

## PSYCHOSOCIAL FACTORS AND HEALTH-RELATED BEHAVIOR AMONG STUDENTS FROM SOUTH-EAST POLAND

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**Abstract:** The aim of this study was to determine the meaning of selected social-demographic factors, such as: gender, place of resident, education, level of knowledge about health and life orientation in modifying the behaviours related to health among university students. The study was conducted among 521 students of two major universities of the South-Eastern Region of Poland. The survey was conducted by means of a diagnostic survey with the use of the Inventory of Health-Related Behaviour (Zygfryd Juczynski's IZZ), A. Antonovsky's Sense of Coherence Questionnaire SOC-29 and the original questionnaire, including socio-demographic variable, as well as a test of statements considering the assessment of the level of knowledge about health. Methods of descriptive statistics, such as: mean, standard deviation, median, upper and lower quartile, and highest and lowest value, methods of analysis of variance, the chi-square test, correlation and linear regression and Spearman's rank correlation coefficient, one-way analysis of variance, Pearson product-moment correlation coefficient, and backward stepwise regression were used for statistical analysis. The study showed that almost a half of respondents (48.9%) were characterized by a low intensity of pro-health behaviour, and among 38.4% it was on an average level. Gender was a factor that differentiated the intensity of health-related behaviour – women indicated a higher level of these behaviours. Almost half of the studied group (48.6%) was characterized by a low level of knowledge about health. The major meaning among studied factors influencing health-related behaviour in the regression model had the level of sense of coherence, gender and material status.

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### INTRODUCTION

The modern holistic concept of health defines it as a state of dynamic balance between spheres of physiology, psychology and sociology. Lifestyle, and related to it pro-health behaviour are, next to biology and genetic factors, health care accessibility, health care quality and socio-psychological attributes of the environment, the main determinant the potential of health [11].

It is assumed that universities are the places for shaping the moral and intellectual élite of society. Graduates, when taking up leading positions in various disciplines, have a significant impact on shaping human attitudes in many spheres of social activity, and above all, in the sphere of health-related behaviour, promoting patterns of pro-health behaviour. According to the literature, a growing body of research investigates students' knowledge of different health-related behaviour [7, 19, 24], student's knowledge

about different behaviours related to health [1, 8, 13], as well as the impact of different psycho-social factors on health and lifestyle. It is therefore important to explore behaviours among young people [6, 20, 21, 22].

In general, young people are aware of the risks and harmful effects of tobacco smoking, alcohol consumption, lack of proper nutrition habits, or low levels of physical activity [7]; however, a lack of strong motivation makes it difficult come to proper decisions concerning health. It is therefore important to continue the research in the scope of this topic among young people.

In recent years, health-related behaviours have become the fundamental area of interest of practitioners and scientists of many disciplines. A growing body of researches and government programmes considering health have focused on individual or group behaviours [10].

According to the professional literature, health-related behaviours and lifestyles are related to the salutogenic concept of health. The main concept of Antonovsky's theory states that each person has an individual predisposition which makes him or her more or less resistant to stressful factors with which he or she is confronted in everyday life. Antonovsky precisely identifies those predispositions determined by him as a sense of coherence (SOC). According to him, SOC guarantees efficient methods of coping with stress and has a positive influence on health-related behaviour. Therefore, in a significant way, it also helps to maintain a good state of health [2, 3, 4].

Researches dedicated to SOC and its impact on human health have been carried out only recently and are the current subject of many international and Polish studies; nevertheless, there are still few reports linking SOC with patterns of health-related behaviour among young people [25, 26]. Originally, SOC was studied in adults, but lately several studies have been conducted among children and young people [26].

The aim of this study was to determine the meaning of selected social-demographic factors, such as: gender, place of resident, education, level of knowledge about health and life orientation in modifying the behaviours related to health among university students.

## MATERIALS AND METHODS

A proper study was preceded by a pilot study conducted among 50 students of the University of Rzeszów. The proper study was conducted between January–June 2006 among 555 students of two major universities of the Podkarpackie Region, Poland: University of Rzeszów and the Technical University. The students represented the following faculties: Polish and English philology, nursing and midwifery, mathematics and physics. The study population was purposefully chosen and restricted to the last years of full-time students of science, the humanities and medicine. This allowed for unification of the study population in terms of age and university experience, and also provided a

cross-section between different faculties of study. The analyzed sample provided a complete representation of young academic experience, adapted to the particular lifestyle and adopted certain patterns and behaviours.

