

Andrzej Lewandowski<sup>1</sup>, Tomasz Kowalik<sup>1</sup>, Mirosława Śmiglewska<sup>1</sup>, Jadwiga Sarwińska<sup>1</sup>, Jacek J. Klawe<sup>2</sup>,  
Paweł Zalewski<sup>2</sup>

**FITNESS SKILLS OF UNIVERSITY STUDENTS – AS EXEMPLIFIED  
BY TOURISM AND RECREATION AND PHYSIOTHERAPY STUDENTS**

**ZDOLNOŚCI KONDYCYJNE MŁODZIEŻY AKADEMICKIEJ – NA PRZYKŁADZIE STUDENTÓW  
KIERUNKU TURYSTYKI I REKREACJI ORAZ FIZJOTERAPII**

<sup>1</sup>Z Katedry i Zakładu Podstaw Kultury Fizycznej UMK w Toruniu Collegium Medicum  
im. L. Rydygiera w Bydgoszczy  
p.o. kierownika: dr Andrzej Lewandowski

<sup>2</sup>Z Katedry i Zakładu Higieny i Epidemiologii UMK w Toruniu Collegium Medicum  
im. L. Rydygiera w Bydgoszczy  
kierownik: dr hab.n.med. Jacek J. Klawe, prof.UMK

**S u m m a r y**

**I n t r o d u c t i o n .** Changes in physical fitness of younger generations are a fact and they include most of its components. Young adults, who decide on the specializations of tourism and recreation as well as physical therapy, will in the future undertake tasks in the area of physical education, and the need of proper strength and endurance forming in those students is a result of that. The aim of this study was to evaluate and compare the level of both of those features in students of both specializations of the University in Toruń.

**M a t e r i a ł i m e t o d y .** 32 male and 77 female second year students of tourism and recreation were examined, together with 28 male and 52 female first year students of physical therapy. Body height and mass were measured for those students as well as Rohrer index and BMI. A trial of static strength and endurance was realized according to Eurofit Physical Fitness Test Battery.

Differences in results of both groups of subjects were evaluated by means of U test.

**R e s u l t s .** It was observed that male students of both specializations were characterized by similar values of the studied motoric and morphological determinants, while female physical therapy students were characterized by slightly greater means of morphological features and significantly greater means of fitness trials.

**C o n c l u s i o n s .** It was concluded that identification of students with their profession by means of motoric and morphological conditioning influences succeeding in their future jobs, while men, as a result of their physiologically higher level of physical fitness, pay less attention than women to its importance in selection of specialization and further realization of their profession.

**S t r e s z c z e n i e**

**W s t ę p .** Zmiany w strukturze sprawności fizycznej młodych pokoleń są faktem i dotyczą one większości jej komponentów. Studia turystyki i rekreacji oraz fizjoterapii skupiają młodzież, która w przyszłości będzie podejmowała zadania w obszarze kultury fizycznej, stąd potrzeba odpowiedniego ukształtowania siły i wytrzymałości wśród osób studiujących na tych kierunkach. Ocenę i porównanie

ich poziomu wśród młodzieży obu kierunków na UMK w Toruniu uczyniono celem podjętej pracy.

**M a t e r i a ł i m e t o d y .** Zbadano 32 studentów i 77 studentek drugiego roku kierunku turystyki i rekreacji oraz 28 studentów i 52 studentki pierwszego roku kierunku fizjoterapii. Zmierzone wysokość i masę ciała oraz wyliczono wskaźnik Rohrera i BMI. Zrealizowano próbę siły sta-

tycznej i wytrzymałości Europejskiego Testu Sprawności Fizycznej „EUROFIF”. Różnice wyników badań obu zespołów studenckich oceniono przy zastosowaniu testu U.

**Wyniki badań.** Stwierdzono, że młodzież męską obu kierunków cechowały podobne wielkości badanych wyznaczników morfologicznych i motorycznych, a studentki fizjoterapii nieznacznie większe średnie cech morfologicznych i istotnie wyższe przeciętne rezultaty prób sprawnościowych.

**Key words:** static strength, endurance, morphological characteristics, specializations, differences.

**Słowa kluczowe:** siła statyczna, wytrzymałość, cechy morfologiczne, kierunki studiów, różnice

## INTRODUCTION

Changes in the structure of physical fitness of younger generations are a fact as well as the process of fitness equalizing among university students [1, 2, 3, 4]. They relate to the majority of the components of physical fitness, and the rudimentary reason for this process are changes in living conditions of most societies caused by civilization development.

The fact that physical activity has become unnecessary in the majority of areas of human lives, especially the professional one, leads to transferring fitness skills onto different, non motoric fields. Despite such changes, some professional groups will retain the level of motoric skills at the relatively high level [5]. With certainty one can point to the present and future existence of such need in professions which utilize directed physical activity as a work tool.

