Original Article Pol J Public Health, Vol. 136 (2026): 1-6

Assessment of body mass index (BMI) and its association with nutritional knowledge and selected lifestyle-related behaviors in adults

Aleksandra Nowobilska-Luberda[1,A-B,D-I,K-L] ✉, Emilia Wacławik-Kapłon[1,A-B,D-G,K-L]

[1] *Instytut Zdrowia, Akademia Nauk Stosowanych w Nowym Targu, Poland*

A – Development of the concept and methodology of the study; B – Query – a review and analysis of the literature; C – Submission of the application to the appropriate Bioethics Committee; D – Collection of research material; E – Analysis of the research material; F – Preparation of draft version of manuscript; G – Critical analysis of manuscript draft version; H – Statistical analysis of the research material; I – Interpretation of the performed statistical analysis; K – Technical preparation of manuscript in accordance with the journal regulations; L – Supervision of the research and preparation of the manuscript

Abstract

Introduction. Body mass index (BMI) is a widely used indirect indicator of nutritional status in adults, although it does not reflect body composition. The relationships between BMI, nutritional knowledge and lifestyle factors remain inconclusive.

Aim. The aim of the study was to assess BMI and its associations with nutritional knowledge and selected lifestyle factors in adults.

Materials and methods. The study included 107 adults aged 20–63 years from Poland. Data were collected using an anonymous online questionnaire based on selected sections of the KomPAN® questionnaire. BMI was calculated from self-reported body weight and height according to World Health Organization criteria. Nutritional knowledge was assessed using 13 selected questions. Correlation analyses were performed using Spearman's rank and Pearson's coefficients ($p < 0.05$).

Results. No significant associations were found between BMI and overall nutritional knowledge or selected unhealthy dietary behaviors. A significant weak negative correlation was observed between BMI and sleep duration ($\rho = -0.21$; $p = 0.030$). In gender-stratified analyses, a positive association between BMI and nutritional knowledge was observed only in women.

Conclusions. Sleep duration was the only lifestyle factor significantly associated with BMI. Nutritional knowledge alone was not related to BMI, suggesting that knowledge may not translate into a healthier body weight. The findings emphasize the role of sleep hygiene in obesity prevention.

Keywords: public health, sleep duration, nutritional knowledge, lifestyle factors, body mass index (BMI), dietary behaviors.

DOI: 10.12923/2083-4829/2026-0001

INTRODUCTION

A healthy lifestyle can be defined as a pattern of behaviours that reduces the risk of serious illness and premature mortality. According to the World Health Organization (WHO), it primarily includes a healthy and balanced diet, regular physical activity, maintaining proper body weight, avoiding stimulants, adequate sleep, and stress management [1]. However, a study conducted by the Ministry of Sport and Tourism showed that only 34% of Poles aged 15–69 meet the WHO recommendations for physical activity during leisure time [2].

Body Mass Index (BMI) is a commonly used indicator for assessing nutritional status and health risk in adults. Excessive body weight is associated with the increased risk of multiple chronic diseases, such as type 2 diabetes, cardiovascular diseases, and certain cancers. Lifestyle factors – including dietary habits, physical activity, sleep duration, and economic status – play a key role in determining BMI values [3].

Although BMI is a widely used and practical measure in population studies, it does not reflect body composition and should be interpreted as an indirect indicator of nutritional status.

Adequate sleep duration and recovery positively affect human health. Evidence indicates that adults with shorter sleep duration have a higher risk of developing abdominal obesity compared with those who sleep longer. These findings suggest that sleep deprivation may be an important risk factor for fat accumulation in the abdominal area, highlighting the importance of adequate sleep in preventing central obesity [4].

Population-based data indicate that the overall quality of dietary habits among Polish adults remains suboptimal. Results from the National Multicentre Health Survey (WOBASZ II) have shown that insufficient consumption of vegetables and fruits and deviations from dietary recommendations are common in the adult population. Furthermore, recent Polish population-based research has demonstrated that diet quality is influenced by nutritional knowledge as well as selected sociodemographic and lifestyle factors, highlighting the complexity of determinants shaping dietary behaviors in adults [5,6].