Participation in the survey was both voluntary and anonymous and the research material was treated confidentially. The students were given instructions in a covering letter, followed by the questionnaire, and before the survey orally informed about the procedure and purpose of study. The use of codes was used to identify the faculty of study of the examined group. Return of the filled-in questionnaires was accompanied by confirmation of participation agreements. The studied sample was statistically estimated with accuracy of  $\pm 4.3\%$  and a 95% confidence interval. A preliminary sample of 555 people was selected. From the 536 replies, 521 were qualified as correctly filled-in, which constitutes 93.8% of the assumed sample. The study population included:

- 183 (35%) Technical University students representing scientific faculties such as mathematics and physics;
- 338 (65%) University of Rzeszów students representing the humanities faculties, namely Polish and English philology, and medical, such as nursing and midwifery.

The survey was conducted by means of a diagnostic survey with the use of A. Antonovsky's Sense of Coherence Questionnaire SOC-29, the original questionnaire, and the Inventory of Health-Related Behaviour (Zygfryd Juczynski's IZZ).

The Inventory of Health-Related Behaviour was created by Zygfryd Juczynski in 1997. The Inventory includes 24 statements describing different behaviours related to health. Taking into consideration indicated by scientists frequency of individual behaviours, a general intensity of health-related behaviour in 5-level scale. The Inventory of Health-Related Behavior (Zygfryd Juczynski's IZZ) was used in order to establish the general intensity of pro-health behaviour as well as the intensity of the four categories of pro-health behaviours: proper nutrition habits (type of foods, well-balanced diet), prophylaxis (health recommendation, health and disease information), positive attitude (psychological factors, such as avoiding too strong emotions, stress, anxiety and depressive situations) and pro-health practices (sleep habits, recreation and physical activity).

With the use of the Sense of Coherence Questionnaire SOC-29 [16] the level of sense of coherence was measured.

With the use of the original questionnaire the knowledge about health was assessed. The questionnaire consisted of 20 affirmative statements regarding the attitudes related to proper nutrition habits, the relation between determined elements of diet and cardiovascular diseases, and cancer diseases, the influence of the use of intoxicants (smoking, alcohol) and medicaments, the role of physical activity and prophylaxis. Statements were made using the following rules:

- 13 statements included content in accordance with common knowledge; a proper answer consisted in putting 'X' in the column "true";

• 7 statements included content in contradiction to common knowledge; a proper answer consisted in putting 'X' in the column "false".

Answers "no opinion" were recognized as a lack of knowledge. Based on the quantity of proper answers, the level of knowledge of each respondent was determined. The results were presented in the scale of knowledge about health:

- High level of knowledge – indicating a minimum of 18 out of 20 statements (90–100%);
- Average level of knowledge – indicating a minimum of 17–15 statements (85–75%);
- Low level of knowledge – indicating a minimum of 14–10 statements (70–50%);
- Very low level of knowledge – indicating 9 statements (less than 50%).

The questionnaire also contained 7 general questions determining indicators of independent variable (i.e. gender, age, specialization, parents' education, place of residence, family status and financial status).

The gathered data were statistically prepared by means of a statistical package STATISTICA 9.0. Types of descriptive statistics, such as mean, standard deviation, median, upper and lower quartile, and highest and lowest value, methods of analysis of variance, the chi-square test, correlation and linear regression and Spearman's rank correlation coefficient, one-way analysis of variance, Pearson product-moment correlation coefficient, and backward stepwise regression, were used for statistical analysis.

## RESULTS

Among the studied population, the majority were women 76.1%. Humanities and medical faculties were almost equally feminized (87% and 97.6%, respectively). Men prevailed in the scientific faculties – comprising 53.8%, whereas women comprised 46.2%. Half of the respondents were aged 20–21 years or older. More than a half of respondents were from rural areas (56.3%). Almost half (45.1%) of the population described their financial situation as relatively good, 30.8% as good, 16.6% as difficult, and 3.7% as very good.

The majority of fathers (43.9%) had vocational education, followed by: 36.6% secondary education, 12.3% higher education, 5.3% elementary education and 1.9% undergraduate education. The majority of mothers (47.7%) had secondary education, followed by: 23.3% vocational education, 18.8% basic and 4.9% undergraduate education.

