentage of respondents (21.0%; including 31 women and 11 men) obtained results indicating a high intensity of health behaviors (7–10 points).

Knowledge

In the test of knowledge about the prevention of cardiovascular diseases caused by atherosclerosis, the respondents scored an average of 19.68 ± 2.60 points out of a total of 24 points. For most respondents, the score was average, and the smallest percentage of respondents demonstrated a high level of knowledge in this area (18.5%), Fig. 1.

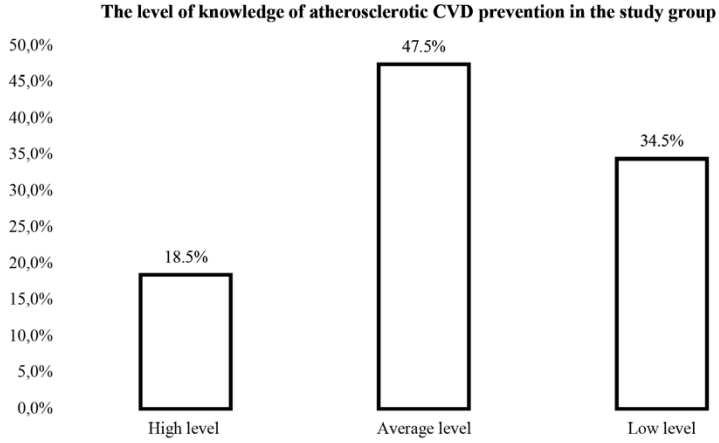

Fig. 1. The level of knowledge of atherosclerotic CVD prevention in the study group.
Source: study based on the results of own research.
Legend: n — number of subjects; % — percentage of respondents, CVD — cardiovascular disease.

Health behaviors of the study participants versus selected sociodemographic factors and the level of knowledge about prevention of atherosclerotic cardiovascular disease

The study included an analysis of the relationship between the overall health behavior index according to the Health Behavior Inventory (IZZ) questionnaire as well as its individual components and selected sociodemographic factors. Apart from a positive mental attitude, the results obtained in all categories differed significantly between women and men, Table 2.

Table 2. Relationships between the overall index of health behavior and its individual components and the gender of the respondents.

Variable	Overall health behavior index	Proper dietary habits	Preventive behaviors	Positive mental attitude	Healthcare practices
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
Women	82.04 ± 12.35	3.39 ± 0.72	3.32 ± 0.63	3.46 ± 0.68	3.50 ± 0.69
Men	76.09 ± 13.83	3.11 ± 0.68	3.07 ± 0.76	3.36 ± 0.71	3.14 ± 0.76
Test	T = 2.926	T = 2.458	T = 2.345	U = 3454.500	T = 3,235
p	**0.004***	**0.015***	**0.020***	0.180	**0.001***

Source: study based on the results of own research.
Legend: M — arithmetic mean; SD — standard deviation; p — probability value; * — value statistically significant; T — student's t-test for independent samples; U — Mann-Whitney U test

The age of the respondents had a significant impact on only one category of health behaviors — in the category of proper eating habits, people aged 24 to 29 obtained significantly higher scores (compared to people aged 18 to 23), p = 0.030.

No significant correlations were found between the health behavior index or its individual components and the respondents' place of residence.

The respondents' financial situation also did not significantly affect the overall health behavior index and most of its components. Only in the category of positive mental attitude those who declared very good or good financial conditions obtained significantly higher scores compared to those who declared average financial conditions, p = 0.0022.

When analyzing the impact of the current professional situation on the respondents' health behaviors, it was found that students scored significantly higher in the category of preventive behaviors in comparison to manual workers. Furthermore, in the aforementioned category, white-collar workers scored significantly higher than blue-collar ones. Similarly, in the health practices category, students scored significantly higher than those who declared that they performed manual labor, Table 3.

Table 3. The relationship between the index of health behaviors according to the IZZ questionnaire and individual components and labor activity.

Variable/ level of health behaviors and their components		Labour activity				Test	p
		Pupil/ student	Mental worker	Physical worker	Work & studies		
Overall health behavior index	M	82.08	80.85	74.92	77.50	F = 2.395	0.069
	SD	12.80	13.06	12.90	12.68		
Proper dietary habits	M	3.30	3.39	3.15	3.39	F = 0.695	0.556
	SD	0.72	0.73	0.78	0.60		

Table 3. Cont.

