Physical activity and nutritional behaviours of female Cracow students of medical and technical fields of study

Aktywność fizyczna i zachowania żywieniowe krakowskich studentek kierunków medycznych i technicznych

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Wprowadzenie. Zachowania zdrowotne są determinowane szerokim spektrum czynników socjoekonomicznych, kulturowych i osobowościowych. Jednym z czynników wpływających na postawy wobec behawioralnych uwarunkowań zdrowia jest poziom wiedzy w przedmiotowym zakresie.

Cel. Analiza wybranych aspektów stylu życia studentek w zależności od profilu kształcenia (kierunki medyczne *vs.* techniczne).

Materiały i metody. Badania przeprowadzono w grupie studentek Collegium Medicum Uniwersytetu Jagiellońskiego (CMUJ; n=176) i Akademii Górniczo-Hutniczej (AGH; n=156) z zastosowaniem przygotowanego kwestionariusza aktywności fizycznej i zachowań żywieniowych.

Wyniki. Analiza statystyczna wykazała, że aktywność fizyczną w czasie wolnym istotnie częściej podejmowały studentki CMUJ niż AGH (72,15 *vs.* 52,56%; p<0,001). Wykazano ponadto tendencję do bardziej racjonalnych zachowań żywieniowych studentek CMUJ niż AGH, w tym w zakresie codziennej konsumpcji pieczywa razowego (26,14 *vs.* 13,46%; p<0,01), warzyw (52,84 *vs.* 36,54%; p<0,01) i fermentowanych produktów mlecznych (28,98 *vs.* 18,59%; p<0,05).

Wnioski. Wykazano zróżnicowanie skali podejmowania aktywności fizycznej i jakości wyborów żywieniowych, ze wskazaniem bardziej racjonalnych zachowań zdrowotnych studentek kierunków medycznych niż technicznych.

Słowa kluczowe: *aktywność fizyczna, zachowania żywieniowe, studentki, profil kształcenia*

Introduction. Pro-health behaviours are determined by a broad spectrum of socio-economic, cultural and personality-related factors. One of the factors influencing attitudes towards behavioural health determinants is the level of knowledge regarding the field in question.

Aim. The aim of research was to analyse selected aspects of female students' lifestyle depending on their profile of education (medical *vs.* technical fields).

Material & method. Research was carried out among a group of female students from Jagiellonian University Medical College (CMUJ; n=176) and the University of Science and Technology (AGH; n=156) using a prepared questionnaire on physical activity and nutritional behaviours.

Results. Statistical analysis showed that CMUJ students were more likely to undertake physical activity during their free time than AGH students (72.15 *vs.* 52.56%, p<0.001). Statistical analysis showed a trend towards more rational dietary behaviours of the CMUJ students than those from AGH, including daily consumption of wholemeal bread (26.14 *vs.* 13.46%, p<0.01), vegetables (52.84 *vs.* 36.54 %, p<0.01) and fermented dairy products (28.98 *vs.* 18.59%, p<0.05).

Conclusion. Diversity of the scale of undertaking physical activity and the quality of nutritional choices was demonstrated, with an indication of the most rational pro-health behaviours among female students studying medicine rather than technical fields.

Key words: *physical activity, nutritional behaviour, female students, educational profile*

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Introduction

A key determinant of holistically defined health, in addition to environmental and biological factors as well as the quality of medical care, is a lifestyle shaped as a result of socio-cultural factors and personal resources of a subject. Preservation and improvement of health potential and early prevention of chronic diseases are conducive to pro-health behaviours, particularly related to a rational diet and recreational physical activity [1].

A rational dietary model is associated with a varied and balanced diet, consuming products with high nutritional density, including vegetables and fruits, whole-grain cereals, dairy products with reduced fat content, fish, vegetable oils and nuts, with the restriction of animal fats, red meat, highly processed

cereal products as well as sweet and salty snacks [2]. An illustration of a rational diet is the model of the new Polish Pyramid of Physical Activity and Healthy Nutrition of the Institute of Food and Nutrition in Warsaw, which also includes recommended daily recreational physical activity. The absolute minimum of performed physical activity for maintaining health (according to current WHO standards) for adults (aged 18-64 years) assumes at least 150 minutes of moderate-intensity exercise (5 x 30 minutes) or at least 1 hour of high intensity exercises (3 x 20 minutes) and strength training with the participation of large muscle groups at least twice a week [3].