Almost a half of the respondents (44.7%) lived with parents during the period of their study, 32.8% rented an apartment. More than a half of fathers (60.5%) were employed, 22.1% received a pension-retirement benefit, 10.0% did not work and 2.9% were registered as unemployed. 54.1% of mothers were employed, 25.7% were retired or pensioners, 13.0% did not work and 7.2% were registered as unemployed.

**Table 1.** Gender and intensity of health-related behaviour.

IZZ	Gender (p=0.0000)			
	Female, N=380		Male, N=120	
	n	%	n	%
Low	172	45.0	73	60.0
Average	158	42.0	35	29.0
High	50	13.0	14	11.0
IZZ (points)	77.9±13.2		68.7±13.8	

A detailed analysis demonstrated that in general 48.9% of students were characterized by low intensity of a pro-health behaviour and 38.4% by an average intensity of a pro-health behaviour level of students. Only 12.7% of the studied group were distinguished by a high intensity of pro-health behaviour. It might be assumed that young people with a high level of pro-health behaviour more frequently maintained a rational diet, avoiding salt, animal fat, sugar and alimentation containing preservatives. Instead, they ate more vegetables, fruit and wholegrain bread, as well as controlled their body-weight, treated instructions connected with health with greater care, and attempted to avoid strong emotions, stress, anger, fear and depressing situations; they all led a balanced family life and saw their doctor regularly.

As presented in Table 1, there is a statistical relation between gender and the intensity of pro-health behaviour (p=0.0000), which means that women are characterized by a higher intensity of pro-health behaviour (mean value 77.9, standard deviation 13.2) than men (mean value 68.7; standard deviation 13.8).

No statistically significant relation was found between the place of residence (p=0.2464), education of father (p=0.6979), education of mother (p=0.3432), and the intensity of pro-health behaviour.

Data presented in Table 2, indicate a relation between the perceived material situation and the level of pro-health behaviour (p=0.0163), which means that young people, who assessed their economic situation as good or very good indicated a higher intensity of pro-health behaviour.

A detailed analysis considering the level of knowledge about health indicated that for a total of 10.420 possible answers, the respondents had given: 7.235 correct answers (69.4%), as well as 1.799 incorrect answers (17.3%). The answers indicating lack of opinion amounted to 1.330, 12.8% of respondents. No answers were given 52 times (0.5%).

Data analysis demonstrated that the definite majority of respondents had a good level of knowledge in the scope of:

- the impact of physical activity on psychophysical condition (94.6%), cardiovascular diseases (88.1%), hypertension (83.3%);
- the influence of stress and bad food habits on peptic ulcer (93.1%);
- harmful effects of computer monitors (92.3%);

**Table 2.** Perceived material situation and intensity of health-related behaviour.

IZZ	Material situation (p=0.0163)									
	Very good, N=20		Good, N=154		Quite good, N=229		Bad, N=83		Very bad, N=16	
	n	%	n	%	n	%	n	%	n	%
Low	11	55.0	65	42.0	107	47.0	54	65.0	8	50.0
Average	7	35.0	62	41.0	96	42.0	23	28.0	4	25.0
High	2	10.0	26	17.0	26	11.0	6	7.0	4	25.0
IZZ (points)	76.2±15.0		77.5±14.0		76.1±13.1		71.1±14.5		73.8±17.0	

- negative impact of tobacco smoking by pregnant women on foetus development (90.8%).

Good evaluation of the level of knowledge also considered the scope of:

- acquired immunodeficiency syndrome (AIDS) prevention – 83.3%;
- the role of cholesterol in proper organism functioning – 82.9%.

Some concerns are related to: lack of knowledge about tooth decay prevention among children (65.5%), as well as lack of knowledge in the scope of elementary rules of physical training and its influence on health (58%), and the relation of alcohol consumption and incidence of civilization diseases (43.6%).

According to the determined level of knowledge, it was found that the faculty of study significantly differentiated the level of knowledge about health. Chi-square test results indicated a difference on the statistically significant level (p=0.0000).