Variable/ level of health behaviors and their components		Labour activity				Test	p
		Pupil/ student	Mental worker	Physical worker	Work & studies		
Preventive behaviors	M	3.35	3.27	2.87	3.18	F = 3.52	**0.015***
	SD	0.69	0.63	0.68	0.63		
Positive mental attitude	Me	3.67	3.33	3.50	3.33	H = 3.284	0.350
	IQR	1.00	0.83	0.75	0.75		
Healthcare practices	Me	3.50	3.50	3.17	3.17	H = 11.067	**0.011***
	IQR	1.00	1.17	0.42	1.25		

Source: study based on the results of own research.
Legend: M — arithmetic mean; SD — standard deviation; p — probability value; * — value statistically significant; T — student's t-test for independent samples; U — Mann-Whitney U test.

No significant correlation was found between the occurrence of CVD among the immediate family of the respondents and the health behavior index and its individual components. However, among the group of respondents whose families had a history of these diseases, the overall health behavior index was higher, as were the results in the categories of proper eating habits, preventive behaviors, and positive mental attitude.

The overall health behavior index and its individual components did not differ significantly depending on the level of knowledge of the respondents, although the value of the overall health behavior index and the results obtained by the respondents in the categories of proper eating habits and positive mental attitude increased with the respondents' level of knowledge, Table 4.

Table 4. Relationship between the overall index of health behavior and its individual components and the level of knowledge of the respondents

Variable/ level of health behaviors and their components		The level of knowledge			Test	p
		High level	Average level	Low level		
Overall health behavior index	Me	87.00	81.00	79.50	H = 4.486	0.106
	IQR	19.00	15.00	16.50		
Proper dietary habits	M	3.47	3.28	3.24	F = 1.331	0.266
	SD	0.81	0.70	0.54		
Preventive behaviors	Me	3.50	3.17	3.33	H = 4.643	0.098
	IQR	1.00	0.83	0.75		
Positive mental attitude	M	3.48	3.42	3.35	F Welch = 0.165	0.848
	SD	0.80	0.63	0.85		

Table 4. Cont.

Variable/ level of health behaviors and their components		The level of knowledge			Test	p
		High level	Average level	Low level		
Healthcare practices	M	3.50	3.36	3.52	F = 0.843	0.432
	SD	0.72	0.72	0.80		

Source: study based on the results of own research.
Legend: M — arithmetic mean; SD — standard deviation; Me — median; IQR — interquartile range; p — probability value; * — value statistically significant; F — ANOVA test; H — ANOVA Kruskal-Wallis test; F Welch — ANOVA Welch test.

Discussion

It has been frequently attempted in the subject literature to assess health behaviors, levels of knowledge about risk factors, and disease prevention in various subpopulations in Poland and worldwide. Numerous reports continue to indicate not only a low level of knowledge in this area, but also a low or average level of health-promoting behaviors [13–17], especially in terms of physical activity and eating habits [14]. Our study focused on the assessment of health behaviors adopted by young adults in the context of preventing cardiovascular diseases caused by atherosclerosis. An analysis of health behaviors showed that the largest number of respondents had results indicating an average (43.5%) or low (35.5%) intensity of health-promoting behaviors in general, while only one in twenty people (21.0%) had results indicating a high overall intensity of health behaviors. The respondents' average value of the overall health behavior intensity index based on IZZ was 80.44 ± 13.0 points. Similar results were obtained in a study by M. Mandziuk, which involved 140 nursing students from Poland and Latvia. The authors found that almost half of the respondents (48.57%) showed results indicating a low level of health-promoting behaviors in general, whereas only 12.14% of the respondents showed results indicating a high overall intensity of health behaviors [18]. Similar results were also obtained in a study by G. Nowak *et al.*, in which the study group consisted of 252 students. Analyzing the components of IZZ, the authors showed the highest intensity of health behaviors in the area of proper eating habits (3.76 ± 0.73), while the lowest values were observed in preventive behaviors (3.37 ± 0.63) [19]. However, it is worth noting that in the discussed studies, a higher intensity of proper eating habits was observed in the group of dietetics students, which may be clearly related to their field of study. In our own study, in which most of the respondents did not have medical education, the intensity of health behaviors in the above categories was lower and ranged from 3.32 ± 0.72 points to 3.26 ± 0.68 points. However, it is worrying that in our own study, the vast majority of respondents indicated a family history of cardiovascular disease caused by atherosclerosis, and nearly a quarter subjectively assessed their health as average or poor. Given the respondents' awareness of the existing risks, results indicating a higher level of health behavior could have been expected. Slightly higher results were recorded in a study conducted by M. Marmola and A. Wańczyk-Welc in a group of 187 people aged 18 to 35, in which the overall health behavior intensity index was 3.83 points higher than in our own study and amounted to 84.27 points. Both in the cited study and in our own research, women obtained higher scores than men (86.54 and 80.49 respectively) [20].

