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*Physical development, physical aptitude and capacity
as well as chosen health behaviours of young women
in the light of environmental differences*

Rapid civilization changes, increasing consciousness of parents resulting from their increasing level of education and better access to various kinds of media, higher standards of medical care and everyday life hygiene and also other processes in today's world create better conditions for development and upbringing of successive generations. In recent years, however, more and more often we have been faced with the opinion that youth, especially girls, are characterized by a low level of physical aptitude and a narrow spectrum of adaptation potential for moderate physical work inconsistent with their high level of physical development. Considering the above, along with other psychological factors which can influence girl's self-esteem, health sense and self-evaluation of undertaken health behaviours and therefore impact on their optimal and successful functioning in social, professional and private life (3, 4). It should be stressed that morpho-functional development as well as health behaviors are sensitive indicators of changes which take place within different groups (5). Many current auxiologic publications call attention to higher levels of biological development as well as speed and coordination abilities in children from urban areas in comparison with children from rural areas, the latter being characterized by a higher level of endurance and strength and a lower level of negative health behaviours induced by negative patterns (7). As a consequence, it seems interesting to compare biological development, physical aptitude and capacity and to establish the level of chosen aspects of health behaviors of women from different environments.

MATERIAL AND METHODS

The study carried out in 2002–2004 examined 503 female physiotherapy students of Świętokrzyska Academy in Kielce. The age of involved persons ranged from 19 to 23 years. This analysis is restricted to results acquired from first year day-students (n=105). The research studied physical development, physical aptitude and capacity as well as chosen aspects of health behaviours (physical activity, cigarette smoking, subjective self-evaluation of health). The level of physical development was based on measurements of height and body mass, three adipose cutaneous folds and chest circumference. BMI and LBM indexes were also calculated. Physical aptitude was evaluated on the basis of results acquired from fitness tests which assessed the explosive strength of lower extremities (long jump), functional force of arms and shoulders (hanging on a bar), force of abdominal muscles (number of bends forward from the lying position), total of sum force, relative force, run speed (shuttle run) and flexibility (forward reaching bends).

The evaluation of physical capacity was carried out on the basis of maximal oxygen uptake measurements. The VO_{2max} value was assessed by using submaximal workload test on cycloergometer. The workload was adjusted individually so that heart rate after achieving steady-state oscillated between 130 and 160 beats per minute. Time of the work was from 7 to 9 min. (1). Heart rate was examined during exercise by auscultation at the apex of heart by measuring the time of 30 heart beats with stop-clock. The VO_{2max} values expressed as liters of oxygen per minute were calculated with use of Astrand-Ryhming nomogram (1) considering correction connected with age

of examined persons. Additionally, VO_{2max} index expressed as ml/kg/min was counted, as it gives more accurate information on efficacy of oxygen supply in examined persons with observed significant diversity of body mass. Evaluation of social differences in morphofunctional development level was based on information about residency place environment. Results obtained from the study were subjected to statistical analysis (\bar{x} , s) in groups separated according to chosen environmental factors (place of residency). Significance of differences between groups were evaluated using the of t-Student test. Strength of association between health behavior and place of residence was evaluated using the non-parametric χ^2 test.

RESULTS

Evaluation of physical development based on measurements of height, body mass, chest circumference and calculated BMI and LBM indexes. Observation of the studied group revealed that girls from urban areas achieved somewhat higher levels of development of analyzed somatic traits. However, the noticed differences are small and statistically insignificant (Table 1).

Table 1. General statistical characteristics of somatic traits in examined female students