Generally speaking, almost a half of the study population (48.6%) represented a low level of knowledge. Nevertheless, among the studied group more than a half was represented by humanities faculty students (57.4%) and science faculty students (60.7%). Average and high level of knowledge was indicated by, respectively, 40.1% and 4.8% of students. The highest level of knowledge (average and high) was represented by medical students (61.9%; 9.5%) followed by students of humanities and science faculties. Science students represented the highest rate of respondents with the lowest level of knowledge about the factors conditioning health (13.1%). In general, 6.3% of the studied group had a very low level of knowledge.

Data presented in Table 3 shows that there is a relation between the level of knowledge about health and the intensity of pro-health behaviour among students (p=0.0008), which means that young people are characterized by a high intensity of pro-health behaviour.

The data analyses considering sense of coherence showed that in the studied group the mean value of sense of coherence amounted to 125.2, and standard deviation – 19.5. In the case of components of sense of coherence, the following mean values were obtained: sense of meaningfulness ( $\bar{x}$  42.5 s -8.1), sense of manageability ( $\bar{x}$  44.7 s -7.9), sense of meaningfulness ( $\bar{x}$  37.9 s -7.4).

Data presented in Table 4 indicate that there is a relation between an average level of sense of coherence and the

**Table 3.** Level of knowledge about factors determining health and intensity of health-related behaviour.

IZZ	Level of knowledge about health (p=0.0008)							
	High, N=24		Average, N=201		Low, N=247		Very low, N=32	
	n	%	n	%	n	%	n	%
Low	7	29.0	85	42.0	136	55.0	17	55.0
Average	16	67.0	87	43.0	83	34.0	7	23.0
High	1	4.0	29	14.0	27	11.0	7	23.0
IZZ (points)	76.8±13.4		78.3±12.9		74.1±13.8		69.5±17.4	

**Table 4.** Average level of sense of coherence and intensity of health-related behaviour according to IZZ.

Analyzed data	IZZ						P (ANOVA)
	Low, N=242		Average, N=193		High, N=64		
	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	
SOC-29	120.0	19.3	129.0	18.1	136.3	17.0	0.0000

**Table 5.** Factors significantly influencing on intensity of health-related behaviour – IZZ (backward stepwise regression).

Effect	Significant of effect	Size of effect	Level of factor
Gender	0.0084	2.6	Female
		-2.6	Male
Material situation	0.0168	1.5	Good
		1.2	Quite good
		-2.7	Bad
Sense of coherence	0.0000	0.23	1 point of sense of coherence

intensity of pro-health behaviour among the studied group (p=0.0000).

Additional to the presented data considering the impact of particular factors on the intensity of pro-health behaviour (IZZ), the General Linear Model was used in further analysis. The model was used to assess the total impact of considered factors on the intensity of pro-health behaviour, as well as to find the apparent relation. The following categorical features: gender, education of mother, education of father, place of residence, financial situation, level of knowledge about health, as well as quantitative feature: the sense of coherence (SOC) were put to the General Linear Model. In order to make the results creditable, some factors were

combined, e.g. education and the material situation. An interaction between gender and the education of parents, as well as between gender and the intensity of pro-health behaviour were put to the model. Backward stepwise regression was used to find an optimal procedure. Statistically significant effects are presented in Table 5.

Analysis of results showed that in the General Linear Model the major meaning among significant factors having the influence on the health related behaviour had the level of sense of coherence ( $p=0.0000$ ), gender ( $p=0.0084$ ) and self-evaluation of material situation ( $p=0.0168$ ). Based on the statistical analysis it was found that between women and men there was a difference in the intensity of health-related behaviour (4–5 points), which means that in the group of women the level of pro-health behaviour was considerably higher than in the group of men (regression coefficient for women (2.6); and for men (-2.6).

It was claimed that all effects observed in the last General Linear Model explain only 19% of IZZ changeability. However, it is not a bad result when taking into consideration the fact the big diversification of individual's attitude against one's health.