However, while social influences, psychological factors, emotional and motivational factors, social environment and self-efficacy are the most significant factors in shaping health behaviors, the extent of one's knowledge also plays a significant role [10]. Furthermore, it seems indisputable that knowledge is an essential criterion for active participation in the process of health care, especially in the field of disease prevention [17].

In our own study, we analyzed the respondents' level of knowledge about cardiovascular disease prevention. The largest group of respondents were those with an average level of knowledge. One in three respondents (34.5%) had a low level, while only 18.0% presented a high level of knowledge. However, no statistically significant correlation was found between the level of knowledge and the health behavior index. However, a tendency was observed in which a higher level of knowledge was accompanied by higher scores in declared behaviors in the categories of positive mental attitude and proper eating habits, as well as in the overall health behavior index. G.J. Nowicki *et al.* also assessed the level of knowledge about risk factors and prevention of lifestyle diseases and health behaviors among 598 professionally active people, who were divided into two groups: medical professionals (305 people) and non-medical workers (293 people). Their study showed that people from the first group, depending on the type of work they did, had a high or medium level of knowledge, while non-medical workers had an average level of knowledge. In comparison with our own research, the authors of the aforementioned study obtained different results. In the non-medical group, it was found that as the level of knowledge increased, the overall value of the health behavior index and its individual components increased as well, while in the medical group no such statistically significant correlations were found [21]. The difference between the cited study and our own study may be due to the fact that a different research tool was used to verify the level of knowledge of the respondents; in both cases, a questionnaire of the authors' own design was used. The difference may also have been influenced by the differences in the socio-demographic characteristics of the study group. In the study by G.J. Nowicki *et al.*, women predominated among medical professionals (88.2%), while 11.8% of the respondents were men. The opposite was true for the non-medical group: men accounted for 76.45% and women for 23.55% of the respondents [21]. The differences in the study results may also have been influenced by the current professional situation, as only professionally active people participated in the aforementioned study, unlike in our own study.

Previous studies clearly indicate that women, people with higher education, and those with good economic status are more likely to engage in health-promoting behaviors than men and people with lower income [20, 22]. These correlations have also been partially confirmed in our research, in which women exhibited a higher intensity of health-promoting behaviors both in terms of the overall index and in most categories compared to the opposite sex. Furthermore, only people with very good or good financial conditions obtained significantly higher scores in the category of positive mental attitude compared to those who declared average financial conditions. However, no significant correlations were found between the health behavior index according to the IZZ questionnaire and its individual components and the respondents' place of residence. The age of the respondents had a significant impact only on the category of health behaviors related to proper eating habits, with significantly higher scores obtained by people aged 24 to 29 (compared to those aged 18 to 23).

In summary, it should be emphasized that cardiovascular diseases are largely preventable, as their development is mainly due to modifiable risk factors [14]. Health behaviors are key to reducing cardiovascular disease risk factors [14], and because they are not permanent patterns, they can

be shaped throughout life [23]. This means that measures aimed at raising young adults' awareness of risks and knowledge of disease prevention, as well as shaping appropriate attitudes and health behaviors, should be treated as a priority in order to reduce the incidence of cardiovascular disease in the population in the future.