Despite the key role of a pro-health lifestyle in raising health potential and prevention of chronic diseases, numerous studies have demonstrated the prevalence of anti-health behaviours in the lifestyle of different population groups, including academic youth with different educational profiles [4-13].

Pro-health behaviours, including ones concerning nutrition, are determined by a broad spectrum of socio-economic, cultural and personality-related factors [14]. One of the factors influencing attitudes towards behavioural health determinants is the level of knowledge regarding the field in question. In accordance with the theory of cognitive dissonance, a higher level of knowledge on the importance of proper nutrition and physical activity for health should favour the development of pro-health attitudes, including more rational health behaviours. Within this context, research was undertaken on the predictive role of educational profile in relation to nutritional choices and physical activity of young female students. Academic youth, especially studying medical fields, should have knowledge within the area of health determinants and the importance of a healthy lifestyle in improving health potential. In accordance with the assumptions of salutogenesis of medical sciences, the task of medicine is not only therapy, but above all, to create an attitude of individual responsibility for health, in accordance with the principle of health subjectivity.

Aim

Determine and analyse the physical activity and nutritional behaviours of female Cracow university students with diversified educational profiles (medical *vs.* technical sciences).

Material and method

Research was carried out in Cracow among a group of medical and nursing students at Jagiellonian University Medical College (CMUJ; n=176) and students of engineering majors at the University of Science and Technology (AGH; n=156), aged 20-27. The average value of the BMI was 21.18 kg/m^2 (CMUJ students) and 20.99 kg/m^2 (AGH students).

The research was carried out using a prepared questionnaire regarding physical activity and nutritional behaviours. The questionnaire included questions referring to the recommendations of the new, current Polish Pyramid of Physical Activity and Healthy Nutrition of the Institute of Food and Nutrition in Warsaw from January 2016. BMI was estimated based on the declared values of body height and mass according to the formula: BMI = body mass (kg)/ body height (m^2). Statistical analysis was performed using the Chi-square test in the PQStat programme ver.1.6.6.246, assuming the test probability level of α=0.05.

Results

Free-time physical activity was undertaken by 62.95% of all the female students, including 6.33% daily or at least 5-6 times a week, and in 3-5.66% of subjects, 3-5 times a week. Statistical analysis showed that CMUJ students were more likely to undertake physical activity in their free time than AGH students (72.15 *vs.* 52.56%, p<0.001) (Tab. I).

In the examined group of female students, the 4-5 meal dietary model dominated (59.64%), with 47.59% of women eating meals very irregularly. The largest percentage of students consumed water and other unsweetened drinks in the amount of 1-2 litres per day (65.66%) and avoided consuming energy drinks (66.86%). In their daily diet, the most common were: vegetables (45.18%), fruits (40.06%), fermented dairy products (21.08%), wholemeal bread (20.18%) and vegetable oils (23.19%). At the same time, about half of the group declared that they did not consume sugary carbonated beverages (53.31%) and fast food products (41.87%). Alcoholic beverages reached 13.25%, consumed almost a few times per week by the studied women. Statistical analysis showed that the daily consumption of the following products was significantly higher among the CMUJ students than those from AGH: wholemeal bread (26.14 *vs.* 13.46%, p<0.01) and vegetables (52.84 *vs.* 36.54%, p<0.01) and fermented dairy products (28.98 *vs.* 18.59%, p<0.05). Nonetheless, AGH students consumed meals by far more irregularly than the CMUJ students (55.13 *vs.* 40.91%, p<0.010), while consuming vegetables (13.46 *vs.* 2.84%, p<0.001) and fruits (6.41 *vs.* 1.70%, p<0.05) at a maximum of several times a month (Tab. I).

