

## Physical activity and BMI in students beginning their studies at the Gdansk University of Physical Education and Sport in the academic year 1999/2000 and 2009/2010

**Authors' Contribution:**

A – Study Design  
 B – Data Collection  
 C – Statistical Analysis  
 D – Data Interpretation  
 E – Manuscript Preparation  
 F – Literature Search  
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**Key words:** *physical activity, BMI, students, lifestyle*

### Abstract

**Background:** *The aim of the study was to assess physical activity undertaken by the students of Gdansk University of Physical Education and Sport in Gdansk, Poland (AWFiS) in their free time in the academic year 1999/2000 and 2009/2010 and the direction of changes in this scope.*

**Material/Methods:** *Students at the Faculty of Physical Education at AWFiS were subject to research in the academic years 1999/2000 and 2009/2010. 639 students were examined (42% women, 58% men). The research was based on a diagnostic survey with an author's own questionnaire containing questions from the scope of physical activity and participation in its forms.*

**Results:** *Mean values of BMI, body weight and height were higher amongst students beginning studies in 2009/2010. The BMI in the academic year 1999/2000, both for female and male students was lower than in 2009/2010. Irrespective of the year of examinations and the gender, the majority of the respondents were characterized by DPA (declared physical activity): 60.86% of the whole sample in 1999 and 47.1% in 2009; this difference was statistically significant. In our own research a decreasing tendency of the students' declared physical activity was observed. Percentage drop in students with GPA (great physical activity) and an increasing percentage of LPA (low physical activity) and UPA (moderate physical activity) – both in women and men.*

**Conclusions:** *The year of the research was a factor diversifying the level of the respondents' physical activity.*

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## Introduction

Physical activity (PA) is the most beneficial factor of the development of fitness and physical capacity. The importance of movement or its limitation and consequences for the normal development of an organism have been universally known. At present, physical activity is perceived as a factor considerably eliminating the majority of civilization threats [1-8]; however, propagating physical activity and active holidays/leisure is still insufficient and not valued enough [9].

A healthy lifestyle is the most effective form of preventing negative phenomena from the point of view of health and an individual's development. Hence in many studies [10-16] attention is paid to home and school environment as basic factors shaping young persons' attitude to physical culture. It is also emphasized that experience derived from family towards physical culture, physical activity and care of wide, versatile development of a human have an effect on the discussed issues in adulthood.

On account of a specific role of Physical Education college as an institution educating and preparing staff for the needs of widely understood physical culture, it seems indispensable to get to know the level of physical activity spontaneously undertaken by students in their free time, which has its roots in family and earlier stages of education.

The aim of the study was to assess physical activity undertaken by students of AWFIS in their free time in the academic years 1999/2000 and 2009/2010 and the direction of changes in this scope. The authors assumed that physical activity of students beginning their university education is at least at the same level in the studied years.

## Material and method

First-year students at the Faculty of Physical Education at Gdansk University of Physical Education and Sport (AWFiS) in Gdansk, Poland were subject to the research in the academic years 1999/2000 and 2009/2010. 639 students were examined (42% women, 58% men). The average age was 19.95 yrs (Table 1). The research was based on a diagnostic survey with an author's questionnaire containing questions regarding physical activity and participation in its forms. The survey remained anonymous. Competitive athletes were not included in the research. Appropriate examinations were preceded by a pilot study in 1999 and 2009 in order to verify the content of questionnaires, paying special attention to questions and research problems. Anthropometric measurements were carried out by Tanita Body Composition Analyzer.

Statistical analysis was based on the computer program STATISTICA version 10 (StatSoft Poland). The values of measurable parameters were presented in arithmetic means and standard deviations, whereas non-measurable parameters in the form of numbers and percentage. In order to examine the relation between two nominal variables in consecutive years (in certain time points of research) the chi-square independence test was applied, whereas for average values the t-Student test, with the level of significance  $p < 0.05$ , was used.

## Results

Table 1 presents characteristics of the research group. On the basis of anthropometric measurements, mass, body height and BMI were presented.