Conclusions

1. The largest percentage of respondents were characterized by average or low levels of health behaviors.
2. The largest group of respondents consisted of people with an average level of knowledge about cardiovascular disease prevention.
3. The results of this study showed that women and people with very good or good financial conditions were more likely to engage in health-promoting behaviors than men and people with lower income.
4. The study results emphasize the importance of shaping healthy behaviors among young adults as well as raising awareness of the risks of cardiovascular disease and preventive behaviors.

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Conflict of interest

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References

1. Główny Urząd Statystyczny. Departament Badań Demograficznych. Trwanie życia w 2022 roku [Central Statistical Office. Demographic Research Department. Life expectancy in 2022]. 2022 [Internet]. Available form: https://stat.gov.pl/obszary-tematyczne/ludnosc/trwanie-zycia/trwanie-zycia-w-2022-roku.2.17.html.
2. World Health Organization. The top 10 causes of death. 2020 [Internet]. Available form: https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death.
3. *Guzik T., Undas A., Szczeklik A., Cybulska B., Kłosiewicz-Latoszek L., Szostak W.B.*: Miażdżyca i ryzyko sercowo-naczyniowe [Stroke and cardiovascular risk]. In: Interna Szczeklika [Szczeklik's Internal Medicin], Gajewski P., Jaeschke R. (eds.). Kraków: Wydawnictwo Medycyna Praktyczna 2021; 152.
4. *Raitakari O., Pahkala K., Magnussen C.G.*: Zapobieganie miażdżycy od dzieciństwa [Prevention of atherosclerosis from childhood]. Nat Rev Cardiol. 2022; 19 (8): 543–554. https://doi.org/10.1038/s41569-021-00647-9.
5. *Dyrcz D.D., Przywara-Chowaniec B.*: Ocena predyspozycji młodych dorosłych do wystąpienia chorób układu krążenia [Assessment of young adults' predisposition to cardiovascular diseases]. Forum Medycyny Rodzinnej. 2019; 13 (1): 36–44.
6. *Garg A., Radhakrishnan S.*: Pediatric hyperlipidemia. Indian Heart Journal. 2024; 76 (1): 104–107. https://doi.org/10.1016/j.ihj.2023.11.269.
7. *Visseren, F.L., Mach F., Smulders Y.M., Carballo D., Koskinas K.C., Bäck M., et al.*: 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology

and 12 medical societies With the special contribution of the European Association of Preventive Cardiology (EAPC). European Heart Journal. 2021; 42 (34): 3227–3337. https://doi.org/10.1093/eurheartj/ehab484.

