

## SECTION – EXERCISE SCIENCES

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## THE LIFESTYLE OF STUDENTS – FUTURE TEACHERS

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### Abstract

**Aim.** To assess pro-health behaviours and physical activity of teacher training students in the context of their future work as a teacher and a health educator.

**Basic procedures.** The study was conducted in a randomly selected group of 486 students, including 416 women (85.60%) and 70 men (14.40%) – from teacher-training programs at three universities in Krakow: Pedagogical University (66.26%), Jagiellonian University (25.31%) and Krakow Academy (8.43%). The Health Behaviour Inventory (IZZ) and a short version of the International Physical Activity Questionnaire (IPAQ) were used in the study.

**Results.** The findings from IZZ showed that most students were characterized by low (47.12%) and average (39.18%), and less often by high (13.17%) levels of pro-health behaviours. The highest intensity of pro-health behaviours was observed in the positive mental attitudes and health practices, and lower in healthy eating habits and preventative behaviours. Statistical analysis confirmed a wider range of health-promoting behaviours among women than men, with an exception of healthy practices. The results obtained from IPAQ showed that young people undertook physical activity at a moderate level (62.14%), and less often at high (26.54%) and low (11.32%) levels. The level of physical activity varied depending on the gender, the women significantly more likely to take it up at a satisfactory level, and men at a high level.

**Conclusions.** The limited amount of pro-health behaviours in the lifestyle of students suggested that prospective teachers did not show proper readiness to promote a healthy lifestyle by their own example and further promote healthy behaviour among children and adolescents, which justifies the need for health education of this group as well as the rationalization of students' lifestyle.

### Introduction

A key determinant of health, defined in the holistic model as a dynamic process of striving for psychophysiological balance, is lifestyle. Maintaining and improving health potential can be done by assuming fa-

vourable pro-health behaviours, associated in particular with a rational way of eating, engaging in recreational physical activity, effective coping with psychological stress, avoidance of psychoactive substances and risky sexual contacts as well as undergoing preventive testing [1, 2].

Healthy behaviour, giving rise to and conditioning lifestyle, is already shaped in children and adolescents in the process of socialization as a result of the impact of norms and patterns of information provided by family, peers, teachers and various social groups [2]. A special role in this field, next to family, is played by school, which has the duty to provide pupils with health education and the creation of appropriate conditions for the development of pro-health attitudes and implementation of behaviours conducive to health [3-7]. It should be emphasized that for the formation of health culture in children and young people, the personal example of the teacher is essential, who through his/her healthy behaviour may create appropriate role models and promote a pro-health lifestyle among students. Referring to the subjectivity of health, active and conscious concern for health among teachers, benefits the formation of positive attitudes towards health and behaviour conducive to the health of students. Being aware of the importance and value of health, teachers are more credible health educators, which favours health promotion among pupils.

According to the core curriculum of general education introduced in 2009, teachers of all specialties are required to carry out health education, not only teachers of Physical Education [7]. The rank of health education raises its recognition in the educational standards regarding preparation for the teaching profession. In 2012, the ordinance of the Ministry of Science and Higher Education (MNiSW) was publicized [8], according to which the standards of teacher training include issues of biomedical and health education, and the duty of universities offering teacher training is to carry out the content with students during the course of education. Proper preparation of students - future teachers, in terms of knowledge, skills and social competences is a prerequisite for the effective implementation of health education and health promotion among future educators.

Despite the crucial role of a pro-health lifestyle for raising health potential and health promotion of individuals, social groups and the population, numerous studies have shown the prevalence of anti-health behaviours in the lifestyle of different populations, including university students [9-19] and teachers [20-25].

Assuming that pro-health behaviours, including physical activity, are key determinants of health, and (not only physical education) undertaking their careers as future teachers will be involved in the health education of school children, studies were carried out on the lifestyle of students studying to be teachers.

The aim of the study was to evaluate the lifestyle of teacher-training students, including pro-health behaviours as well as their physical activity, and to analyze the correlation between the considered behavioural de-

terminants of health. We attempt to answer the question of whether prospective teachers are willing to be positive role models in encouraging their students to assume pro-health attitudes.