## DISCUSSION

The review of the literature regarding behaviour related to health enabled the assumption that socio-demographic factors, such as: gender, place of residence, parents' education, financial situation, and level of knowledge about health, constitute an essential element of influence in shaping health [7, 15, 22, 30, 31, 32, 33]. In the international research among youth, abnormal behaviours are characteristic for the majority of the population [30, 31, 32]. Smokers constitute 23.6–58.7% of studied students [23, 31], alcohol consumption 43–52% [9, 32]; health promoting behaviours are relatively unpopular; and regular physical activity, at least three times a week, was performed by approx. 28.4% of young people, and a well-balanced diet observed among 33.6% [27, 31]. A detailed comparative analysis with other scientists is quite difficult due to different survey questions formulation and different interpretation. In the present study, almost half of the university students (48.9%) were characterized by low intensity of pro-health behaviour and almost every third student had an average intensity. Only 12.7% of the studied group was distinguished by a high level of such behaviours. Similar results were obtained by Lee *et al.* [21] who emphasized that selected pro-health behaviour (physical activity, health practices, eating habits, coping with stress) were characteristic only for a small group of people from Hong Kong (6.5–27.1%).

Many researchers underline the differences in undertaking pro-health behaviour between students of both genders [30, 31, 32, 33]. This results from many studies in which men more often cared about physical activity and cope better with stress; however, they more often smoked cigarettes and consumed alcohol [30, 31]. Interesting results in that

area were demonstrated Scott-Sheldon *et al.* [26]. In the conducted study among Greek and non-Greek students, the authors demonstrated that non-Greek female students more frequently than male students smoked cigarettes, used marihuana, consumed more alcohol and had more sexual partners [32]. Similar results were obtained by Kramer *et al.* [31].

Studies related to knowledge about health showed that students had a good knowledge in the scope of the influence of physical activity on psychophysics condition, cardiovascular and hypertension, the influence of stress and bad food habits on peptic ulcer, harmful effects of computer monitors, and the negative impact of tobacco smoking by pregnant women on foetus development. Some concerns are related to: lack of knowledge about tooth decay prevention among children, as well as lack of knowledge in the scope of elementary rules of physical training and its influence on health, and the relation of alcohol consumption and incidence civilization diseases. It is quite comforting that only a small group of respondents did not have an elementary knowledge about the factors conditioning health and its threats. In the light of the above analysis a question arises: whether or not the students' opinions about the role of health-related behaviours in shaping health correspond with knowledge resources on factors co-creating them, even with reference to the development of civilization diseases. Finally, the present study proved that the level of knowledge about health does not significantly modify health-related behaviour. However, it is possible that the impact of knowledge about health is modified by other factors such as: gender, education or sense of coherence. It is quite comforting that only a small group of respondents did not have an elementary knowledge about the factors conditioning health and its threats. In the light of the above analysis, a question arises: whether or not the students' opinions about the role of health-related behaviours in shaping health correspond with knowledge resources on factors co-creating them, even with reference to the development of civilization diseases.

It was stated that among the analyzed psychosocial factors, the most significant for health-related behaviour modification is the level of sense of coherence, and the least significant the financial situation of the family. Parents' education and place of residence did not have any impact at all. Gender is a factor that differentiated the intensity of health-related behaviour. Women indicated a higher level of those behaviours, which is reflected in many studies [31, 32]. The sense of coherence also modified the intensity of health-related behaviours. It should be underlined that the sense of coherence among other essential factors, such as: gender, level of knowledge about health, place of residence, and financial situation, has a dominant meaning in health-related behaviours modification. The results confirm the opinion of Antonovsky [3], indicating that the higher the level of the coherence, the higher the tendency towards taking pro-health behaviour.

Results of this study show that among the studied group, the mean value of sense of coherence amounts to 125.2, and more than a half of the students represented an average level of SOC. In the studies carried out among students, published in the world's literature, a different result of sense of coherence values was obtained [18, 25, 28, 29].

The closest to the established results of this study were obtained by Lam [20], who examined 122 American students of Vietnamese origin, and their SOC was estimated at 124.38. Slightly higher values of SOC – 127.55 – were obtained for American Chinese investigated by Ying *et al.* [32]. However, Japanese students were characterized by lower values of SOC – 117.9, and definitely higher values were perceived by Europeans students – 142.5 [5].

The above-mentioned data indicates the unambiguous differentiation of the level of sense of coherence among students, which in turn is in accordance with Antonovsky's concept, according to whom SOC is shaped, reinforced and refined throughout one's life, and a significant meaning is attributed to the environment and the conditions in which the child grows up and develops as a young person. The essential role of the influence of socio-cultural context (over a long period of time) and the pattern of life experience are shown to be very important in the establishment of a sense of coherence.