Although several Polish studies have examined selected lifestyle factors or nutritional knowledge separately, fewer analyses have simultaneously assessed BMI, nutritional knowledge, sleep duration and dietary behaviors in adult populations [6-9].

AIM OF THE STUDY

The main aim of the study was to assess body mass index (BMI) as an indicator of nutritional status and to analyze its associations with nutritional knowledge and selected lifestyle factors in adults.

The specificobjectives were listed below:

1. to evaluate the level of nutritional knowledge using selected questions from the KomPAN® questionnaire;
2. to examine the relationship between BMI and selected dietary behaviors, sleep duration, physical activity, and financial situation;
3. to assess gender-specific differences in the associations between BMI, nutritional knowledge, and selected lifestyle factors.

MATERIALS AND METHODS

The study group consisted of 107 adults aged 20–63 years from various regions of Poland, with the majority residing in the MałopolskieVoivodeship. The adopted age range reflects the adult population eligible for the KomPAN® questionnaire, which is intended for individuals aged 16–65 years.The sociodemographic characteristics of the study participants, including, among others, age, sex, and place of residence, are presented in Table 1.

Participants were recruited using convenience sampling through online distribution of the questionnaire. The adopted age range reflects the adult population eligible for the KomPAN® questionnaire. Participation in the study was voluntary and anonymous. All respondents provided informed consent prior to their participation in the research.

The study was conducted using an anonymous questionnaire. Participation was voluntary, and all participants provided informed consent to take part in the study. According to national regulations, studies based on anonymous and voluntary questionnaire surveys that do not involve medical intervention or the collection of sensitive personal data do not require approval from a bioethics committee. The study was conducted in accordance with the principles of the Declaration of Helsinki.

A questionnaire based on the KomPAN® survey tool [10] was used for the study. The data was collected in December 2024 and January 2025. Participation was voluntary and anonymous. Data were gathered using a survey method. Respondents answered questions regarding sociodemographic data, including gender, age, place of residence, economic status, and the number of people in the household. The questionnaire also included questions related to anthropometric data, such as body weight and height. Based on these values, the Body Mass Index (BMI) was calculated by dividing body weight (kg) by the square of height (m^2), to assess the nutritional status of the respondents according to WHO criteria for adults [3].

Participants' knowledge was assessed using 13 questions from Part C of the KomPAN® questionnaire, a tool designed to analyze nutritional beliefs and habits of people aged 16–65. The questions addressed knowledge on topics such as carbohydrates, milk, fruits and vegetables, salt intake, fat intake, consumption of marine fish, and vitamins [10]. Part C of the KomPAN® questionnaire focuses on nutrition-related beliefs and knowledge. The selected items were deliberately chosen to assess respondents' understanding of key dietary principles relevant to body weight regulation.

Other parts of the KomPAN® questionnaire (A, B, and D), which address dietary habits, food frequency, and lifestyle behaviors, were used separately to analyze selected lifestyle-related factors.

Thirteen questions from Part C of the KomPAN® questionnaire were deliberately selected to assess basic nutritional knowledge relevant to body weight regulation and overall diet quality. These questions address key dietary concepts related to energy balance, fat and carbohydrate intake, fiber consumption, salt intake, and vitamin D synthesis, which are indirectly associated with lifestyle behaviors influencing BMI. Although the selected items do not directly measure nutritional status, they provide insight into respondents' awareness of dietary principles that may affect long-term body weight and health outcomes.The selected items do not measure nutritional status directly. Their purpose was to assess respondents' awareness of fundamental dietary principles related to energy balance

TABLE 1. Frequency analysis for sociodemographic variables, including gender, size of place of residence, number of adults and underage individuals in the household, self-assessed financial situation, and sleep duration in the surveyed group of respondents (N = 107).