## Material and methods

Voluntary and anonymous research was carried out in the years 2013-2014 in a randomly selected group of 486 people, including 416 women (85.60%) and 70 men (14.40%) aged 22-28 years (mean age: 23 years). The study included 3<sup>rd</sup> year female and male B.A. students of teaching studies from three Krakow universities: Pedagogical University (66.26%), Jagiellonian University (25.31%) and the Krakow Academy (8.43%). The significant differences in the number of women and men were due to the general trend that fewer men study in the teacher training field.

Based on the Health Behaviour Inventory (IZZ) by Z. Juczynski [26], we assessed four categories of health behaviours: proper eating habits (PEH), preventative behaviour (PB), pro-health practices (PHP) and positive mental attitude (PMA). The intensity of healthy behaviours in the group was evaluated using sten scores [26].

The level of physical activity was evaluated based on the short version of the International Physical Activity Questionnaire (IPAQ). The evaluated categories were: sitting, walking and moderate to vigorous physical activity. Based on the metabolic coefficient values (MET) of participants, they were classified into groups with different levels of physical activity:

- high – individuals meeting at least one of the two criteria specified below are classified into this level:
  - 3 or more days of vigorous physical exercise, totalling at least 1,500 MET–minutes per week,
  - 7 or more days of any combined physical activity (walking, moderate or vigorous efforts) exceeding 3,000 MET–minutes per week,
- moderate – individuals meeting at least one of the three criteria specified below are classified into this level:
  - 3 or more days of vigorous physical effort, not less than 20 minutes a day,
  - 5 or more days of moderate physical effort or walking, not less than 30 minutes a day,
  - 5 or more days of any combined physical activity (walking, moderate or vigorous efforts) exceeding 600 MET–minutes per week,
- low – individuals who did not show any physical activity or did not meet conditions for the moderate or high level were included in this category [27].

For statistical analysis, we used the Statistica 12 and SPSS 21 programmes. Statistical analysis of results regarded the assessment of the level of pro-health behav-

hours and physical activity in relation to sex and the correlation between the considered variables (IZZ and IPAQ categories). Basic statistics are presented by the number of cases (N), percentage (%), mean (M) and standard deviation (SD). Statistical analysis for constant variables (level of healthy behaviours and physical activity) was conducted using: a) analysis of variance with Tukey's post-hoc test (to identify the gender related differences in the level of pro-health behaviours categorized according to the level of physical activity: high, moderate, low); b) analysis of variance with repeated measurements and planned comparisons (to compare differences in the level of the individual pro-health behaviour of students and gender related differences in the level of individual health behaviours, to compare the differences in the level of individual indicators of physical activity for students and the gender related differences in the level of individual indicators of physical activity); c) Spearman's rank correlation coefficient (identification of relationships between the level of physical activity and pro-health behaviours); d) analysis of moderation (determining gender related differences in relationships between the level of physical activity and pro-health behaviours). For nominal variables (categorized level of healthy behaviour and categorized general indicator of physical activity) we used: the chi-squared test ( $\chi^2$ ) with multiple comparisons: z tests for proportions with Bonferroni's correction

(comparison between genders and the categorized level of healthy behaviour, as well as the categorized general indicator of physical activity. We assumed the following level of significance in the statistical analysis:  $\alpha = 0.05$ . We also described the results for  $\alpha < 0.10$ .

## Results

Analysis of the results obtained using the IZZ questionnaire showed that the majority of the studied students presented low (47.12%) and moderate (39.18%) levels of pro-health behaviours. Only 13.17% of the participants were characterized by a high level. There were no statistically significant differences in the intensity of pro-health behaviours in the men or women ( $\chi^2(2) = 1.100$ ;  $p = 0.577$ ) (Tab. 1).