Specializations of tourism and recreation and physical therapy attract young adults, who in the future will undertake tasks in the area of physical activity. That is where the need for proper level of strength and endurance among students of both specializations comes from. The aim of this study was to evaluate the level of both strength and endurance in students of both specializations at the University in Toruń (UMK). It was assumed that the above mentioned specializations as well as the lack of fitness identification for either of the specializations would be the factors equalizing the level of fitness of university students.

## MATERIAL AND METHODS

In the academic year 2010 / 2011 students of tourism and recreation and physiotherapy of the University in Toruń (UMK) were included in the study during summer camps. Recruitment process for both specializations does not involve motoric identification of the candidates, which had been a rule for admission for many years in physiotherapy. On the contrary,

**Wnioski.** Uznano, że samoidentyfikacja kandydatów na studia z wybranym zawodem pozostawia ślad morfologicznego i motorycznego uwarunkowania powodzenia w późniejszej pracy, a mężczyźni z tytułu fizjologicznie wyższego poziomu zdolności kondycyjnej przywiązują mniejszą, niż kobiety, wagę do ich znaczenia podczas wyboru studiów i późniejszej realizacji zawodu.

tourism and recreation specialization has only existed for a few years at UMK and its curriculum realizes a three times fewer, when compared to physiotherapy, number of classes of physical fitness and motoric education character.

Body height and mass were measured as basic morphological features, from which then Rohrer index, reflecting general body built, and BMI, allowing stating possible overweight or fatness, were derived [6]. A static strength trial was conducted by means of hand clenching of left and right hand as well as running endurance at variable pace, which are included in Eurofit Physical Fitness Test Battery [7,8], and which are included in physical fitness structures as motoric manifestations [9].

Along these proceedings, full sets of results were obtained from 32 male and 77 female second year students of tourism and recreation, and 28 male and 52 female first year students of physiotherapy. The results were processed by means of basic statistical methods, and U test was used to evaluate the differences in mean determinants of the studied motoric abilities [10].

## RESULTS

Table 1 presents comparative characteristics of morphological features measurements and calculated numbers for Rohrer index and BMI of the student groups.

As may be concluded from the data, studied groups of men and women did not differ significantly. They were characterized by a similar body built and correct value of BMI.

Table 2 shows comparative characteristics of the results of fitness trials in the student groups.

Numerical data included in the table proves that students of each specialization were not significantly different from each other as far as mean results of fitness trials were concerned. In female groups stated differences were of similar tendency to male groups.

However, female physiotherapy students were characterized by greater means in both static strength measurements and endurance trial, moreover, the differences between them and female tourism and recreation students were statistically significant.

Table I. *Comparative characteristics of morphological features in groups of students*

Tabela I. *Charakterystyka porównawcza cech morfologicznych badanych zespołów studenckich*

Feature	Physiotherapy (n = 80)	Tourism and Recreation (n = 109)	D	U
(n = 28) Men (n = 32)				
Body height (cm)	177.99±6.80	180.68±6.62	2.63	1.56
Body mass (kg)	77.02±8.53	76.4±11.06	0.63	0.25
Rohrer Index	1.37±0.16	1.29±0.18	0.08	2
BMI	24.33±2.52	23.38±3.10	0.95	1.31
(n = 52) Women (n = 77)				
Body height (cm)	166.61±4.99	166.32±6.11	0.29	0.29
Body mass (kg)	61.56±9.82	59.35±9.84	2.20	1.25
Rohrer Index	1.32±0.22	1.29±0.18	0.03	1
BMI	22.13±3.54	21.11±3.92	1.02	1.54

Table II. *Comparative characteristics of fitness trials results in groups of students*

Tabela II. *Charakterystyka porównawcza wyników prób sprawnościowych badanych zespołów studenckich*

Feature	Physiotherapy (n = 80)	Tourism and Recreation (n = 109)	D	U
(n = 28) Men (n = 32)				
Right arm strength	55.82±7.77	53.53±8.44	2.29	1.10
Left arm strength	54.82±9.24	52.00±7.71	2.82	1.29
Endurance	8.50±1.88	8.22±2.37	0.28	0.51
(n = 52) Women (n = 77)				
Right arm strength	35.29±4.48	32.12±5.41	3.17	3.64*
Left arm strength	33.83±4.68	31.07±5.17	2.76	3.17*
Endurance	5.781±.33	4.95±1.44	0.84	3.65*

\* Significance of differences for  $\alpha$  0.01

## DISCUSSION

The data and its analysis presented in this study allowed verification of proposed hypothesis and determining basic issues. At first, it needs to be reminded that the studied groups were admitted based

only on their intellectual abilities and candidate's identification with a profession connected with physical education, which, in the light of reports denoting equalizing of biological value level in university students, accounted for set hypothesis [2,3,4]. It was positively verified; however, only partially as far as morphological characteristics were concerned. Comparison of obtained data with previous ones presented by other authors, confirms the fact of lack of coincidence in received results and furthermore, in the acquired logic of the argument [11, 12, 13, 14, 15].