Three categories of students were recognized based on the declared number of hours of physical activity during a week beyond the college curriculum (marching, strolls, walking to the college – not analyzed in the paper). The first group was characterized by great physical activity (GPA) – 5 and more hours of physical activity during a week, moderate physical activity (MPA) – from 3 to 4 hours per week and low physical activity (LPA) – from 0 to 2 hours every week (Table 2); in each group the mean value of BMI was calculated (Table 3). In the group of low-physical activity students who declared participation in passive activities (use of computer, reading, going to the cinema, watching TV, listening to music etc.) were distinguished. It was called a sedentary group (Table 4).

Table 1. Characteristics of the subjects

Gender Research year $\bar{x} \pm SD$	Women		Men	
	1999/2000 n=152	2009/2010 n=119	1999/2000 n=175	2009/2010 n=193
Age (yrs)	20.1±1.27	19.3±1.14	20.6±1.52	19.8±1.43
Mass (kg)	<b>59.9±5.73<sup>a</sup></b>	<b>66.7±8.26</b>	<b>74.7±9.37<sup>b</sup></b>	<b>78.0±7.85</b>
Height (m)	1.68±2.84	1.71±1.07	1.77±1.73	1.79±0.9
BMI (kg/m <sup>2</sup> )	<b>21.16±1.05<sup>c</sup></b>	<b>22.85±1.76</b>	<b>23.74±1.67<sup>d</sup></b>	<b>24.34±1.68</b>

t-Student test between mean values; bp=0.005, cp=0.0000, dp=0.0007

Table 2. Percentage of subjects declaring various levels of physical activity

Gender Research year	Women				Men				Total					
	1999/2000		2009/2010		1999/2000		2009/2010		1999/2000		2009/2010			
	n= 152	%	n=119	%	n=175	%	p	n=193	%	n=327	%	p	n=312	%
GPA	86	56,6	54	45,4	<b>113</b>	<b>64,6</b>	*	<b>93</b>	<b>48,2</b>	<b>199</b>	<b>60,9</b>	**	<b>147</b>	<b>47,1</b>
MPA	38	25,0	32	26,9	34	19,4	ns	42	21,8	72	22,0	ns	74	23,7
LPA	28	18,4	33	27,7	28	16,0	ns	58	30,0	56	17,1	ns	91	29,2

The chi-square independence test between two nominal variables, level of significance p<0,05 \* p=0.0110, \*\*p=0.0077

Table 3. Mean values of BMI depending on the declared physical activity

Gender Research year $\bar{x} \pm SD$	Women		Men	
	1999/2000	2009/2010	1999/2000	2009/2010
GPA	<b>18.74 ± 0.86<sup>a</sup></b>	<b>20.82 ± 1.33</b>	22.16 ± 1.34	22.53 ± 1.57
MPA	<b>20.38 ± 0.93<sup>b</sup></b>	<b>22.16 ± 1.75</b>	23.76 ± 1.5	24.55 ± 1.93
LPA	25.14 ± 1.36	25.87 ± 2.2	25.56 ± 2.17	26 ± 1.54

t-Student test between mean values; level of significance p<0.05 ap = 0.0000, bp = 0.0000

Table 4. Subjects declaring sedentary activities in LPA (low-activity group) [%]

Low physical activity	Women		Men		Total	
	1999/2000	2009/2010	1999/2000	2009/2010	1999/2000	2009/2010
To 2h weekly	13.82	19.33	14.86	26.43	14.37	23.72
Sedentary activities	4.60	8.40	1.14	3.63	2.75	5.45
Total	18.42	27.73	16.00	30.00	17.12	29.17

Values not statistically significant

Average features for BMI, body weight and height were higher in students beginning studies in 2009/2010. The BMI in the academic year 1999/2000, both for female and male students was lower than in 2009/2010. The lower mean BMI value, the higher declaration of physical activity both in 1999 and 2009 (Table 3). Irrespective of the year of research and gender, declared physical activity amounted to 60.86% for the whole sample of respondents in 1999 and 47.1% in 2009 – this difference was statistically significant. In our own research a decreasing tendency of the declared physical activity was observed (percentage drop in students declaring any physical activity

and increasing percentage in low-activity group and moderate level – both in women and men). Significant statistical differences of GPA (great physical activity) depending on the year of the research were observed in men who devoted much more time to intense physical activity in 1999/2000 than students beginning studies 10 years later.