Sex	**N**	**Percent**
Women	76	71.0
Men	31	29.0
Place of residence	N	Percent
Rural area	49	45.8
City below 20,000 inhabitants	24	22.4
City with 20,000-100,000 inhabitants	19	17.8
City above 100,000 inhabitants	15	14.0
Number of person members in the household	N	Percent
1	10	9.3
2	19	17.8
3	19	17.8
4	26	24.3
5	17	15.9
6	11	10.3
7	3	2.8
8	1	0.9
10	1	0.9
Number of minors underage persons in the household	N	Percent
0	57	53.3
1	23	21.5
2	17	15.9
3	8	7.5
4	2	1.9
Self-assessment of financial situation	N	Percent
Below average	9	8.4
Average	74	69.2
Above average	24	22.4
Sleep duration	N	Percent
6 hours or less per day	31	29.0
7-8 hours per day	74	69.2
9 hours or more per day	2	1.9

and diet quality, which may indirectly influence long-term body weight regulation. In the present study, nutritional knowledge was therefore treated as a potential modifying factor rather than a direct determinant of BMI.

It should be noted that commonly used questionnaires in nutritional research assessing dietary beliefs and eating habits (e.g., the KomPAN® questionnaire developed under the editorship of Gawęcki) are not psychometric scales and therefore do not report internal consistency coefficients. This is because they do not measure a single latent construct but rather a set of descriptive indicators reflecting behaviors and nutrition-related beliefs.

The individual questions are presented in Table 3.

Two composite indices were created: the Knowledge Index and the Nutrition Index. The Knowledge Index was calculated by summing the number of correct answers for each respondent.The internal consistency of the constructed Knowledge Index, based on 13 dichotomous items, was assessed using the Kuder–Richardson 20 (KR-20) coefficient.The Nutrition Index was calculated by summing points for the following variables: snacking, fast food consumption, sweets, and drinking of sweet beverages.

Statistical analyses were performed using IBM SPSS Statistics 29. Basic descriptive statistics were analyzed, along with Kolmogorov-Smirnov tests and correlation analyses using Pearson's r and Spearman's rho coefficients. The significance level was set at the conventional $\alpha = 0.05$.

Because of missing data od specific variables, sample sizes differed across variables and analyses; therefore, N values refer to the number of available observations.

RESULTS

The distribution of selected lifestyle-related behaviors, including dietary habits, sleep duration, and self-assessed financial situation, is presented in Table 1.

Basic descriptive statistics for anthropometric variables, including BMI, body weight, and height, are presented in Table 2.

TABLE 2. Correlation analysis of data of Group 1 respondents.

	M	Me	SD	Sk.	Kurt.	Min.	Max.
Body weight (kg)	70.89	67.00	16.21	1.29	1.73	42.00	130.00
Height (cm)	169.57	168.00	8.48	0.26	-0.64	152.00	190.00
BMI (kg/m^2)	24.51	23.59	4.50	1.65	3.22	18.18	41.97
Age	33.42	32	10.58	0.39	-0.82	20	63

Note. M – mean; Me – median; SD – standard deviation; Sk. – skewness; Kurt. – kurtosis; Min. and Max. – minimum and maximum values of the distribution

To verify whether the assumption of normal distribution was met for the measured quantitative variables (BMI, Knowledge Index, and Proper Nutrition Index), an analysis of basic descriptive statistics along with the Kolmogorov-Smirnov test was first performed. The test results were statistically significant for all measured variables (BMI: $p<0.001$, Knowledge Index: $p=0.004$, and Proper Nutrition Index: $p=0.030$). However, the skewness and kurtosis values, with the exception of BMI, did not exceed the absolute value of 1, which means that the distributions were not significantly asymmetric compared to a Gaussian curve [11]. Therefore, parametric tests could be applied to test the hypotheses, provided that no other assumptions were violated.

Respondents' knowledge of nutrition

An initial frequency analysis was conducted to determine the number of correct and incorrect answers given for each of the 13 questions assessing respondents' knowledge of proper nutrition. The KR-20 coefficient for the Knowledge Index was 0.57, indicating moderate internal consistency. The summary is presented in Table 3.

The most challenging question was Question 1 – whether cereal products should be consumed only once per day – while the easiest was Question 11 – whether sun exposure supports the production of vitamin D in the body. Respondents also struggled with questions about the main sources of dietary energy and culinary processing of the food. For instance, only 29% of respondents correctly answered Question 13 – whether the use of cold water rather than hot water in processing vegetables may help to preserve their nutritional values. The total possible score ranged from 0 to 13, with an average score of 8.27 and a median score of 8. Thus, over half of the participants scored 8 or higher, indicating a satisfactory level of nutritional knowledge (see Table 3).