Manifestations of motoric fitness skills are determined by numerous factors, however, in the case of strength, conditioning its level with body height and mass seems rudimentary [16,17]. Hence, it might be expected that a similar level of morphological features in the studied groups would favor lack of difference in the area of tested motoric skills. Such result was only observed in trials of male students, despite slightly lower mean results in realized fitness trials of tourism and recreation male students. Female students of this specialization were also characterized by lower mean results in endurance and static strength trials, however, the difference compared with physiotherapy students' means, in statistical evaluation, was significant. Such result proves that young women choosing tourism and recreation, while deciding on this specialization, probably did not identify their future profession with physical effort, characteristic for active recreation and qualified tourism. Instead, they placed it in different areas of recreation and touristic traffic services. It may also be assumed that a small number of physical activities in the curriculum and accompanying lack of demands in the area of physical fitness and motoric skills might have been the factors informing candidates about the requirements for their future profession. Therefore, similar results of corresponding characteristics were observed in female students of medical (32.07±4.32) [13] and technical (4.28±1.45/27.09±14.00) [14] university in Bydgoszcz, whose male colleagues had worse results than the studied male groups (7.18±2.17/46.49±9.22) [15], as well as physiotherapy students at the Academy of Physical Education in Poznań (10.37±1.24/55.10±7.06) [18]. Students of the academy in Poznań, when compared to male groups, were characterized by greater means in fitness trials – especially endurance, which seems to confirm motoric conditioning in

selecting a college and specialization, as well as in identifying with the profession.

Results of a study concerning female students' fitness indirectly prove that motoric conditioning plays a role in successful realization of one's profession; hence in professions distinctive of men and requiring physical effort, masculinization of women occurs, together with their exhibiting a higher level of motoric skills than the remaining part of the population [19,20]. Such view is confirmed by a study of physiotherapy students, which seems to be accordance with observations of physical therapists' physical efficiency [21,22,23]. According to the study, women working as physical therapists are characterized by a higher than in men level of this motoric feature. Hence, identification of college candidates with their selected professions leaves a reminiscence of motoric conditioning in succeeding in the future career, however, men, due to their being physiologically more fit [24], pay less attention than women to its importance in choosing their future professions [23].

Obtained results of both groups of men and women studying tourism and recreation seem alarming. The lack of higher than in other students' level of basic motoric characteristics fails to aid a professional role of propagating physical activity – which should be a task of both physical therapists and recreation animators. Moreover, results of female tourism and recreation students are the more alarming as they constitute the majority of the total of students in this specialization.

Realized study allowed pointing a small range of biological conditioning in selecting college specialization and profession set in the area of physical education. It also enabled formulating conclusions listed below.

## CONCLUSIONS

Similar values of morphological features measurements stated in the study confirm a tendency of equalizing biological value of university students, while differences in the level of strength and endurance of studied female groups, contrasting with the even level of morphological features, might attest to the influence of other than morphological conditioning on fitness. Moreover, they may justify the thesis of transferring their manifestations onto different, other than motoric structures in the organism. They could also prove that female students of tourism and

recreation identify themselves with the areas of the profession, which do not require fitness.

Identification of college candidates with their selected profession leaves a reminiscence of motoric conditioning for succeeding in the future career. However, men, due to their physiologically higher level of fitness, pay less attention than women to its importance when choosing a specialization and profession. Furthermore, in the light of relatively low means in fitness trials of female tourism and recreation students, as well as the lack of motoric identification of college candidates for specializations set in the area of physical education, providing full and appropriately early information concerning curriculum requirements and professional competence seems essential.