In 1999/2000 the level of the declared physical activity in female students was higher in comparison with the respondents in 2009 – the differences were not statistically significant. Physical activity described as moderate amounted to 22.02% for the whole sample of subjects in 1999 and 23.7% in 2009. Respondents who did not participate in any physical activity or declared up to 2h/week were classified (in the low physical activity group) at the levels: 17.12% of all subjects in 1999 and 29.17% in 2009. A percentage increase in respondents declaring a low level of physical activity between the studied years was observed, yet these differences were not statistically significant. Table 2 presents the number and percentage of respondents with respect to their declarations towards physical activity, considering their gender and year of research.

## Discussion

According to observations and scientific literature on a decrease in physical activity in societies, it can be claimed that in next years one should expect similar results.

For the contemporary man physical activity is becoming more and more important as an element of a healthy lifestyle which directs interests of people of different ages towards motor activities, sport and recreation in the natural environment. Its health benefits are quite thoroughly described in literature. It is also emphasised that that role of physical activity for improving health and prevention of so-called civilization illnesses gives research on young people's physical activity special significance. A lot of factors determine participation in or lack of contact with physical culture. Everyday health behaviours concerning physical activity enable making a choice between health and illness.

The results of CBOS study (Opinion Research Center) have recently shown beneficial changes in a lifestyle of Poles [17]. The GUS (Central Statistical Office) data confirm the above as well [18]. Findings of this research placed Poles above the European average with respect to the percentage of people declaring a high level of physical activity (EU: 31.3% vs PL: 33.5%) [18]. Also 44.7% of the Polish respondents declared intensive physical activity during the last 7 years (EU: 41.3%). In our own research 47.1% of the respondents were categorized as a group of a high level of physical activity. Inadequacy in the scope of physical activity mainly concerns respondents beginning studies in 2009.

School and academic young people, although having an easy access to equipment and sports facilities, as well as a well-developed pro-health education program do not differ as to participation in physical activity from the rest of the Polish society. Research findings of Nazimow-Krakowska [19], Chodorowski [20], or Lisicki [21], describing participation of university students from different Polish centres, confirm this alarming fact. Research findings of Zaleski [22], concerning sports interests and participation in physical activity of university students from Tri-city, and works of Wojtyczek [23], which refer to physical activity as one of the chosen elements of a lifestyle, and also our own findings presented in this paper indicate that young people from PE colleges participate in forms of physical activity to a larger extent. Therefore, their physical activity is higher in comparison with the whole society. However, the review of literature within the range of physical activity of Polish population points out preferential treatment of its passive forms [24,25,26]. Wolańska [27] claims that a relatively small group – 25% of the society – is interested in participation of active recreation and sports activity. The analysis of our own material concerning involvement of PE students in physical activity shows lower activity of male students compared to female students in 1999. A decade later in the group of students declaring passive physical activity a higher increase in the low level of activity was observed in women than in men. Drygas et al. [26] point at young people as not very active physically and definitely with a predominance of a 'sedentary' lifestyle.

## Conclusions

1. A year of examination was a factor diversifying the respondents' level of physical activity.
2. The need for physical activity in one's life is declared most often by those respondents, who have already undertaken or are taking up such an initiative.
3. It is possible to determine the level of everyday physical activity of young people beginning their studies as high with respect to the whole society.
4. Students with the lowest BMI in the research group demonstrated the biggest physical activity.