In international literature there are some studies investigating the changes of SOC in the group of young people [14, 17]. Studies carried out by Kuuppelomäki & Utriainen (1996–1999), considering the assessment of sense of coherence at the beginning of the study, the continuation, and in the third year of the study, among Finnish students, showed that for the majority of young people, the baseline SOC and at the end stage of study were unchanged. Only in the case of few students, SOC had weakened, and one third of students strengthened their sense of coherence [17].

The majority of studies conducted worldwide focus on the relationship between high SOC and state of good health [3, 4]. In this context, undertaking educational activities aiming to shape strong SOC among young people, would be an important element of education of young society for the benefit of conscious choices for health-related behaviour. In the Polish studies, despite a growing interest of these issues, relatively few reports are found which combine a sense of coherence with the patterns of health behaviours, whereas a study on this subject conducted on the population of young people are almost entirely absent.

Dependency analysis proved that there is a relation between the sense of coherence and pro-health behaviour. It might be assumed that students with a high level of sense of coherence more often maintain a rational diet, take note of instructions related with health, prefer an active for that of leisure, get enough sleep, attempt to avoid strong emotions, stress, and depressing situations, as well manage stress better.

Quite interesting data in that scope were presented by Kuuppelomäki and Utriainen [18]. Their study considering the

change of SOC among health care students showed that health-related behaviours, such as physical activity, smoking and drinking alcohol were not associated with the intensity of SOC changes.

The present study demonstrates that shaping a strong sense of coherence among children and young people is very important in the aspect of its influence on healthy people, so that during their life they would undertake conscious behaviour, and therefore strengthen and develop a potential of health.

The knowledge gained during this study might be used in practical activity, both during the education process and in designing future health-related behaviour and health education promotion plans, as well as in shaping a pro-health lifestyle among students.

## CONCLUSIONS

1. Almost a half of respondents (48.9%) were characterized by a low intensity of pro-health behaviour, and among 38.4% it was on an average level.
2. Gender is a factor differentiating the intensity of health-related behaviour – women indicate for a higher level of these behaviours.
3. Almost half of the studied group (48.6%) was characterized by a low level of knowledge about health.
4. The major meaning among the studied factors influencing health-related behaviour in the regression model had the level of sense of coherence, gender and material status.

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## REFERENCES

1. Al-Ansari JM, Honkala S: Gender differences in oral health knowledge and behavior of the health science college students in Kuwait. *J Allied Health* 2007, **36**, 41–46.
2. Antonovsky A: The structure and properties of Sense of Coherence SCALE. *Soc Sci Med* 1993, **36**, 725–733.
3. Antonovsky A: Can attitudes contribute to health? *Adv J Mind Body Health* 1992, **8**, 33–49.
4. Antonovsky A: *Unraveling the Mystery of Health: How People Manage Stress and Stay Well*. Jossey-Bass Inc, San Francisco 1987.
5. von Bothmer MIK, Fridlund B: Self-rated health among university students in relation to sense of coherence and other personality traits. *Scand J Car Sci* 2003, **17**, 347–357.
6. Bojar I, Wdowiak L, Humeniuk E, Błaziak P: Change in the quality of diet during pregnancy in comparison with WHO and EU recommendations – environmental and sociodemographic conditions. *Ann Agric Environ Med* 2006, **13**, 281–286.
7. Carroll SL, Lee RE, Kaur H, Harris KJ, Strother ML, Huang TT: Smoking, weight loss intention and obesity-promoting behaviors in college students. *J Am Coll Nutr* 2006, **25**, 348–353.
8. Ford AM, Bass MA, Keatley R: Osteoporosis knowledge and attitude: a cross-sectional study among college-age students. *J Am Coll Health* 2007, **56**, 43–47.