Among the four categories of attitudes conducive to health, the subjects most often undertook behaviours including positive mental attitude and pro-health behaviour, and more rarely behaviour related to proper eating habits, and the least, preventive behaviour. Within these categories, there was a statistically significant difference between men and women in the range of undertaken behaviours associated with positive mental attitude ( $F(1,480) = 7.041$ ;  $p = 0.008$ ), proper eating habits ( $F(1,480) = 23.950$ ;  $p < 0.001$ ) and preventive behaviours ( $F(1,480) = 15.176$ ;  $p < 0.001$ ). Lack of

**Table 1.** Level of students' pro-health behaviours according to gender (in percentage terms)

IZZ results	Total		Women		Men	
	N	%	N	%	N	%
High	64	13.17	57a	13.70	7a	10.00
Moderate	189	38.89	163a	39.18	26a	37.14
Low	233	47.94	196a	47.12	37a	52.86
Total	486	100.00	416	100.00	70	100.00

a, b - z tests for proportions with Bonferroni's correction (significantly differing values are marked: a, b)

**Table 2.** Categories of pro-health behaviours among students according to gender (M  $\pm$  SD)

Pro-health behaviours	Total (N=486)		Women (N=416)		Men (N=70)		Difference p
	M	SD	M	SD	M	SD	
Positive mental attitude	19.47	4.16	19.71	4.13	18.03	4.07	<b>0.008</b>
Preventative behaviours	17.99	4.64	18.31	4.63	16.07	4.22	<b>&lt; 0.001</b>
Proper eating habits	18.95	4.92	19.41	4.75	16.17	5.01	<b>&lt; 0.001</b>
Pro-health practices	19.48	4.10	19.57	4.00	18.91	4.69	0.161
Pro-health behaviours (total indicator)	75.88	12.83	77.00	12.43	69.19	13.17	<b>&lt; 0.001</b>

Assumed level of significance  $\alpha = 0.05$

significant differences was only found in the case of undertaking pro-health practices ( $F(1,480) = 1.975; p = 0.161$ ) (Tab. 2).

Analysis of variance showed statistically significant differences in the intensity of almost all health behaviour categories. There was a lack of statistically significant differences only between the intensity of pro-health practices and positive mental attitude of the surveyed students (Tab. 3).

Based on the data obtained using the IPAQ questionnaire, it was found that students most often (62.14%) undertook physical activity sufficiently. A smaller percentage (26.54%) presented a higher than average level of physical activity, while almost 12% of students did not meet the criteria for the sufficient or high levels (Tab. 4).

Statistical analysis showed significant differences in the level of physical activity of men and women ( $\chi^2(2) = 6.521; p = 0.038$ ). Men more often than women declared

high, and rarely sufficient levels of physical activity. It was also found that there were more men than women among those characterized by insufficient levels of physical activity, but the differences were not statistically significant (Tab. 4).

Among the four categories of physical activity included in the IPAQ questionnaire (Tab. 5), the highest values were found for the indicators of walking and vigorous efforts, and lower rates for moderate efforts and sitting. In addition, the men obtained higher results in vigorous efforts compared to women (above 1,500 or 3,000 MET-min/week) and moderate (600-1,500 or 600-3,000 MET-min/week) and physical activity related to walking (below 600 MET-min/week), and lower in terms of sitting.

On the basis of the conducted analyzes, statistically significant differences in terms of the students undertak-

**Table 3.** Differences in intensity of each category of pro-health behaviours in the group of university students

	F(1,486)			p		
	PMA	PB	PEH	PMA	PB	PEH
PB	48.30			< 0.001		
PEH	4.67	17.82		0.030	< 0.001	
PHP	0.002	39.37	4.27	0.968	< 0.001	0.039

PEH - proper eating habits

PB - preventative behaviour

PHP - pro-health practices

PMA -.positive mental attitude

**Table 4.** Level of physical activity among students according to gender (in percentage terms)

Level of physical activity	Total		Women		Men	
	N	%	N	%	N	%
High	129	26.50	103 <sup>b</sup>	24.80	26 <sup>a</sup>	37.10
Moderate	302	62.10	268 <sup>b</sup>	64.40	34 <sup>a</sup>	48.60
Low	55	11.30	45 <sup>a</sup>	10.80	10 <sup>a</sup>	14.30
Total	485	100.00	416	100.00	70	100.00

Explanations as in Table 1

**Table 5.** Categories of physical activity among students according to gender (MET-min/week)

IPAQ categories	Total			Women			Men		
	N	M	SD	N	M	SD	N	M	SD
IPAQ vigorous	468	1194.27	2042.66	400	1120.40	1750.19	68	1628.82	3258.33
IPAQ moderate	461	719.91	1366.19	393	650.43	1126.42	68	1121.47	2280.14
IPAQ walking	445	2859.21	2861.35	385	2816.19	2842.92	60	3135.27	2986.81
IPAQ sitting	393	399.24	169.42	340	402.79	170.03	53	376.42	165.22
IPAQ total	418	4819.85	4497.27	362	4595.66	4053.36	56	6269.06	6560.31

ing almost all categories of physical activity are demonstrated. Such differences were not determined only with respect to moderate and vigorous efforts (Tab. 6).

