

Socio-Demographic Factors and Health-Oriented Behaviors of University Students in the Podkarpackie Region. Long-Term Prospective Research

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Abstract

The aim of the study was to achieve a prospective long-term evaluation of the impact of socio-demographic factors on students, and their healthy behaviors. It was a diagnostic survey employing a standardized interview questionnaire. The survey was conducted among 905 first-year students of medical and non-medical faculties (18–19 years of age), and the University of Rzeszów, and Rzeszów University of Technology. It was conducted in 2009 and repeated two years later. The rating of the behavior patterns of students was conducted in accordance with the following schedule: October 2009 – January 2010 (T1), October 2011 – January 2012 (T2). The level of healthy behaviors in 2012 increased significantly in a positive direction compared to 2009 ($p < 0,001$), in particular in the category: proper eating habits ($p < 0,001$) and preventive behaviors ($p < 0,001$). In 2009 men in the first year of the study had a lower level of healthy behaviors, an average of 3,63 points, than women (T1) and in 2012 of 5,42 points lower (T2). The level of healthy behaviors in 2012 increased significantly in a positive direction compared to 2009, in particular in the category: proper eating habits and preventive behaviors. Women showed more pro-health attitudes than men. The pro-health attitudes characterized by medical students was seen in a greater degree.

Keywords: health behaviors, students

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Introduction

Today, all over the world, especially in developed countries, it is possible to prevent a significant amount of mortality and morbidity. The impact on the future risk of disease, and even early deaths, can be closely tied to behaviors shaped in early adult life, and later lifestyle. According to the European Health Report, the main determinants of health are socio-economic factors, lifestyle and environment. Unhealthy eating, lack of physical activity, smoking, alcohol consumption and drug use, are considered to be the most important risk factors related to lifestyle (*The European Health Report...* 2013).

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Analyzing patterns of health behavior of young people is important for the whole society. That allows us not only to take appropriate measures to reduce these negative behaviors (e.g., risky sexual behavior), but also to develop effective preventive measures (like comprehensive behavioral interventions) (Johnson et al. 2011). A review of the literature concerning health-related behaviors among students indicates that there is a certain stereotypical perception of students. University students are particularly susceptible to a number of phenomena which pose a risk to one's health to varying degrees (Arria et al. 2011; Keller et al. 2008; King and Vidourek 2013; Saddleson et al. 2015).

Promoting the health and safety of young adults, especially university students, is crucial to the future of any country. The years of study represent a unique period of a student's life, where the important choices concerning health and the forming of healthy behavior patterns, which will be continued in the future, occur. These choices are not only related to the safety and wellbeing of young people, but also the risk in the future of contracting serious chronic diseases. Investing today in the health of young adults, we are investing in the workers and parents of tomorrow (Shumaker, Ockene, and Riekert 2009).

University students are included in the group of people who become socialized partially through their education. The time of studies can significantly influence behavior, in the context of one's health. Frequently it is related to the specific conditions of social life: the weekly and semester rhythm, credit, colloquia, exams, and interactions with the academic staff. Many studies have shown an increase in the adverse health effects in this group of young people (*European Drug Report...* 2013; *Global Status Report...* 2014; Sommet et al. 2012; von Bothmer and Fridlund 2005). It should be emphasized that there is a group of tightly-coupled behaviors within the university infrastructure itself. They concern the places where student meals are consumed, recreation, sports, leisure and living in the dorms. These are not, therefore, a matter of free choice for young people, but they largely depend on the conditions at the university and the course of study they choose (Shumaker, Ockene, and Riekert 2009). The literature shows that many authors have studied the knowledge of students on various health-related behaviors (Al-Ansari and Honkala 2007; Green and Knechtges 2015) and the impact of various psychosocial and legislative factors on the health and lifestyle of young people (Diez, Fortis, and Franco 2012; Edge, Newbold, and McKeary 2014; Greene et al. 2011; Perusse-Lachance, Tremblay, and Drapeau 2010; Rzeźnicki et al. 2015). Thus, it seems important to continue the research on this issue.

The aim of the study was to achieve a prospective long-term evaluation of the impact of socio-demographic factors on students from the Podkarpackie Region, and their healthy behaviors. Specific aims:

- estimation of the dynamics of change in health behaviors from 2009–2012
- analysis of the relationship between selected socio-demographic factors such as: gender, place of residence, place of residence while studying, the material resources of the family, subject studied, and health behaviors

1 Materials and Methods

1.1 Study population

The survey was conducted among 905 first-year students of medical and non-medical faculties (18–19 years of age), of University of Rzeszów and Rzeszów University of Technology. The survey was conducted in 2009 and was repeated two years later. Rating the behavior patterns of students was conducted in accordance with the following schedule: October 2009 – January 2010 (T1), October 2011 – January 2012 (T2). To test the tools for understanding the relevant research questions, the research was preceded by a pilot study, conducted in a group of 50 students from the University of Rzeszów, during the period from November to December 2008.