Table I. Physical activity as well as rational and inadequate nutritional behaviours of female medical (CMUJ) and technical (AGH) students (%)
Tabela I. Aktywność fizyczna oraz racjonalne i wadliwe zachowania żywieniowe studentek kierunków medycznych (CMUJ) i technicznych (AGH) (%)

Pro-health behavior (physical activity and nutrition) /Zachowania zdrowotne (aktywność fizyczna i żywienie)	Total /Ogółem n=332	CMUJ n=176	AGH n=156	p
Free-time physical activity /Aktywność fizyczna w czasie wolnym	62.95	72.16	52.56	<0.001
Physical activity every day or 5-6 times a week /Aktywność fizyczna codziennie lub 5-6 razy w tygodniu	6.33	6.82	5.77	0.695
Physical activity 3-4 times a week /Aktywność fizyczna 3-4 razy w tygodniu	15.66	14.77	16.67	0.636
4-5 meals a day /4-5 posiłków dziennie	59.64	63.07	55.77	0.176
3 meals a day /3 posiłki dziennie	33.3	31.25	35.90	0.370
1-2 meals a day /1-2 posiłki dziennie	6.63	5.68	7.69	0.462
Regularity of meals (definitely yes) /Regularność posiłków (zdecydowanie tak)	26.51	27.84	25.00	0.558
Irregularity of meals (definitely yes) /Nieregularność posiłków (zdecydowanie tak)	47.59	40.91	55.13	0.009
Wholemeal bread every day /Pieczywo razowe codziennie	20.18	26.14	13.46	0.004
Vegetables every day /Warzywa codziennie	45.18	52.84	36.54	0.003
Vegetables max. a few times a month /Warzywa maksymalnie kilka razy w miesiącu	7.83	2.84	13.46	<0.001
Fruit everyday /Owoce codziennie	40.06	43.75	35.90	0.145
Fruit max. a few times a month /Owoce maksymalnie kilka razy w miesiącu	3.92	1.70	6.41	0.027
Fermented dairy products every day /Produkty mleczne fermentowane codziennie	21.08	28.98	18.59	0.027
No consumption of sweetened soda beverages /Niespożywanie słodkich napojów gazowanych	53.31	51.14	55.77	0.398
Sweetened carbonated beverages at least a few times a week /Słodkie napoje gazowane przynajmniej kilka razy w tygodniu	13.25	13.07	13.46	0.916
No consumption of energy drinks /Niespożywanie napojów energetyzujących	66.87	63.07	71.15	0.118
Energy drinks at least a few times a week /Napoje energetyzujące przynajmniej kilka razy w tygodniu	12.95	14.20	11.54	0.470
No consumption of fast food /Niespożywanie produktów fast food	41.87	44.89	38.46	0.236
Fast food every day /Fast food codziennie	9.04	10.23	7.69	0.421
Sporadic consumption of pork /Sporadyczna konsumpcja mięsa wieprzowego	17.17	18.75	15.38	0.417
Pork max. a few times a month /Mięso wieprzowe maksymalnie kilka razy w miesiącu	44.58	43.18	46.15	0.587
Vegetable oils every day /Oleje roślinne codziennie	23.19	18.18	28.85	0.021
Water and other non-sugar beverages in the volume of 1-2 l a day /Woda i inne napoje niesłodzone w ilości 1-2 l dziennie	65.66	62.50	69.23	0.197
Water and other non-sugar beverages less than once a day /Woda i inne napoje niesłodzone w ilości mniejszej niż 1 l dziennie	26.81	23.30	30.77	0.125
Alcoholic beverages at least a few times a week /Napoje alkoholowe przynajmniej kilka razy w tygodniu	13.25	11.93	14.74	0.451

Discussion

The presented research showed a limited scale of physical activity and rational dietary choices among female students from the Cracow environment, as well as diversification of some aspects of lifestyle analysed depending on educational profile (medical *vs.* technical sciences), with an indication of more pro-health behaviours among CMUJ students than those from AGH.