8. *Koskinen J.S., Kytö V., Juonala M., Viikari J.S.A., Nevalainen J., Kähönen M., et al.*: Childhood risk factors and carotid atherosclerotic plaque in adulthood: The Cardiovascular Risk in Young Finns Study. Atherosclerosis. 2020; 293: 18–25. https://doi.org/10.1016/j.atherosclerosis.2019.11.029.
9. *Chung R.J., Touloumtzis C., Gooding H.*: Staying young at heart: cardiovascular disease prevention in adolescents and young adults. Curr Treat Options Cardiovasc Med. 2015; 17 (12): 61. https://doi.org/10.1007/s11936-015-0414-x.
10. *Włodarczyk E.*: Psychologia zachowań zdrowotnych a promocja zdrowia — wybrane zagadnienia [Psychology of health behavior and health promotion — selected issues]. Medyczna Wokanda. 2019; 12: 61–90. doi: 10.32055/mw.2019.12.4.
11. *Soroń M., Dudziak J., Gancarz K., Lechoniewicz A., Ostrowska A., Skiba K., et al.*: Zachowania zdrowotne a samoocena w grupie młodych dorosłych [Health behaviors and self-esteem in a group of young adults]. Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego 2023; 194–212. doi: 10.15584/978-83-8277-138-1.14.
12. *Juczyński Z.*: Narzędzia pomiaru w promocji i psychologii zdrowia [Measurement tools in health promotion and psychology]. Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego 2012.
13. *Chen L., Li X., Lv Y., Tan X., Zhong W.V., Rong S., et al.*: Physical frailty, adherence to ideal cardiovascular health and risk of cardiovascular disease: a prospective cohort study. Age and Ageing. 2023; 52 (1): 1–9. https://doi.org/10.1093/ageing/afac311.
14. *Kaminsky L.A., German C., Imboden M., Ozemek C., Peterman J.E., Brubaker P.H.*: The importance of healthy lifestyle behaviors in the prevention of cardiovascular disease. Prog Cardiovasc Dis. 2022; 70: 8–15. https://doi.org/10.1016/j.pcad.2021.12.001.
15. *Niezgoda T., Orzeł Z., Wójcik K., Guz E., Sutryk M., Szuster I.*: Analiza wiedzy pacjentów Poradni Kardiologicznej SPZOZ w Garwolinie na temat czynników ryzyka chorób układu krążenia [Analysis of the knowledge of patients of the Cardiology Clinic of the Public Healthcare Centre in Garwolin about the risk factors for cardiovascular diseases]. In: Opieka pielęgniarska i jej aspekty ekonomiczne II [Nursing care and its economic aspects II]. Milecka D., Garwacka-Czachor E., Kędra E. (eds.). Państwowa Akademia Nauk Stosowanych w Głogowie 2024; 132–141.
16. *Barłowska-Trybulec M., Gosek A.*: Wiedza społeczeństwa na temat wpływu aktywności fizycznej na prewencję i leczenie osteoporozy [Public knowledge about the impact of physical activity on the prevention and treatment of osteoporosis]. Art of Healing. 2022; 37 (2): 37–45. doi: 10.4467/18982026SZL.22.013.16672.
17. *Nowicki G.J., Ślusarska B., Kocka K., Piasecka H.*: Stan wiedzy na temat czynników ryzyka i profilaktyki chorób cywilizacyjnych a zachowania zdrowotne pracowników medycznych i niemedycznych [The state of knowledge about risk factors and prevention of lifestyle diseases and the health behavior of medical and non-medical workers]. Medycyna Środowiskowa — Environmental Medicine. 2017; 20 (1): 41–47. https://doi.org/10.19243/2017105.
18. *Mandziuk M.*: Zachowania zdrowotne studentek pielęgniarstwa w Polsce i na Łotwie [Health behaviors of nursing students in Poland and Latvia]. Rozprawy Społeczne. 2017; 11 (4): 50–55. doi: 10.29316/rs.2017.38.
19. *Nowak G., Pawlas K., Duda S., Kulik A., Nowak D.*: Poczucie własnej skuteczności a zachowania zdrowotne i satysfakcja z życia studentów dietetyki [Self-efficacy, health behaviors, and life satisfaction among dietetics students]. Psychologia Rozwojowa. 2018; 23 (3): 83–95. doi: 10.4467/20843879PR.18.018.9359.
20. *Marmola M., Wańczyk-Welc A.*: Zachowania zdrowotne a poczucie satysfakcji z życia u młodych dorosłych [Health behaviors and life satisfaction in young adults]. Fides et Ratio. 2017; 32 (4): 185–196.
21. *Nowicki G.J., Ślusarska B., Kocka K., Piasecka H.*: Stan wiedzy na temat czynników ryzyka i profilaktyki chorób cywilizacyjnych a zachowania zdrowotne pracowników medycznych i niemedycznych [The state

of knowledge about risk factors and prevention of lifestyle diseases and the health behavior of medical and non-medical workers]. Medycyna Środowiskowa — Environmental Medicine. 2017; 20 (1): 41–47. https://doi.org/10.19243/2017105.

22. *Czerski W.*: Zachowania zdrowotne a intensywność użytkowania Facebooka wśród studentów [Health behaviors and the intensity of Facebook use among students]. Rozprawy Społeczne. 2021; 15 (1): 30–47.
23. *Nowicki G.J., Ślusarska B., Zboina B., Kocka K., Bartoszek A., Wiśniewska A.*: Zakres rozumienia pojęcia „zachowania zdrowotne" oraz uwarunkowania aktywności zdrowotnej człowieka [The scope of understanding the concept of "health behawior" and the determinants of human health activity]. Acta Scientifica Academiae Ostroviensis. Sectio A, Nauki Humanistyczne, Społeczne i Techniczne. 2018; 11 (1): 372–387. https://doi.org/10.33674/acta_1720181.