TABLE 3. Distribution of correct answers to 13 questions assessing participants' knowledge of nutrtion (N = 107).

	Percentage
1. Cereal products are sufficient when consumed once per day.	
Correct	25.2
2. Only children and adolescents should consume milk.	
Correct	74.8
3. Fruits and/or vegetables should be included in every meal.	
Correct	78.5
4. High salt intake protects against hypertension.	
Correct	83.2
5. Reduction of fatty foods in the diet helps to prevent cardiovascular disease.	
Correct	85.0
6. Frequent consumption of fatty marine fish accelerates atherosclerosis.	
Correct	63.6
7. Canola oil and olive oil contain a lot of cholesterol.	
Correct	57.0
8. Wholegrain bread contains more fiber than white bread.	
Correct	86.0
9. Complex carbohydrates in the diet should be replaced with simple sugars.	
Correct	57.0
10. Protein should be the main source of energy in a proper diet.	
Correct	27.1
11. Sun exposure promotes the production of vitamin D in the body.	
Correct	96.3
12. Consuming fruits rich in vitamin C increases iron absorption.	
Correct	64.5
13. The use of cold water rather than hot water in processing vegetables may help to preserve their nutritional values.	
Correct	29.0

Relationship between BMI and knowledge

In order to deepen the above analysis, the relationship between the Knowledge Index and the study participants' BMI was examined using Spearman's rank correlation. The result was not statistically significant: ρ = 0.12; p = 0.214, which means BMI was independent of overall knowledge levels in this study group. However, further analyses stratified by sex revealed a different pattern of associations between BMI and nutritional knowledge, which is presentedin the Table 7. Both variables are independent of each other in the studied sample.

Association between BMI and dietary habits of the respondents

In the next step of the statistical analysis, the potential association between BMI and the frequency of incorrect dietary habits was examined. Due to the asymmetric distribution of BMI and the ordinal nature of the frequency of unhealthy eating behaviors, Spearman's rank correlation coefficient was used in this part of the analysis as well.

The obtained results were not statistically significant for any of the analyzed behaviors, including snacks between meals, consumption of fast food, sweets, and sugar-sweetened beverages. Therefore, there is no basis to conclude that the frequency of unhealthy dietary behaviors is associated with respondents' BMI. The correlation results are summarized in Table 4.

TABLE 4. Spearman's rank correlation between BMI and the frequency of exhibiting incorrect dietary habits (N = 106).

		BMI
Snacks ing	*Spearman's rho*	0.07
	p-value	0.491
Fast food	*Spearman's rho*	0.04
	p-value	0.667
Sweets	*Spearman's rho*	0.14
	p-value	0.159
Sugar-sweetened beverages	*Spearman's rho*	0.04
	p-value	0.717

In order to further clarify the above findings, an additional analysis was conducted by correlating BMI with a constructed index of the severity of incorrect dietary habits. However, the Spearman's rho correlation analysis did not indicate a co-occurrence of the two variables in the studied population, rS = 0.112; p = 0.255.The calculated coefficient was not statistically significant, and therefore there is no basis to conclude that BMI is correlated with the overall severity of incorrect dietary behaviors.

Relationship between BMI and sleep duration, physical activity self-assessment and financial situation

An analogous analysis was performed to examine the relationship between BMI and sleep duration, self-assessed physical activity and financial situation. The calculated Spearman's rho coefficients indicated only one statistically significant correlation – between BMI and sleep duration.Most respondents reported sleeping 7-8 hours per night, while a smaller proportion declared sleep duration of ≤6 hours or ≥9 hours. The detailed distribution of sleep duration categories is presented in Table 1.

This was a week negative correlation The inverse nature of the relationship indicates that as the amount of sleep increases (7-8 hours per day), BMI tends to decrease. The other two correlations (physical activity and financial status) were not statistically significant. The results are shown in Table 5.

TABLE 5. Spearman's rank correlation between BMI and sleep duration, physical activity, and financial situation of the respondents (N = 106).