9. Gill JS: Reported levels of alcohol consumption and binge drinking within the UK undergraduate student population over the last 25 years. *Alcohol Alcohol* 2002, **37**, 109–120.
10. Healthy People 2010 [Internet; cited 31 July 2009]. Available from: <http://www.healthypeople.gov/>.
11. Health 21 – Health for All in the 21st Century: The Health for All Policy Framework for the WHO European Region. *Eur Health Ser* 1999, **6**.
12. Juczyński Z: *Narzędzia Pomiarów w Promocji i Psychologii Zdrowia*, 119–122. Pracownia testów psychologicznych, Warszawa 2001.
13. Kear ME: Psychosocial determinants of cigarette smoking among college students. *J Comm Health Nurs* 2002, **19**, 245.
14. Kivimäki M, Feldt T, Vahtera J, Nurmi J-E: Sense of coherence and health: evidence from two cross-lagged longitudinal samples. *Soc Sci Med* 2000, **50**, 583–597.
15. Kielbasiewicz-Drozdowska I: Student's pro-healthy lifestyle choices – social and economic determinants. *Res Yearb* 2007, **13**, 254–258.
16. Koniarek J, Dudek B, Makowska Z: Kwestionariusz Orientacji Życiowej. Adaptacja The Sense of Coherence Questionnaire (SOC) A. Antonovsky'ego. *Przeegl Psychol* 1993, **4**, 491–502.
17. Krämer A, Prüfer-Krämer L, Stock C, Tshiananga JT: Differences in health determinants between international and domestic students at German university. *J Am Coll Health* 2004, **53**, 127–132.
18. Kuuppelomäki M, Utriainen P: A 3 year follow-up study of health care students' sense of coherence and related smoking, drinking and physical exercise factors. *Int J Nurs Stud* 2003, **40**, 383–388.
19. Lam BT: Impact of perceived racial discrimination and collective self-esteem on psychological distress among Vietnamese-American college students: Sense of coherence as mediator. *Am J Orthopsychiatry* 2007, **77**, 370–376.
20. Lee RL, Loke AJ: Health-promoting behaviors and psychosocial well-being of university students in Hong Kong. *Public Health Nurs* 2005, **22**, 209–220.
21. Łuszczzyńska A: Zmiana zachowań zdrowotnych. Dlaczego dobre chęci nie wystarczają. Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2004.
22. Mazur A, Klimek K, Telega G, Hejda G, Wdowiak L, Malecka-Tendera E: Risk factors for obesity development in school children from south-eastern Poland. *Ann Agric Environ Med* 2008, **15**, 281–285.
23. Nordrehaug Åström A, Rose Masalu J: Oral health behavior patterns among Tanzanian university students: a repeat cross-sectional survey. *BMC Oral Health* 2001, **1**, 2.
24. Pawlińska-Chmara R, Wronka I, Suliga E, Broczek K: Socio-economic factors and prevalence of underweight and overweight among female students in Poland. *J Comp Hum Biol* 2007, **58**, 309–318.
25. Piko BF, Luszczynska A, Gibbons FX, Tekozel M: A culture-based study of personal and social influences of adolescent smoking. *Eur J Public Health* 2005, **15**, 393–398.
26. Scott-Sheldon LAJ, Carry KB, Carry MP: Health behaviour and college students: Does Greek affiliation matter? *J Behav Med* 2008, **31**, 61–70.
27. Seo DC, Nel E, Agle J, Ma SM: Relationship between physical activity and behavioral and perceptual correlates among midwestern college students. *J Am Coll Health* 2007, **56**, 187–197.
28. Steptoe A, Wardle J, Cui W, Bellisle F, Zotti AM, Baranyai R, Sanderman R: Trends in smoking, diet, physical exercise, and attitudes toward health in European university students from 13 countries, 1990–2000. *Prev Med* 2002, **35**, 94–104.
29. Togari T, Yamazaki Y, Nakayama K, Shimizu J: Development of a short version of the sense of coherence scale for population survey. *J Epidemiol Community Health* 2007, **61**, 921–922.
30. Torsheim T, Aaroe LE, Wold B: Sense of coherence and school-related stress as predictors of subjective health complaints in early adolescence: interactive, indirect or direct relationships? *Soc Sci Med* 2001, **53**, 603–614.
31. Tsuneji M, Sonoe M, Shigeji M, Osami K, Fumihiko J, Noriaki T, Keiko G, Shigeo K: A study on health practice of university students. *J Educ Health Sci* 1999, **44**, 537–548.
32. Ying YW, Lee PA, Tsai JL: Attachment, sense of coherence, and mental health among Chinese American college students: variation by migration status. *Int J Intercult Relat* 2007, **31**, 531–544.
33. Ying YW, Lee PA, Tsai JL: Predictors of depressive symptoms in Chinese American college students: parent and peer attachment, college challenges and sense of coherence. *Am J Orthopsychiatry* 2007, **77**, 316–323.