Purposive sampling was applied. The study was designed to take into account full-time students taking undergraduate university course. Consequently, the study group was uniform in terms of age and duration of time at university. The young people participating in the survey were part

of an academic society, but with regard to their lifestyle it was assumed that due to their limited experience as university students they had not yet adopted specific behavioral patterns typical for this population. As reflected by their objectives and history, Rzeszów University of Technology and University of Rzeszów are local schools of higher education, a fact which is likely to affect the further analyses. Participation in the study was voluntary and anonymous, and the research material was confidential. Surveys were administered in person by trained interviewers. Before individual testing, each respondent was informed in writing, about the purpose of the research, and instructed on how to fill out the questionnaire. Collection of the correctly completed questionnaires constituted consent to participate in the study.

During the first study a sample of 1 000 individuals was selected and sets of questionnaires were distributed to them. 940 completed questionnaires were received back. Further analyses took into account 905 correctly filled out questionnaires, which constituted 90,5%⁽¹⁾ of the initial sample. The survey was repeated two years later in the same group of students. The ratio of the students attending classes on the day the survey was conducted amounted to 59,1% of the initial sample.

1.2 Study parameters

Patterns of health behaviors were evaluated by using a validated tool: the Behavioral Health Inventory (IZZ) proposed by Zygfryd Juczyński. The initial questionnaire concerned the following socio-demographic data: gender, marital status, subject of study, place of origin, place of residence during the study, self-estimate of the material status of the family. The inventory of health behaviors was developed by Juczyński (2009).

It is a reliable, accurate and standardized tool for research. The inventory contains 24 statements describing various types of health-related behaviors. Given the frequency indicated by the respondents of individual behavior on a five-point scale, it was possible to determine the general severity of behavior conducive to their health, and the severity of the four categories of health behaviors: healthy eating habits (taking into account the type of food consumed—e.g., wheat bread, vegetables, fruit), preventive behaviors (regarding the adherence to a healthy diet and to obtaining information on health and disease), a positive mental attitude (psychological factors such as avoiding overly strong emotions, stress, tensions and depressing situations) and health practices (including daily sleep habits, recreation and physical activity). Selected numerical values are counted. The value of the overall rate of the severity of health behavior falls within the range of 24–120 points. The higher the score, the greater the severity of the declared health behaviors (Juczyński 2009).

1.3 Data Analysis

Data analysis was based on methods of descriptive statistics and statistical inference. Distribution of the relevant characteristics in the study population was presented in the form of summarized descriptive statistics (most frequently the mean, median, and standard deviation, as well as minimum and maximum value) for numerical characteristics. Nominal characteristics were presented in the form of tables comprising numerical and percent distribution of the specific variants.

Adequate methods of statistical inference were applied to assess differences between first-year students and those at later years of university course (2009 versus 2012) related to health behaviors, habits and other relevant factors, and to examine to what extent these differences were a matter of chance or whether they reflected an actual tendency. The tests were selected to match the nature of the comparative analyses. The following statistical tests were applied: chi-square test of independence was used to examine the differences in the frequency of certain behaviors in the groups or generally differences in the distribution of nominal characteristics; a Mann-Whitney test was used to compare average level of qualities of ordinal nature in two groups, while a Kruskal-Wallis test was used for comparing a few groups; analysis of variance was applied to test the hypothesis assuming there were no differences in the average level of a numerical characteristic in two or more populations. The study also used methods of multidimensional statistical analysis, in particular

1. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

regression models, to examine simultaneous effects of selected sociodemographic factors in the patterns of health behaviors (defined as IZZ scores). The model also accounted for interactions between the factors. Results of regression analysis are presented as a table of significant effects with the values of corresponding regression coefficients accompanied with a detailed assessment of their statistical significance (Petrie and Sabin 2005).