		BMI
Sleep duration	*Spearman's rho*	-0.21
	p-value	0.030
Physical activity	*Spearman's rho*	-0.07
	p-value	0.457
Financial situation	*Spearman's rho*	-0.03
	p-value	0.729

The relationship between knowledge and nutrition, financial situation, physical activity, and sleep duration was also analyzed. None of the calculated coefficients indicated a statistically significant correlation, as shown in Table 6. This means that respondents' knowledge did not correlate with their dietary habits, economic status, physical activity, or sleep duration.

TABLE 6. Pearson's and Spearman's correlations between knowledge and nutrition, financial status, physical activity, and sleep duration (N = 107).

		Knowledge
Nutrition	*Spearman's rho*	-0.13
	p-value	0.174
Financial status	*Spearman's rho*	-0.06
	p-value	0.558
Physical activity	*Spearman's rho*	0.02
	p-value	0.870
Sleep duration	*Spearman's rho*	0.14
	p-value	0.163

BMI correlations by gender

An additional correlation analysis between BMI and selected variables was performed separately for men and women. The results are presented in Table 7.

TABLE 7. Spearman's rank correlation between BMI and the variables described in the table among the respondents, stratified by gender (N = 106).

			BMI
		Women	Men
Snacks ing	*Spearman's rho*	0.13	0.07
	p-value	0.256	0.728
Fast food	*Spearman's rho*	-0.13	0.02
	p-value	0.253	0.930
Sweets	*Spearman's rho*	0.14	0.33
	p-value	0.225	0.069
Sugary drinks	*Spearman's rho*	-0.14	0.02
	p-value	0.228	0.900
Unhealthy Nutrition Index	Spearman's rho	0.04	0.21
	p-value	0.740	0.268
Knowledge	*Spearman's rho*	0.23	0.02
	p-value	0.044	0.934
Financial situation	*Spearman's rho*	-0.05	0.15
	p-value	0.674	0.422
Sleep duration	*Spearman's rho*	-0.18	-0.35
	p-value	0.131	0.057
Physical activity	*Spearman's rho*	-0.09	-0.10
	p-value	0.467	0.596

A significant correlation was found between BMI and knowledge in women only. This positive correlation suggests that among women, higher nutritional knowledge is associated with higher BMI. In men, there was a correlation approaching statistical significance between BMI and sweet consumption – a moderately strong positive correlation. This indicates that the more frequently men consume sweets, the higher their BMI. Additionally, in men, a similar correlation was found between BMI and sleep duration – a moderately strong negative correlation, meaning that longer sleep is associated with lower BMI.

LIMITATIONS

This study has several limitations that should be considered when interpreting the results. Firstly, the sample size was relatively small (n = 107) and was not fully representative of the general adult population, as most participants resided in the Małopolskie Voivodeship. Secondly, body weight and height were self-reported, which may have introduced reporting bias. Thirdly, due to the cross-sectional design of the study, causal relationships between BMI, nutritional knowledge, and lifestyle factors cannot be established. Additionally, BMI was used as an indirect indicator of nutritional status and does not account for body composition or fat distribution, which may limit the interpretation of the results. Finally, nutritional knowledge was assessed using a limited number of selected questions from the KomPAN® questionnaire, which may not fully capture the complexity of dietary knowledge.

DISCUSSION

Advances in scientific research have improved understanding of the relationships between diet, lifestyle, and health status. One of the most important challenges for European countries – and globally – will be to improve the quality of life and the health of the adult population. Numerous sources indicate that nutritional disorders are a significant public health issue. Proper nutritional status influences well-being, quality of life, disease progression and treatment outcomes. In recent years, research on healthy dietary behaviors has gained importance in the context of increasing rates of overweight and obesity. The findings of this study were compared with the results of other studies on similar topics conducted among adults.[3, 12-13].

In the present study group, the level of nutritional knowledge among most respondents was satisfactory. A similar observation was made by other researchers [14], whose analysis, based on the KomPAN® questionnaire, also showed a satisfactory level of knowledge among patients.

Our study demonstrated that BMI did not correlate with the overall Knowledge Index, in line with findings by Jeżewska-Zychowicz and Plichta, who reported no association between nutrition knowledge and BMI in Polish young adults. This suggests that nutritional knowledge alone may not translate into measurable body-weight outcomes and is influenced by behavioral, psychological, and environmental factors. Therefore, nutritional knowledge constitutes a necessary but not sufficient condition for healthy eating behaviors[7].