In Table 7, we presented the results of analyzing the relationship between the intensity of particular categories of healthy behaviours and the physical activity levels of students. Statistical analysis showed that students with low physical activity presented less intensity of healthy eating habits than students with its sufficient and high levels ( $F(2,480) = 5.507$ ;  $p = 0.004$ ), while the differences were not gender-dependent ( $F(2,480) = 0.484$ ;  $p = 0.617$ ). We also showed significant correlations between the intensity of health practices and the level of physical activity, differentiated according to gender ( $F(2,480) = 3.759$ ;  $p = 0.024$ ). In the group of students with high physical activity, fewer men than women undertook pro-health practices ( $F(1,480) = 7.518$ ;  $p = 0.006$ ). On the other hand, in students with insufficient ( $F(1,480) = 0.363$ ;  $p = 0.547$ ) and sufficient ( $F(1,480) = 0.959$ ;  $p = 0.328$ ) levels of physical activity, the intensity of healthy practices was similar in men

and women. Among the men, there were differences in the intensity of pro-health practices depending on the level of physical activity. The men with sufficient physical activity showed higher intensity of pro-health practices than the men with high levels of physical activity ( $F(1,480) = 1.059$ ;  $p = 0.006$ ). In women, there was no significant difference in this respect. Statistical analysis did not confirm the differences between the other analyzed categories of pro-health behaviours and the level of physical activity ( $p > 0.05$ ).

The subject of analysis was also the relationship between the intensity of particular categories of physical activity according to the IPAQ (IPAQ vigorous, IPAQ moderate, IPAQ walking and sitting) and different categories of healthy behaviours according to the IZZ. As shown in Table 8, with increasing indicators of vigorous and moderate physical activity, there was an increase in the intensity of prevention and proper eating habits. It was also shown that students characterized by higher rates of vigorous exercise and activities associated with walking showed a lower intensity of the so-called pro-health practices.

**Table 6.** Differences in the intensity of physical activity categories in the group of university students

	<b>F(1,358)</b>			<b>p</b>		
	IPAQ vigorous	IPAQ moderate	IPAQ walking	IPAQ vigorous	IPAQ moderate	IPAQ walking
IPAQ moderate	26.51			< 0.001		
IPAQ walking	69.60	179.76		< 0.001	< 0.001	
IPAQ sitting	60.66	24.56	252.15	< 0.001	< 0.001	< 0.001

Assumed level of significance  $\alpha = 0.05$

**Table 7.** The relationship between the intensity of each category of pro-health behaviours and the level of physical activity in university students

Level of physical activity	IZZ categories	Men		Women	
		M	SD	M	SD
High (Women N = 103 Men N = 26)	Positive mental attitude	19.89	3.91	18.15	4.40
	Preventative behaviour	19.32	4.26	16.77	4.42
	Proper eating habits	20.83	4.70	16.73	5.68
	Pro-health practices	19.37	3.82	16.92	4.73
Moderate (Women N = 268 Men N = 34)	Positive mental attitude	19.74	4.20	18.06	3.81
	Preventative behaviour	18.02	4.62	16.09	4.22
	Proper eating habits	19.22	4.63	16.44	4.49
	Pro-health practices	19.48	4.14	20.21	3.92
Low (Women N = 45 Men N = 10)	Positive mental attitude	19.13	4.22	17.60	4.48
	Preventative behaviour	17.71	5.21	14.20	3.43
	Proper eating habits	17.31	4.76	13.80	4.61
	Pro-health practices	20.56	3.41	19.70	5.60

**Table 8.** Correlations between the intensity of the various physical activity categories and pro-health behaviours in academic students