The study was approved by the Bioethical Commission of the Faculty of Medicine, the University of Rzeszów in Rzeszów (No. 7/12/2010). The study was conducted in accordance with the “Declaration of Helsinki.”²

2 Results

In both studies (T1 and T2), women accounted for the majority (59,2% versus 61,1%) and most of them were unmarried (98,7% versus 94,8%). The study group was primarily represented by students of the University of Rzeszów (73,1% versus 77,8%), the remainder were students from Rzeszów University of Technology (26,6% versus 22,2%). In the first study (T1) students represented the following subject of study: the exact sciences 37,3%; humanities 31,1%; medical 31,0%, while in the repeated study (T2): medical 43,7%; humanities 28,4%; the exact sciences 27,9%. More than half of the young adults came from rural areas (56,7% versus 52,1%). In both studies (T1 and T2) almost half of the respondents during the period of study lived in rented rooms (49,1% versus 44,8%). Students in both studies evaluated their material situation (most often) as good (47,7% versus 50,1%) (tab. 1).

Assessment of the changes in health behavior between the T1 and T2 periods, indicates that there is a statistical significant difference ($p < 0,001$). A high level of health behaviors in the repeated study (T2) was declared by 1,5 times more students, than in the first study (19,0%

Tab. 1. Demographic characteristics of the research group

		T1 ^a		T2 ^b	
		n	%	n	%
Sex	woman	536	59,2	361	61,1
	man	369	40,8	230	38,9
Marital status	married	8	0,9	22	3,7
	single	891	98,7	560	94,8
	others	4	0,4	9	1,5
University type	polytechnic	243	26,9	131	22,2
	university	660	73,1	460	77,8
Subject of study	humanistic	285	31,7	168	28,4
	medical	279	31,0	258	43,7
	exact	335	37,3	165	27,9
Place of residence	city less than 100 000 residents	256	28,3	177	29,9
	city over 100 000 residents	136	15,0	106	17,9
	country	513	56,7	308	52,1
Place of residence during the study	family house	332	36,7	230	38,9
	rented room/flat/etc.	444	49,1	265	44,8
	dormitories	128	14,2	96	16,2
Material situation	very good	61	6,8	48	8,1
	good	428	47,7	296	50,1
	average	383	42,7	224	37,9
	difficult	26	2,9	23	3,9

^astudents surveyed in years 2009–2010

^bstudents surveyed in years 2011–2012

2. See: World Medical Association Declaration of Helsinki. Ethical Principles for Medical Research Involving Human Subjects. By World Medical Association, December 31, 2013, doi:10.1001/jama.2013.281053, [a:] https://www.wma.net/wp-content/uploads/2016/11/DoH-Oct2013-JAMA.pdf.

versus 12,9%). The proportion of people with an average level of health behaviors (39,8% versus 42,1%) also increased. At the same time, the percentage of students with low levels of these behaviors, decreased (47,3% versus 38,9%). The level of health behaviors in 2012 increased significantly in compared to 2009 ($p < 0,001$), in particular in the category: proper eating habits ($p < 0,001$) and preventive behaviors ($p < 0,001$) (tab. 2).

Tab. 2. Comparison of level of escalation of healthy activities among students in periods T1 and T2

Level of healthy activities according to Behavioral Health Inventory (IZZ)	T1 ^a		T2 ^b	
	<i>n</i>	%	<i>n</i>	%
Low	418	47,3	230	38,9
Average	352	39,8	249	42,1
High	114	12,9	112	19,0

$p < 0,001$

^astudents surveyed in years 2009–2010

^bstudents surveyed in years 2011–2012

Analysis of the relationship between selected socio demographic factors in the T1 period showed that:

- sex is the factor most strongly affecting health behavior, men in the first year of the study have a lower level of healthy behaviors, an average of 3,63 points, than women;
- the material situation (very good and good) is a factor contributing to higher levels of healthy behavior on average of 2,68 points;
- place of residence has less impact on health behaviors, respondents who live in the family home had lower levels—compared to people living in the dormitories—of 1,64 points;
- subject of study—students studying non-medical subjects exhibited a lower level of healthy behaviors with an average of 2,1 points; and
- permanent residence is statistically significant only as it relates to the field of study—students from the cities studying in non-medical fields have a higher level of healthy behaviors than those from rural areas; in the case of medical subjects, the results were different (tab. 3).

Tab. 3. Significance of influence of selected factors on healthy activities in T1 (students surveyed in years 2009–2010)

Tested factor	Variable level	Point of reference	Parameter	<i>p</i>
Free word	–	–	76,40	< 0,001
Sex	woman	man	3,63	< 0,001
Subject of study	non-medical	medical	–2,01	0,027
Place of living during study	family house	dormitories	–1,64	0,006
Place of living during study	rented room, flat etc.	dormitories	–0,05	0,925
Material status	very good/good	average/difficult	2,68	0,001
Subject of study × place of living	non-medical/city	non-medical/country	1,83	0,024

Note: Model estimated with Ordinary Least Square Method; $R^2 = 0,057$; $F = 8,8$; $p < 0,001$

It should be emphasized that the individual effects overlap—for example, the level of healthy behaviors of women studying in the medical field and with a stable financial situation, is clearly higher than the average IZZ for a man, who studies in a non-medical field, with a poor financial situation. The difference is: $3,63 + 2,01 + 2,68 = 8,3$ points.