In our study, no significant correlation was found between unhealthy dietary behaviors and BMI. Importantly, recent evidence from adult populations indicates that high consumption of ultra-processed foods may be associated with adverse obesity-related outcomes, such as abdominal obesity, without corresponding increases in BMI. This suggests that BMI alone may not fully capture the health impact of unhealthy dietary behaviors and that additional anthropometric or metabolic indicators may be required to adequately assess diet-related health risks [15].

An important public health aspect is the role of sleep, with increasing evidence that insufficient sleep is a risk factor for obesity and metabolic disorders. In our study, shorter sleep duration (≤6 hours) was associated with higher BMI, consistent with findings from other studies [8,16]. Sleep deprivation promotes hormonal dysregulation (increased ghrelin, decreased leptin), which may lead to increased appetite [17].

Our study also showed that nutritional knowledge was not associated with financial situation, physical activity, or sleep duration, suggesting that knowledge alone cannot overcome the complex web of socioeconomic and behavioral influences that shape dietary choices. Supporting this, a representative cross-sectional survey of Polish adults demonstrated that nutrition-related behaviors are influenced by a range of sociodemographic and lifestyle factors, highlighting the complexity of determinants shaping dietary practices in this population [7].

This underscores that individual knowledge is only one part of a larger set of determinants influencing diet quality and health outcomes.

Only in women was a correlation found between BMI and nutritional knowledge, possibly reflecting greater attention to meal quality among women being overweight. Previous Polish studies have shown that women are more likely than men to engage in dieting behaviors, pay attention to food choices, and demonstrate a higher interest in nutrition-related issues, which may contribute to higher levels of nutritional knowledge in this group. This may help to explain the observed association in the present study [7].

Although some statistically significant associations were observed, their strength was weak (ρ values around 0.2), and in some cases the results were borderline significant (e.g., the association between BMI and nutritional knowledge in women). Therefore, these findings should be interpreted with caution. The relatively small size of the male subgroup and the multiple correlation analyses performed increase the risk of type I error. Consequently, the observed associations may not fully reflect stable relationships at the population level and should be confirmed in larger samples.

The findings of this study suggest that preventing overweight and obesity requires attention not only to nutritional knowledge but also to everyday lifestyle factors, particularly sleep habits and individual dietary behaviors. The observed associations indicate that improving health outcomes in adults may depend on integrating nutritional education with practical lifestyle modifications. These results highlight the importance of promoting comprehensive health awareness that combines knowledge with sustainable daily habits.

CONCLUSIONS

1. In the studied group of adults, a statistically significant association was observed between body mass index (BMI) and sleep duration, with shorter sleep being related to higher BMI values.
2. No significant relationship was found between BMI and the level of nutritional knowledge in the entire study population, indicating that knowledge alone is not sufficient to determine proper nutritional status.

3. After stratification by sex, a positive association between BMI and nutritional knowledge was observed in women, which may suggest a greater interest in nutrition among women with excess body weight.
4. No significant associations were observed between BMI and the frequency of selected unhealthy dietary behaviors, physical activity level, or the financial situation of the respondents.
5. The obtained results highlight the important role of sleep as a factor related to body weight in adults and indicate the need to include sleep hygiene in obesity prevention programs.