## REFERENCES

1. Charzewska J., Chabros E., Rogalska-Niedźwież M., Górowska D., Wilczewski A. Czy dystanse środowiskowe ulegają zmianom? *Wychowanie Fizyczne i Sport*: 1991;2,31-41
2. Drabik J. *Sprawność fizyczna i jej testowanie u młodzieży szkolnej*. Gdańsk: AWF; 1992.
3. Przewęda R., Trzeźniowski R. Przemiany sprawności fizycznej młodzieży w Polsce. *Wychowanie Fizyczne i Sport*: 1992;4;3-16.
4. Lewandowski A.; *Sprawność fizyczna młodzieży akademickiej Bydgoszczy*. w: *Aktywność ruchowa ludzi w różnym wieku*, Umiastowska D. (red.), 1996,2,81-83, Wydaw. Promoc. ALBATROS, Uniwersytet Szczeciński.
5. Drozdowski Z. *Antropometria w wychowaniu fizycznym*. Poznań: AWF; 1992.
6. Drozdowski Z. *Antropologia a kultura fizyczna*. AWF. Poznań 1996.
7. Committee of experts as sports research. Eurofit - European test of physical fitness. Rome; 1988.
8. Szopa J, Grabowski M. Europejski test sprawności fizycznej. Kraków: AWF; 1991.
9. Stanisław A. *Przystępny kurs statystyki z zastosowaniem Statistica PL na przykładach z medycyny*. Tom 1. *Statystyki podstawowe*. Kraków: StartSoft Polska; 2006.
10. Raczek J. *Koncepcja strukturalizacji i klasyfikacji motoryczności człowieka*. w: *Motoryczność człowieka – jej struktura zmienność i uwarunkowania*, (red.) W. Osiński, Monografie 311,63-80, AWF Poznań, 1993.
11. Lewandowski A.; *Charakterystyka morfologiczna i motoryczna młodzieży studiującej nauki medyczne*. w: *Wychowanie fizyczne i Sport w Badaniach naukowych*, Strzelczyk R. (red.), 1998, Monografie nr 335,85-91, AWF Poznań.
12. Lewandowski A., Kowalik T., Śmiglewska M., Kurczewski M., Klawe J., Zalewski P.; *Educational*

- level and physical endurance of physiotherapy students. w: *Medical and Biological Sciences*, 2010,24/3,21-25
13. Czerwczak D., Lewandowski A.; Siła statyczna i skład ciała młodzieży podejmującej studia w Akademii Medycznej im Ludwika Rydygiera w Bydgoszczy. w: *Medical and Biological Sciences*, 2005, 19/3,35-41.
  14. Kostencki A. Budowa somatyczna i sprawność fizyczna studentów I roku Akademii Techniczno Rolniczej. *Scripta Periodica*, III;2/2000;1/2;617-624 – Pamiętnik Międzynarodowego Kongresu nauk Antropologicznych „Antropologia 2000” Bydgoszcz 2000.
  15. Bratkowska-Gołaszewska E., Bieranowska M. Budowa somatyczna i sprawność fizyczna studentek I roku Akademii Techniczno Rolniczej. *Scripta Periodica*, III;2/2000;1/2;518-523 – Pamiętnik Międzynarodowego Kongresu nauk Antropologicznych „Antropologia 2000” Bydgoszcz 2000.
  16. Orzech J. Podstawy treningu siły mięśniowej. Monografia treningu siły mięśniowej. Sport i Rehabilitacja, Tarnów, 2000.
  17. Osinski W. Antropomotoryka. AWF Poznań, 2003.
  18. Wieczorek A.; Sprawność fizyczna w grach sportowych a kierunek studiów w uczelni wychowania fizycznego. w: *Aktywność ruchowa ludzi w różnym wieku*, Umiasowska D. (red.), 2001, 4,515-521, Wydaw. Promoc. ALBATROS, Uniwersytet Szczeciński.
  19. Drozdowski Z. Cechy dymorficzne kobiet wykonujących zawody typowo męskie. W: *Prace Studiów Wychowania Fizycznego i Sportu Uczelni Technicznych*, 6;328-330, WSI Koszalin, 1979.
  20. Drozdowski Z. Sport i zawodowa aktywność kobiet w ich dymorficznych uwarunkowaniach. w: *Problemy dymorfizmu płciowego w sporcie (cz. 5)*; 307-312, AWF Katowice,1999.
  21. Lewandowski A, Żółtowska J, Grucza R, Klawe J. Obciążenia zawodowe fizjoterapeutek pracujących na oddziałach szpitalnych. *Medical and Biological Sciences* 2009; 1 (23): 57-61.
  22. Lewandowski A, Wasielewska M., Grucza R, Klawe J.J, Zalewski P. Wybrane obciążenia zawodowe fizjoterapeutów z Szpitala Uniwersyteckiego im. A. Jurasza w Bydgoszczy. w: *Fizjoterapia Polska* 2010;3(4vol.);10,234-241.
  23. Lewandowski A., Siedlaczek M., Mańkowski D., Grucza R., Tafil-Klawe M., Klawe J.J., Zalewski P.; złożono do druku w 2011.
  24. Jaskólski A, Jaskólska A. Podstawy fizjologii wysiłku fizycznego z zarysem fizjologii człowieka. AWF Wrocław, 2005.

Address for correspondence:

Dr Andrzej Lewandowski  
Uniwersytet Mikołaja Kopernika w Toruniu  
Collegium Medicum  
im. Ludwika Rydygiera w Bydgoszczy  
Katedra i Zakład Podstaw Kultury Fizycznej  
tel./fax: 52 585-36-12 / 585-11-19  
e-mail. kizpodskf @ cm.umk.pl

Received: 10.01.2012

Accepted for publication: 6.03.2012