IPAQ categories & IZZ categories	N	R	t(N-2)	p
IPAQ_sitting & positive mental attitude	393	-0.12	-2.46	<b>0.014</b>
IPAQ_sitting & preventative behaviours	393	-0.05	-1.02	0.308
IPAQ_sitting & proper eating habits	393	-0.02	-0.45	0.652
IPAQ_sitting & pro-health practices	393	-0.04	-0.84	0.399
IPAQ_vigorous & positive mental attitude	468	0.03	0.73	0.464
IPAQ_vigorous & preventative behaviours	468	0.11	2.41	<b>0.016</b>
IPAQ_vigorous & proper eating habits	468	0.18	3.96	<0.001
IPAQ_vigorous & pro-health practices	468	-0.11	-2.49	<b>0.013</b>
IPAQ_moderate & positive mental attitude	461	0.08	1.62	0.106
IPAQ_moderate & preventative behaviours	461	0.11	2.36	<b>0.019</b>
IPAQ_moderate & proper eating habits	461	0.22	4.79	<0.001
IPAQ_moderate & pro-health practices	461	-0.06	-1.25	0.211
IPAQ_walking & positive mental attitude	445	-0.07	-1.54	0.124
IPAQ_walking & preventative behaviours	445	-0.01	-0.13	0.893
IPAQ_walking & proper eating habits	445	-0.02	-0.44	0.663
IPAQ_walking & pro-health practices	445	-0.24	-5.29	<b>&lt;0.001</b>
IPAQ & positive mental attitude	418	-0.04	-0.74	0.461
IPAQ & preventative behaviours	418	0.03	0.56	0.579
IPAQ & proper eating habits	418	0.08	1.73	<b>0.085</b>
IPAQ & pro-health practices	418	-0.26	-5.52	<b>&lt;0.001</b>

Assumed level of significance  $\alpha = 0.05$  and trend level  $\alpha = 0.10$

Also, the total indicator of physical activity was negatively associated with healthy practices. It was also found that the more time students devoted to sitting, the lower their positive mental attitude. The trend showing an increase of healthy eating habits along with the increase of overall physical activity was also demonstrated.

The results concerning the relationship between the intensity of particular categories of physical activity and health behaviours according to gender were shaped differently (Tab. 9). Three trends in the differentiation of physical activity and healthy behaviours according to gender are shown. Men who often undertook vigorous

**Table 9.** Relationships between the categories of healthy behaviours and physical activity, according to gender in university students

Dependent variable	Independent variable	$\beta$	SE	t	p	Interaction
Positive mental attitude	IPAQ moderate	0.049	0.066	0.753	0.452	$\beta_M = -0.14$ ( $p = 0.043$ ) $\beta_K = 0.04$ ( $p = 0.550$ )
	IPAQ vigorous	0.135	0.070	1.921	<b>0.055</b>	
	IPAQ walking	0.015	0.080	0.186	0.853	
	IPAQ sitting	-0.010	0.097	-0.105	0.916	
	IPAQ	-0.029	0.075	-0.379	0.705	
Preventative behaviours	IPAQ moderate	0.004	0.065	0.056	0.955	$\beta_M = -0.10$ ( $p = 0.162$ ) $\beta_K = 0.06$ ( $p = 0.301$ )
	IPAQ vigorous	0.120	0.069	1.736	<b>0.083</b>	
	IPAQ walking	0.108	0.078	1.386	0.166	
	IPAQ sitting	0.035	0.096	0.367	0.714	
	IPAQ	-0.024	0.075	-0.319	0.750	

Proper eating habits	IPAQ moderate	0.044	0.064	0.699	0.485	
	IPAQ vigorous	0.053	0.062	0.859	0.391	
	IPAQ walking	0.048	0.092	0.518	0.605	
	IPAQ sitting	-0.048	0.090	-0.529	0.597	
	IPAQ	0.025	0.074	0.337	0.737	
Pro-healthy practices	IPAQ moderate	0.125	0.065	1.914	<b>0.056</b>	$\beta_M = -0.17 (p = 0.008)$ $\beta_K < 0.01 (p = 0.959)$
	IPAQ vigorous	0.072	0.070	1.024	0.306	
	IPAQ walking	-0.099	0.080	-1.226	0.221	
	IPAQ sitting	-0.012	0.097	-0.126	0.900	
	IPAQ	0.024	0.074	0.313	0.755	

Assumed level of significance  $\alpha = 0.05$  and trend level  $\alpha = 0.10$

$\beta$  – standardized regression coefficient

SE – standard error

K - women

M - men

physical activity, at the same time, had lower intensities of prevention and positive mental attitude. In women, we found an increasing trend in this area, especially in respect of prevention. Moreover, men who often undertook moderate exercise also showed lower intensity of pro-health practices.