In the second study, a slightly different structure of factors, affecting the level of health behaviors, was singled out. This was due to the increasing variation in the level of healthy behaviors between men and women, and students studying in the medical and non-medical fields during the period of study. Based on the analysis it was found that in repeated studies after two years, the following factors have an impact on the level of healthy behaviors:

- sex is the factor most strongly affecting healthy behavior in the third year of study; men have a lower intensity of healthy behaviors on average 5,42 points lower than women

- subject of study — a lower level of healthy behaviors, on average 5,16 points, was found among students studying non-medical fields
- the place of origin and economic status — the interaction between the place of residence and financial situation lies in the fact that people with a poor economic situation coming from the towns had worse levels of these behaviors than those coming from rural areas
- place of residence while studying — people living in rented flats and having a good financial situation have a better level of healthy behavior, while in the group of students living while studying in the dormitories, the situation turned out to be the opposite (tab. 4)

Tab. 4. Significance of influence of selected factors on healthy activities in T2 (students surveyed in years 2011–2012)

Tested factor	Variable level	Point of reference	Parameter	<i>p</i>
Constant	–	–	77,80	< 0,001
Sex	woman	man	5,42	< 0,001
Subject of study	non-medical	medical	–5,16	< 0,001
Place of living x material status	city/good	country/good	–2,27	0,025
Place of living during study × material status	family house × good	dormitories/good	3,29	0,205
Place of living during study × material status	rented room/flat/etc. × good	dormitories/good	3,88	0,026

Note: Model estimated with Ordinary Least Square Method; $R^2 = 0,123$; $F = 16,43$; $p < 0,001$

3 Discussion

There are many theories explaining health behavior changes (Plotnikoff et al. 2013; Shumaker, Ockene, and Riekert 2009; Wright 2015). However, in the literature, we find little research evaluating the changes in the patterns of health-related behaviors of students. Steptoe and colleagues (Steptoe et al. 2002) conducted a study among university students indicating that some health behaviors and beliefs concerning health have changed between 1990 and 2000. Data was collected on groups of more than 10 000 students in thirteen European countries. The direction of these changes showed that the frequency of smoking increased, the frequency of the consumption of fruit decreased and the level of activity and consumption of fat, among students, remained unchanged. It was also observed that the respondents in 2000 perceived less linkages between their health and their behavior than in 1990.

Analysis of the research focused on the comparison of the levels of healthy behaviors of students in 2009 and 2012 did not confirm the direction of the changes outlined in the above studies. It turned out that the level of healthy behaviors in a study conducted in 2012 had increased significantly, in the positive direction, compared to the survey conducted in 2009. The differences mostly affected categories of prevention and healthy eating habits, which means that, together within the time-period of the study, young people cared more about a balanced diet, were avoiding salt, animal fat, sugar, and food with preservatives, while they frequently consumed fruit, vegetables, whole wheat bread and controlled their weight. Even more students respected health recommendations, and took seriously the guidelines for their own health and disease prevention. There were no differences found between the studies in terms of the other two categories: positive mental attitude and health practices. Students in a similar manner in both studies attempted to avoid strong emotions, stress, anger, anxiety, and situations which affect them depressingly, to lead settled family lives and regularly visit the doctor. In our study, the largest number of students were characterized by a low severity in healthy behaviors, whereas a comparable situation occurred in the study, repeated in 2012, where a high level of healthy behaviors increased significantly. Presumably, these changes may be the result of positive socio-economic changes and prevention programs for children and young people, introduced on the national and regional level.

In worldwide studies of students, abnormal behavior was found to be a characteristic of the majority of the population. In the United States, 24,6% of the respondents use tobacco products

(Arrozola et al. 2015), 58,4% drink alcohol,³ and health-promoting behaviors are relatively less popular; regular exercise at least three times a week taken by approximately 28,4% of young people, and the maintaining of a healthy diet 33,6% (Steptoe et al. 2002). Conducting a thorough comparative analysis with other authors is quite difficult because of the different formulation of the questions in the questionnaire survey and their different interpretation.