The described frequency of performed recreational physical activity should be referred to the recommendations regarding physical activity for adults. WHO's current recommendations for physical activity, which are the absolute minimum for adult health, include at least 150 minutes of moderate exercise (5 × 30 minutes) or at least one hour of vigorous exercise (3 × 20 minutes) and strength training at least 2 times a week [3]. The frequency of recreational physical activity demonstrated in the studied group of students, referring to the current recommendations in this area, indicates that the activity at the recommended frequency (at least 5 times a week) was undertaken by only about 6% of the group. Physical activity at the minimum recommended frequency (at least 3 times a week) was undertaken by about 16% of the studied women. Therefore, the vast majority of the group (around 78%) did not undertake physical activity meeting the adopted criteria. At the same time, statistically significant differences regarding the frequency of performing free-time physical activity, depending on the profile of education, were indicated, with significantly higher participation of CMUJ students in physical activity than AGH students (regarding free-time performance, $p<0.001$), which confirms the relationship of educational profile with commitment to adopting an active lifestyle, however, with an indication of a definitely low level of physical activity regarding both students of medical and technical majors.

Other studies showed a varied level of physical activity among academic youth, with an indication

of lower activity among women than men [10, 12, 15-21]. The low participation among Cracow students of medical and technical fields in physical culture in the discussed study corresponds to the results of other authors' research. In another group of Polish students of medical and non-medical fields, it was shown that over half did not undertake regular physical activity [16]. Białystok students of dietetics and physical therapy usually undertook physical activity 2-3 times a week [20]. Very low physical activity was also described among students of physical therapy and medicine at the Medical University of Warsaw (43% of students did not exercise regularly). It was confirmed that students of medical fields (future physical therapists and doctors) are not sufficiently prepared to promote healthy behaviours among society [10]. The diversity of undertaking physical activity described in the present study, depending on the profile of education, was also demonstrated among students [22] studying at Łódź, Lower Silesia and Cracow [16] universities. Similarly, research at foreign centres showed a low level of physical activity among medical students 39.8 and 37.2% among non-medical students. Sufficient physical activity regarded only about 6% of medical and non-medical students [23]. At the University of Malaysia, 49% of medical students and 35% of students studying other majors were physically inactive (OR: 1.79, $p<0.05$) [21].

The discussed results of the author's research also showed nutritional errors among female students in Cracow, particularly related to the irregularity of consuming meals and low prevalence of daily consumption of recommended products, including wholemeal bread, vegetables and fruits, fermented dairy products and vegetable oils, and the relatively low scale of avoiding contraindicated products including sugary carbonated drinks and fast foods. Low consumption of vegetables and fruits (less than half of the group, daily) may limit the nutritional and health value of the diet, because vegetables and fruits are low glycemic sources of fibre, mineral salts and carotenoids, other antioxidant vitamins and polyphenols, bioactive substances with antioxidant and hypotensive properties. Low intake of whole grain cereal products could have lowered the supply of fibre, limiting the energy value of the diet and group B vitamins involved in regulating metabolic processes. Low intake of fermented dairy products may have also reduced the health potential of women's diets, through limited intake of calcium and probiotic bacteria, positively modulating the lipid profile of the blood. Among the studying females, low consumption of vegetable oils that could have lowered the supply of unsaturated fatty acids with hypolipemic and hypotensive properties was found. In turn, consumption of sugary carbonated drinks and fast food increased the supply of atherogenic simple sugars and trans-unsaturated fatty acids. The health benefits of the diet could have also been reduced by reaching for alcoholic beverages (at least several times a week by about 13% of the female students).

The discussed research also showed diversification of some nutritional behaviours depending on educational profile, with an indication of a larger scale of rational dietary choices among CMUJ than AGH students, including those associated with more frequent daily inclusion of products with high nutritional density, especially wholemeal bread, vegetables and fermented dairy products. More rational dietary behaviours of CMUJ students were conducive to regulation of metabolic rate and supply of fibre, mineral salts (including potassium, magnesium and calcium), vitamins (antioxidant and B group) and bioflavonoids, increasing health potential and limiting health risks, constituting primary prevention of chronic diseases.