## Discussion

Positive attitudes towards health and its determinants as well as undertaking health-promoting behaviours by students preparing for the teaching profession are factors favouring the creation of appropriate standards and promoting a healthy lifestyle among children and youth - potential students. The results of our research indicate that most students of teacher education programmes declared low (47.94%) and moderate (38.89%) levels of pro-health behaviours, confirming the limited range of behaviours conducive to health among the academic students, and this corresponds with the results of other authors. Similar trends of the dominance of the moderate levels of pro-health behaviour was described by students from different universities in Poznan [28], Holy Cross University in Kielce [29], Bialystok nursing students [30] and Lublin medical students [31]. A similar level of pro-health behaviours was described among athletes [32].

Based on analysis of literature, it was demonstrated that students often rest inefficiently [10], preferring passive forms of leisure activities [9] and eating incorrectly [12, 16, 28, 33-37]. Moreover, contrary to popular knowledge about the dangers of addiction, university students often reached for alcoholic beverages [10, 16, 17]. The results of research on tobacco use by students were inconclusive. Some studies have suggested the

proliferated [10, 14, 19, 38], while others the limited scale of smoking in this population [11, 39].

On the basis of our own research, it was found that Krakow teaching specialization students received the highest scores among the four categories of healthy behaviours in terms of pro-health practices (adequate amount of sleep, weight control, avoiding stimulants), and positive mental attitude (positive thinking, maintaining proper relations with others and avoiding strong emotions, tension and stress), and smaller in terms of healthy eating habits and preventive behaviour (adherence to medical recommendations, regular testing, avoiding colds, acquiring information about health). Similar trends were demonstrated in the Poznan group of students presenting the highest intensity of behaviour conducive to health in terms of positive mental attitude, and the lowest in terms of prevention [28]. Also, the Holy Cross students received the highest values in terms of positive mental attitude and pro-health practices, and the lowest regarding proper eating habits [29]. Also, students of Lublin Medical University presented the best behaviour in terms of pro-health practices, and the lowest in the category of prevention [31].

The high level of behaviour conducive to health in the area of positive mental attitude demonstrated in the discussed studies could indicate that Krakow teaching students, alike students from other academic centres [40], were aware of the negative impact of psychological stress on health and its involvement in the etiology of a variety of chronic diseases. It is worth noting that for the maintenance and improvement of health, it is important not only to limit exposure to stress, but above all, to have the ability to apply effective coping strategies [41]. The significance of active and effective coping with

psychological stress was pointed out by researchers in dealing with the issue of professional burnout in teachers [42, 43]. According to S. Tucholska [42: 225-226], it is very important *for teachers to have the appropriate interpersonal skills as a threshold in this profession (...), but equally important (...) are properties such as resilience, initiative, optimism, self-confidence, high self-esteem, the ability to adapt to different, and sometimes difficult conditions and circumstances, and to actively and effectively cope with stress.*

In turn, the relatively high levels of the so-called everyday health practices (sleep, physical recreation, avoiding drugs and others) of students found in our study may be confirmation of the recently observed positive changes in the lifestyle of adults, including the younger generation. Their activity manifests itself e.g. in activities performed outside, such as running or cycling, but also in the use of the offers of fitness clubs, swimming pools and other recreation centres. Therefore, it can be believed that contrary to the opinions about the permanence of passive leisure habits, attractiveness of active recreation behavioural patterns and a general increase in environmental awareness as well as the health of society are causing the still existing cultural barriers in the access to recreation (especially physical) to gradually disappear.