## References

1. Wojtyniak B, Gorynski P. Sytuacja zdrowotna ludności Polski [Health situation in the Polish population]. Warsaw: NIZP-PZH; 2008. Polish.
2. Powell KE, Blair SN: The public health burdens of sedentary living habits: theoretical but realistic estimates. *Med Sci Sport Ex.* 1994;26:851-856.
3. Malina RM, Little BB. Physical activity: the present in the context of the past. *Am J Hum Biol.* 2008;20(4):373-91.
4. Narodowy Program Przeciwdziałania Chorobom Cywilizacyjnym. Moduł I: Program Zapobiegania Nadwadze i Otyłości oraz Przewlekłym Chorobom Niezakaźnym poprzez Poprawę Żywienia i Aktywności Fizycznej POL-HEALTH na lata 2007-2011 [The National Program for Preventing Civilization Diseases. Module 1: Program of preventing overweight, obesity and chronic non-contagious diseases through the improvement of nutrition and physical activity for the years 2007-2011]. Warsaw (Poland): Ministerstwo Zdrowia [Ministry of Health]. Available from [http://www.mz.gov.pl/wwwfiles/ma\\_struktura/docs/otylosc\\_06012010.pdf](http://www.mz.gov.pl/wwwfiles/ma_struktura/docs/otylosc_06012010.pdf). Accessed on 2010.05.10. Polish.
5. Kalucka S, Ruszkowska J, Drygas W. Aktywność fizyczna, wciąż niedoceniony element profilaktyki zdrowotnej [Physical activity still underestimated element of health prophylactic]. *Polska Medycyna Rodzinna.* 2002;4(4):367-370. Polish.
6. Jegier A. Aktywność ruchowa w promocji zdrowia oraz zapobieganiu chorobom przewlekłym [Physical activity in health promotion and prevention of chronic illnesses]. In: Jegier A, Nazar K, Dziak A, eds. *Medycyna sportowa [Sport Medicine]*. Warszawa: PTMS; 2006, 403-456. Polish.
7. Drabik J. Aktywność fizyczna w edukacji zdrowotnej społeczeństwa [Physical activity in health education of a society]. Part 1. Gdansk: AWF; 1995. Polish.
8. Horn DB, O'Neill JR, Pfeiffer KR, Dowda M, Pate RR. Predictors of physical activity in the transition after young women. *Journal of Physical Activity and Health.* 2008;5:275-285.
9. Drygas W. Czy siedzący tryb życia nadal stanowi zagrożenie dla zdrowia społeczeństwa polskiego? [Are sedentary living habits hazardous for health of the Polish society?] [letter]. *Medycyna Sportowa.* 2006;22:111-116. Polish.
10. Fraczek B. Rodzina jako środowisko kształtujące prozdrowotny styl życia młodzieży [Family as an environment creating pro-health life style of young people]. *Annales Universitatis Mariae Curie-Skłodowska Lublin-Polonia.* 2004;LIX,suppl.XIV,113:102-107. Polish.
11. Fraczek B, Klimek AT, Cieslar G. Aktywność fizyczna jako element prozdrowotnego stylu życia rodziny. [Family as an element creating pro-health life style of young people]. *Annales Universitatis Mariae Curie-Skłodowska Lublin-Polonia.* 2004;LIX,suppl.XIV,112:94-101. Polish.
12. Skibinska K. Aktywność ruchowa młodzieży licealnej [Physical activity of secondary school students]. *Kultura Fizyczna.* 2002;1-2:17-23. Polish.
13. Woynarowska B, Mazur J. Zachowania zdrowotne i zdrowie młodzieży szkolnej w Polsce i innych krajach. Tendencje zmian w latach 1990-1998 [Health behaviour and health of school children in Poland and other countries. Tendencies of changes in the years 1990-1998]. Warsaw: University of Warsaw; 2000. Polish.
14. Nowak-Zaleska A. Candidates for the first year of studies at the university level institution of physical education and their physical activity. *Baltic Journal of Health and Physical Activity.* 2011;3:186-193.
15. Walentukiewicz A, Lysak A, Wilk B. Selected health attitudes (physical activity and nutrition) of 18-year-old girls graduating from secondary schools of Tricity. *Baltic Journal of Health and Physical Activity.* 2011;2:112-120.
16. Piatkowska M, Ruzbarská I. The Evolution of Physical Activity Guidelines. *Baltic Journal of Health and Physical Activity.* 2011;4:299-310.
17. O aktywności fizycznej Polaków. Komunikat z badań BS/23/2003 [On physical activity of Polish people. Report on research BS/23/2003]. Warsaw: CBOS [Public Opinion Research Center]; 2003. Available at [http://www.cbos.pl/SPISKOM.POL/2003/K\\_023\\_03.PDF](http://www.cbos.pl/SPISKOM.POL/2003/K_023_03.PDF), 20.03.2010. Accessed on 2010.05.10. Polish.
18. Uczestnictwo Polaków w sporcie i rekreacji ruchowej w 2008 r. [Participation of Poles in sport and recreation in 2008]. Warsaw: GUS [Central Statistical Office]. Available at