REFERENCES

1. World Health Organization. Everyday actions for better health: WHO recommendations. Geneva: WHO; 2025. Available from: https://www.who.int/europe/news-room/fact-sheets/item/everyday-actions-for-better-health-who-recommendations [cited 2025 Dec 18].
2. Ministerstwo Sportu i Turystyki. Poziom aktywności fizycznej Polaków 2024. Warszawa: Ministerstwo Sportu i Turystyki; 2024. Available from: http://www.gov.pl [cited 2025 Apr 5].
3. World Health Organization. Obesity and overweight. Geneva: WHO; 2024. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight [cited 2025 Apr 5].
4. Kohanmoo A, Akhlaghi M, Sasani N, et al. Short sleep duration is associated with higher risk of central obesity in adults: a systematic review and meta-analysis of prospective cohort studies. Obes Sci Pract. 2024. Epub ahead of print. doi:10.1002/osp4.772.
5. Kwaśniewska M, Pikala M, Bielecki W, et al. Ten-year changes in adherence to a healthy diet in a nationwide sample of Polish adults: results of the WOBASZ surveys. Nutr Metab Cardiovasc Dis. 2021;31(6):1876-1885. doi:10.1016/j.numecd.2021.02.012.
6. Kucharska A, Sińska BI, Panczyk M, et al. Nutritional knowledge, sociodemographic, and lifestyle factors as determinants of diet quality – a Polish population-based study. Front Public Health. 2025;13:1613598. doi:10.3389/fpubh.2025.1613598.
7. Jeżewska-Zychowicz M, Plichta M. Diet quality, dieting, attitudes and nutrition knowledge: their relationship in Polish young adults – a cross-sectional study. Int J Environ Res Public Health. 2022;19(11):6533. doi:10.3390/ijerph19116533.
8. Suliga E, Kozieł D, Cieśla E, et al. Sleep duration and the risk of obesity – a cross-sectional study. Med Stud. 2017;33(3):176-183. doi:10.5114/ms.2017.70343.
9. Żarnowski A, Jankowski M, Gujski M. Nutrition Knowledge, Dietary Habits and Food Labels Use – A Representative Cross-Sectional Survey Among Adults in Poland. Int J Environ Res Public Health. 2022;19(18):11364. doi:10.3390/ijerph191811364.
10. Jeżewska-Zychowicz M, Gawęcki J, Wądołowska L, et al. KomPAN® questionnaire for dietary habits and nutrition beliefs assessment in youth aged 16–18 and adults, version 2.2 – self-administered version. In: Gawęcki J, editor. KomPAN® questionnaire for dietary habits and nutrition beliefs assessment and data processing procedures. Warsaw: Committee of Human Nutrition Science, Polish Academy of Sciences; 2024. p. 22-34. Available from: https://diettools4u.uwm.edu.pl/kompan/ [cited 2025 Apr 17].
11. George D, Mallery P. IBM SPSS Statistics 27 Step by Step: A Simple Guide and Reference. 17th ed. New York: Routledge; 2022.
12. Afshin A, Sur P, Fay KA, et al. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2019;393(10184):1958-1972. doi:10.1016/S0140-6736(19)30041-8.
13. Ng M, Gakidou E, Murray CJL, et al. Global, regional, and national prevalence of adult overweight and obesity: analysis based on the Global Burden of Disease Study 2021. Lancet. 2025. doi:10.1016/S0140-6736(25)00355-1.
14. Bieniek-Walenda J, Brończyk-Puzoń A, Jagielski P. Evaluation of nutrition knowledge using the KomPAN questionnaire in acute coronary syndrome patients hospitalized in an invasive cardiology unit: a preliminary report. Folia Cardiol. 2020;15(1):1-5. doi:10.5603/FC.2020.0012.
15. Lu W, et al. Ultra-Processed Food Consumption Is Associated with an Increased Risk of Abdominal Obesity but Not with BMI-Defined Overweight and Obesity in Adults. Foods. 2025;14(22):3955. doi:10.3390/foods14223955.
16. Zhou Q, Zhang M, Hu D. Dose-response association between sleep duration and obesity risk: a systematic review and meta-analysis of prospective cohort studies. Sleep Breath. 2019;23(4):1035-1045. doi:10.1007/s11325-019-01824-4.
17. Van Egmond LT, Meth EMS, Engström J, et al. Effects of acute sleep loss on leptin, ghrelin, and adiponectin in adults with healthy weight and obesity: a laboratory study. Obesity (Silver Spring). 2023;31(3):512-520. doi:10.1002/oby.23616.

ORCID

Aleksandra Nowobilska-Luberda https://orcid.org/0000-0003-2359-2486
Emilia Wacławik-Kapłon https://orcid.org/0000-0002-1047-2111

Corresponding author
Aleksandra Nowobilska-Luberda
Instytut Zdrowia, Akademia Nauk Stosowanych w Nowym Targu,
Kokoszków 71, 34-400, Nowy Targ, Polska;
email: aleksandra.nowobilska-luberda@ppwsz.home.pl