The studied Krakow teaching specialization students received lower scores in terms of pro-health behaviours implemented through proper eating habits. Meanwhile, a varied and balanced diet, taking into account, inter alia, preferring the consumption of fruits and vegetables, whole-grain cereals, fermented low-fat dairy products, fish and vegetable fats and reducing the consumption of products with a high content of saturated fatty acids, trans isomers, sugars and salt, promotes improving health and the prevention of diet-dependent diseases [44]. The trends regarding limited proper eating behaviours noted in the study among the Krakow academic youth confirmed the quantitative and qualitative abnormalities in eating habits often described in different populations, including among students studying in different fields [10, 16, 28, 33, 35, 37, 46].

Among the analyzed categories of healthy behaviours, future-teachers showed the lowest level of behaviours conducive to health in terms of prevention including, among others, compliance with medical recommendations, regular checkups, avoidance of colds and obtaining information on the prevention and etiology of health hazards. Comparable results were obtained in studies among students of early primary school education [46], according to which only every third student preventatively consulted a doctor and did not ignore signs of disease. Other studies have shown that medical students, despite their information in the field of prevention and etiology of diseases, did not implement their

knowledge in daily life [9, 47]. It can be assumed that ignoring prevention by academic youth results primarily from the distant perspective of health loss and the risk of developing chronic diseases when at a young age.

An important element of a healthy lifestyle is regular physical activity, tailored to the individual abilities of human exercise [48]. In order to assess the readiness of the students to promote physical activity among their future students, their level of physical activity was determined. In the light of the results, it was shown that most students of teaching specializations (62.10%) declared a moderate level of physical activity, with an indication of its higher level in men than women. The female students undertook physical activity at a level sufficient and less frequently – at a high level more often than the male students. The moderate level of physical activity meant that more than half of the study group performed moderate efforts or walking at least five times a week for at least 30 minutes a day, vigorous efforts at least three times a week for at least 20 minutes a day, or a combination of efforts performed at least five times a week, above 600 MET-min/week [27]. The research of other authors showed different levels of students' physical activity [14, 16, 29, 49-56]. The results of research among young people studying at Pope John Paul II State School of Higher Education in Biala Podlaska [57], which also demonstrated that the largest proportion of the group (approximately 60%) undertook moderate physical activity, corresponded with the trends described in our research. Alike the youth in Krakow, students from Biala Podlaska frequently undertook walking (959.2 MET-min/week) and vigorous efforts (901.5 MET-min/week), which were more often performed by men than women ( $p < 0.05$ ). A similar, higher level of physical activity in men has also so been shown among Greek [58] and American [59] students.

In the studied group of Krakow students, there were alarming trends in the relationship between physical activity levels and the intensity of each category of pro-health behaviours. It has been shown that students with insufficient levels of physical activity, at the same time, presented the lowest intensity of behaviour in terms of healthy eating habits. This could suggest a lack of sufficient knowledge on the positive impact of combining physical activity and a proper diet on health. Moreover, in subjects performing high levels of physical activity, the men received lower results than women in terms of the intensity of the so-called pro-health practices. This group of men also obtained lower scores in terms of the intensity of behaviour in the area of pro-healthy practices than the men undertaking sufficient physical activity. This may suggest that they were physically active not to improve health, but for other reasons, including physical activity being fashionable.

In our research, we also attempted to answer the question of whether there is a relationship between the nature of undertaken physical exercise and the intensity of the pro-health behaviour of young people. The data obtained show that students undertaking vigorous exercise and activity associated with walking were less likely to undertake pro-health practices. Analysis of the relationship between these variables according to gender confirmed that there was also a downward trend in the intensity of pro-health practices in men performing moderate physical activity. Therefore, students studying teaching, despite the fact that they were physically active only to a restricted extent, cared about proper rest, maintaining appropriate weight and limiting smoking. Further analyses showed that students undertaking vigorous and moderate physical activity often also realized proper eating habits and preventative behaviours. Analysis of the relationship between these variables according to gender confirmed, however, that the intensity of prevention when performing vigorous exercise showed an upward trend only in women. Similarly, the intensity of the positive mental attitude along with the upward trend in the volume of vigorous exercise increased in women, and in the men, it decreased. Therefore, it can be assumed that the women presented greater health awareness, especially that most of them performed vigorous and sufficient physical activity, and also scored higher rates than men in several health behaviour categories. The tendency in women for a higher intensity of healthy behaviour than men has also been confirmed in other studies [29]. In addition, along with the increase in vigorous physical activity, there was also an increase in the intensity of prevention and positive mental attitude, which confirmed the importance of physical activity in the reduction of mental tension and the improvement of well-being, among others, due to the increased secretion of endogenous opioids (beta-endorphins). Analysis of the relationships between the type of exercise and the intensity of pro-health behaviours also showed that along with the increase in time spent sitting, there was a decrease in the intensity of the positive mental attitude in young people. Therefore, the identified relationships confirmed that an active lifestyle has a positive effect on the reduction of tension and psychological stress, and improves emotional state, as one of the important areas of health understood holistically as an attempt to achieve psychophysiological balance. The analysis of the relationship between physical activity levels and the intensity of healthy behaviours was also done in research on the determinants of the Kielce Holy Cross students' lifestyle. The statistically significant relationship was confirmed - that the highest indicator of healthy behaviour was achieved by students performing vigorous physical activity, and the lowest - students with low