- [http://www.stat.gov.pl/cps/rde/xbcr/gus/PUBL\\_kts\\_Uczestnictwo\\_pol\\_w\\_sporcie\\_w\\_2008r.pdf](http://www.stat.gov.pl/cps/rde/xbcr/gus/PUBL_kts_Uczestnictwo_pol_w_sporcie_w_2008r.pdf). Accessed on 2010.05.10. Polish.
19. Nazimow-Krakowska T. Miejsce sportu i rekreacji fizycznej w czasie wolnym mlodziezy akademickiej [Place of sport and leisure of university students in their free time]. *Rocznik Naukowy /Katowice/*. 1990;18:111-127. Polish.
  20. Chodorowski Z. Zainteresowania sportowe studentow I roku Politechniki w Gdansku na podstawie ankiet [Sports interests of first year students at the Technical University of Gdansk based on a survey]. *Wychowanie Zdrowotne w Sporcie Akademickim*. 1973;7:46-53. Polish.
  21. Lisicki T. Ogolna sprawnosc fizyczna oraz postawy wobec profilaktyki zdrowotnej i aktywnosci ruchowej studentow I roku studiow. Na przykladzie studentow Trojmiasta [General physical fitness and attitudes towards health prophylactic and physical and motor activity of the first-year students from Tricity]. Gdansk: AWFIS; 2002. Polish.
  22. Zaleski R, Zaleska A, Wilk B. Aktywnosc ruchowa w strukturze czasu wolnego studentow Trojmiasta [Motor activity of Tricity students in the structure of their free time]. In: Marciszewska B, Ozdzinski J, eds. *Rekreacja, Turystyka, Kultura. Współczesne problemy i perspektywy wykorzystania czasu wolnego*. [Recreation. Tourism. Culture. Contemporary problems and prospects of making good use of free time]. Gdansk: AWFIS; 2004, 71-79. Polish.
  23. Wojtyczek B. Ocena wybranych elementow stylu zycia (aktywnosci fizycznej, samooceny zdrowia) mlodziezy rozpoczynającej studia w Akademii Wychowania Fizycznego [Assessment of some elements of living habits (physical activity, self-evaluation of health) in young people beginning their studies at the University of Physical Education]. *Medycyna Sportowa*. 2003;19(1):31-39. Polish.
  24. Kunicki BJ: Społeczne bariery rekreacji fizycznej [Social barriers of physical recreation] Warsaw: AWF; 1984. Polish.
  25. Skład M. Sport wyczynowy [Professional sport]. In: Krawczyk Z, Przeweda R, Ulatowski T. eds. *Raport o kulturze fizycznej w Polsce* [Raport on physical culture in Poland]. Warsaw: AWF and Komitet Nauk o Kulturze Fizycznej Polskiej Akademii Nauk [Scientific Committee on Physical Culture Polish Academy of Sciences]; 1989, 107-122. Polish.
  26. Drygas W, Bielecki W, Puska P: Ocena aktywnosci fizycznej mieszkancow szesciu krajow europejskich. [Evaluation of physical activity of inhabitants from six European countries. Project "Bridging East-West Health Gap"]. *Medycyna Sportowa*. 2002;5:169-174. Polish.
  27. Wolanska T. Rekreacja ruchowa [Motor recreation]. In: Krawczyk Z, Przeweda R, Ulatowski T. eds. *Raport o kulturze fizycznej w Polsce* [Raport on physical culture in Poland]. Warsaw: AWF and Komitet Nauk o Kulturze Fizycznej Polskiej Akademii Nauk [Scientific Committee on Physical Culture Polish Academy of Sciences]; 1989, 71-86. Polish.