The present study investigated the relationship between the respondents' health behaviors and selected sociodemographic factors (e.g., sex, permanent residence, place of residence during the period of study and the course of study). Overall, the research on health behaviors shows that sex is one of the strongest predictors of healthy behavior (Ayranci, Erenoglu, and Son 2010; Kim, Park, and Kang 2015; Larouche 1998; Manierre 2015). Our results confirm this relationship. Sex, among other factors, has a dominant role in modifying the health behavior of students. At the time of the study, women were characterized by a higher severity of healthy behaviors, in a positive direction, as compared to men. Global studies have reported that female students were more likely than men to lead a healthy lifestyle and exhibit healthy behaviors (Larouche 1998). A study conducted by von Bothmer and Fridlund, among students in Sweden has shown that such healthy behaviors were characterized more often by women than men. The authors demonstrated that female students consumed less alcohol (95% versus 75%) and had a sensible diet (21% versus 10%). In turn, among male students, researchers found a higher proportion of obesity (30% versus 13%) and a decreased interest in dietary advice and healthy activity (von Bothmer and Fridlund 2005). Other interesting results were presented by Schmidt (2012). The author, examining the impact of stress on health behavior, proved that gender is an important variable influencing perceived stress, limiting food and as it relates to emotional eating. Female students felt higher levels of stress and exhibited a higher tendency to restrict food ($p = 0,046$), and to eat on an emotional basis ($p < 0,001$), than their male counterparts. In contrast, male students were much more fit and physically active, feeling less stress, and these males better assessed their health and fitness and mental health, compared to female students (Schmidt 2012). Maltby and Day found that physical activity performed by students was undertaken for different motivations, for men and women. Men undertake physical activity by direct intrinsic motivation, such as the desire to take up the challenge, while in women the motivator is the desire to lose extra pounds or to benefit their overall health (Maltby and Day 2001).

World literature shows that the relationship between the place of permanent residence and health-related behaviors, are paramount (Jamali et al. 2013; Wei et al. 2012). The economic situation of the family is also associated with the general indication of health-related behaviors, and slightly more to the category of health practices, including daily sleep habits, recreation and physical activity. This means that young people perceiving their situation as good and very good, demonstrated a greater tendency to healthy behaviors. The field of study was a factor which differentiated students, particularly in the category of proper eating habits. This means that students of medical studies show a greater tendency towards healthy behavior, consume more fruit and vegetables, avoid eating salt and heavily salted foods with preservatives, and often include in their diets whole wheat bread. It should be emphasized that the students of the medical faculties, due to the higher density of the health-related curriculum, are likely to have a higher degree of awareness of the risks associated with a poor lifestyle. Students of mathematics and physics were characterized by the weakest demonstration of positive behaviors. Perhaps it is related to the higher proportion of men in these fields.

It is worth mentioning that our studies show a lower level of healthy behaviors among students living in family homes, than those living in dormitories. Perhaps these modern hostel structures, often having facilities such as clubs, gyms, grocery stores, kitchenettes, services, and convenient contact with the peer group, have a positive effect on healthy behavior. It is a well-known fact that today's modern family is a bit lost in the timeless tasks of the modern world. Parents cease to be a role model for young people. The present, continuous "lack of time" means that the real needs of

3. See: Results from the 2015 National Survey on Drug Use and Health: Detailed Tables. Table 6.88B: Alcohol Use in the Past Month among Persons Aged 18 to 22, by College Enrollment Status and Demographic Characteristics: Percentages, 2012 and 2013, [a:] <https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2013.pdf>, page 1647.

children and youth is not a priority. Not without significance is the clear disparity between science and recreation, and changes in the patterns of spending free time with children and young people, who are found to be increasingly under the influence of the mass media. Young people spend more and more time watching television, working with the computer, and social contacts, while reducing the amount of time devoted to leisure—sport and other healthy behaviors, which may reflect the results of the study (Szafraniec 2011).

Conclusions

The level of healthy behaviors in 2012 increased significantly in a positive direction compared to 2009, in particular in the category: proper eating habits and preventive behaviors. Women showed more pro-health attitudes than men. The effect of gender is more pronounced in the group of older students. As the time of study increased, the difference between students of medical and non-medical students also increased. The pro-health attitudes characterized by medical students was seen in a greater degree. The influence of other factors is much smaller, and is involved in the interaction with other factors.

Implications for practice—The knowledge obtained in the course of the research may be used, not only in theory but also in a practical manner, in terms of improving the decision-making process, as it relates to the context of health policy in Poland; both in the course of teaching, and also in the form of guidance on the implementation of activities in the field of health promotion and health education, as well as in the development of a healthy lifestyle among students.

Limitations of the Study—The participants were recruited from two local universities in the Region of Podkarpackie, Poland, which is reflected in the analysis and results. It is recommended in the future to examine the relation between the level of sense of coherence and patterns of health-related behavior among students of other universities in Poland.

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