levels of physical activity. Thus, high levels of physical activity significantly influenced the higher indicators of pro-health behaviour in the Kielce students studying different fields, including pedagogy [29]. The assessment of the relationship between physical activity levels and intensity of pro-health behaviours was also the subject of research among the Turkish youth [60].

On the basis of this research and the results obtained by other authors, we can conclude that the university students – also future educators, showed unsatisfactory levels of pro-health behaviours. Although the majority undertook sufficient levels of physical activity, it should still be borne in mind that maintaining and improving health potential is not only promoted by physical activity with the characteristics of health training, but also by proper nutrition, effective coping with psychological stress, undergoing check-ups, avoidance of psychoactive substances and risky sexual contacts [1, 2]. This may suggest that students - future teachers – implement a healthy lifestyle to a limited extent and do not show adequate readiness to be future role-models for children and adolescents in the promotion of pro-health behaviours. A low level of health awareness was found in a group of Turkish teachers, and the authors suggested the legitimacy of the implementation of post-graduate health education programmes [60]. It should be noted that the adverse health habits of students - future teachers - established during the period of studies can weaken the effectiveness of future educational activity promoting the healthy lifestyles of children and adolescents, but it also reduces their own potential health. Strengthening attitudes and pro-health behaviours of students of teaching specializations is very important for the effectiveness of health promotion among children and youth, given the importance of individual health beliefs in their future careers as health educators.

## Conclusions

Analysis of the level of physical activity and pro-health behaviours of students allowed to formulate the following conclusions:

1. A large part of the Krakow university students studying to be teachers was characterized by a low level of pro-health behaviours and a sufficient level of physical activity, thus, they implemented a healthy lifestyle to a limited extent.
2. Gender was a significant variable differentiating intensity of particular categories of pro-health behaviours and physical activity levels of the Krakow student youth - future teachers. Women obtained higher rates of healthy behaviours in terms of: proper eating habits, positive mental attitude and prevention. Women more often performed physical activity at a moderate level and at a vigorous level, less often

- than the men. The results confirmed greater involvement of the female teaching specialization students than the males in the process of conscious and active health achievement.
3. The significant relationship was shown between physical activity levels and the intensity of particular categories of pro-health behaviours of young people, with the moderating role of gender. Among those with a high level of physical activity, men showed lower intensity of pro-health behaviours than the women. Additionally, in men, along with the increase in the volume of vigorous exercise, there was a decrease in the intensity of prevention and positive mental attitude, and with the increase in the volume of moderate physical activity, there was a decrease in the intensity of undertaking pro-health practices. These results are suggestive of other motives for undertaking physical activity than pro-health reasons for the men.
  4. Increasing the amount of time spent sitting was accompanied by a reduction in the intensity of the students' positive mental attitude, which confirmed the negative impact of low physical activity on emotional state.

### Applicative conclusions

1. The health education of future teachers should place greater emphasis on the development of positive attitudes towards health and pro-health behaviour, particularly in the area of preventive measures and recommendations for proper nutrition, because of all the categories of pro-health behaviour, it is the category in which students achieved the lowest results.
2. Raising the awareness of teaching specialization students, regardless of their field of study, that carrying out health education at schools is their responsibility resulting from the provisions of the standards applicable in training for the teaching profession.

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