Other studies also confirmed the occurrence of incorrect nutritional behaviours among academic youth, including students with different educational profiles [22, 24-27]. Similar nutritional errors were found, including irregular eating, too few meals during the day, insufficient ration of vegetables, fruits, wholemeal bread and milk and its products, and too frequent consumption of sweets, carbonated and alcoholic beverages, instant-products and fast food, described among Warsaw students (University of Physical Education – AWF, and Warsaw University of Life Sciences – SGGW) [24]. Young people from Poznan universities also confirmed dietary errors, including those related to irregularity of eating and low fruit consumption [25]. Improper nutritional behaviours, including eating between meals, over-consumption of sweets, instant meals and alcohol, were also described among students from the Holy Cross province [26]. Qualitative nutritional errors have also been described in studies of foreign centres, including those Chinese [27] and Brazilian [28]. An important element of students' lifestyle is alcohol consumption. According to Łaszek, et al. [29], the types of alcohol most often consumed by students are beer and wine, while students of medical fields (above 32%) declared an increase in alcohol consumption after taking up studies. These tendencies are in line with the results of research by Myszkowska-Ryciak, et al. [24].

The described variation in some of the nutritional behaviours of CMUJ and AGH students, with a tendency towards more intensified rational choices among students with a health-oriented educational profile (CMUJ), corresponds to the results of other authors' research. A Warsaw study by Myszkowska-Ryciak, et al. [24] showed that SGGW students declared more favourable dietary choices than AWF students, par-

ticularly regarding the number of consumed meals, regular consumption of cereal products (including whole wheat bread) and avoiding fast food and sugary carbonated drinks. Similarly, the assessment of nutritional behaviours among students of medical and non-medical majors from the Holy Cross province (126 women and 74 men) confirmed that their nutritional behaviours were dependent on the field of study, with more favourable dietary behaviours among students of medical rather than non-medical fields [26]. Similarly, research among students from various Łódź universities showed that physical activity and nutritional behaviours are dependent on gender, profile of studies and living conditions of young people [22]. The importance of educational profile for the scale of rational choices was also confirmed by research among public health and IT students in Rzeszów, which showed more favourable habits among the public health students [30].

The research generally confirms that students are a population group particularly vulnerable to dietary errors, their diet largely dependent on existing factors, in particular – income, knowledge regarding nutrition, level of education, living conditions and undertaken professional work [31, 32]. In addition, among young women, dietary restrictions, frequent and long-term use of reduction diets and the adoption of various substances to maintain a slim figure, are a common phenomenon. In the author's study, the average value of the BMI was within the norm. Similar results were obtained in research among students of the University of Physical Education (AWF) and the University of Life Sciences (SGGW) in Warsaw [24].

In conclusion, the limited scale of rational behaviours in the area of the analysed aspects of lifestyle among CMUJ and AGH students and their diversity depending on profile of study should be highlighted. There is a definite tendency for these behaviours to be more positive among students with a health-oriented profile. The obtained results suggest that health education among the CMUJ students, in accordance with the theory of cognitive dissonance, translates into the formation of a positive attitude towards health and basic behavioural factors conditioning it, including physical activity and rational nutrition. The results seem to indirectly confirm the significance of health education for a more health-oriented lifestyle of academic youth, also indicated by the authors of the above mentioned studies. However, it should be noted that a higher level of knowledge regarding health determinants does not always directly translate into pro-health behaviours, as confirmed by Pakistani medical students [33].

Conclusion

1. Limited participation of Cracow students in regular, free-time physical activity was demonstrated, as well as statistically significant differentiation depending on the profile of education, with an indication of significantly more frequent physical activity undertaken by medical (CMUJ) students than students of technical fields (AGH).
2. Nutritional errors were indicated among female students in Cracow, particularly related to the irregular consumption of meals and low prevalence of daily consumption of recommended products, as well as the diversification of some nutritional behaviours depending on the profile of education, with a larger scale of rational dietary choices among CMUJ than AGH students.
3. Educational profile is one of the factors differentiating pro-health behaviours among university students with an indication of the positive significance of the profile of studies oriented towards health culture.

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