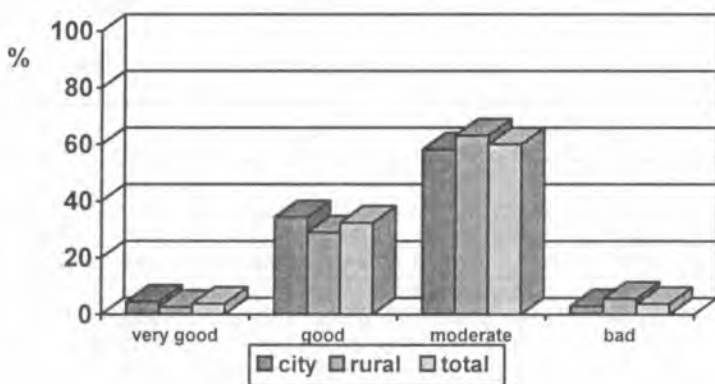
Examined characteristic	Urban area (n=67)			Rural area (n=38)			d	t-Student test value
	\bar{x}	s	v	\bar{x}	s	v		
Body height	166.94	5.48	3.28	165.52	5.3	3.2	1.42	1.279
Body mass	57.75	6.43	11.13	56.24	5.37	9.54	1.51	1.214
BMI	20.72	2.08	10.03	20.51	1.55	7.55	0.21	0.525
LBM	44.88	5.71	12.72	43.76	5.50	12.56	0.42	1.041
Chest circumference	75.20	5.15	6.84	74.78	3.87	5.17	0.42	0.407

Table 2. General statistical characteristics of motoric aptitude and physical capacity in examined female students

Examined characteristic	Urban area (n=67)			Rural area (n=38)			d	t-Student test value
	\bar{x}	s	v	\bar{x}	s	v		
Explosive strength of lower extremities	165.37	20.45	12.36	161.29	25.64	15.89	4.08	0.436
Functional force of arms and shoulders	5.37	6.60	195.84	6.87	5.94	86.46	-1.5	0.1430
Force of abdominal muscles	20.52	4.27	20.8	19.37	5.40	27.87	1.15	1.195
Run speed	21.71	2.81	12.94	21.35	4.41	187.65	0.36	0.502
Flexibility	13.29	6.28	47.25	10.87	6.18	56.85	2.42	1.893
Total sum of forces	57.69	9.09	15.6	60.03	12.24	20.38	-2.34	1.103
Relative force	1.30	0.23	17.69	1.38	0.27	19.56	-0.08	1.696
VO_{2max} l/min	2.36	0.49	20.76	2.42	0.47	19.42	-0.06	0.609
VO_{2max} ml/kg/min	40.71	8.11	19.92	43.45	8.71	20.04	-2.74	1.602

Analysis of chosen aspects of physical aptitude depending on place of residence concludes, that, similarly to somatic traits, there are no gross, significant differences between groups. The only exception is that students from rural areas are characterized by a higher level of strength abilities (absolute and relative sum of forces, functional force of arms and shoulders) and speed. Their oxygen uptake capacity is insignificantly higher than in their peers from urban areas. Calculated mean $\text{VO}_{2\text{max}}$ values expressed as l/min and as ml/kg/min are higher in this group. On the other hand, students from urban areas are characterized by somewhat higher mean level of flexibility and explosive force of lower limbs (Table 2).

Small environmental diversity is also distinctive when analyzing subjective evaluation of family socio-economic status among the examined persons. The highest percentage of students perceive their material status as good. Only 3.8% of examined girls think that their socio-economic status is qualitatively bad. This relation is similar in groups from both environments. However, worth attention is a fact that students from urban areas more often define their socio-economic conditions as good than students from rural areas (Fig. 1).

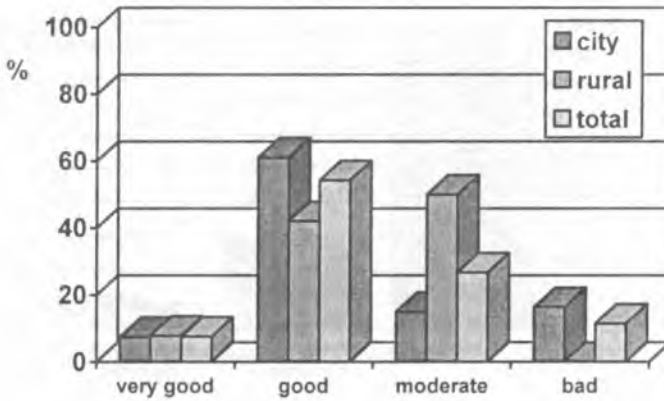


$$\chi^2=10.879 > \chi^2_{0.05, 3}=7.815 \quad H_0 \neq 0 \quad r_c=0.07$$

Fig. 1. Socio-economic conditions in the opinion of examined female students with regard to the place of residence

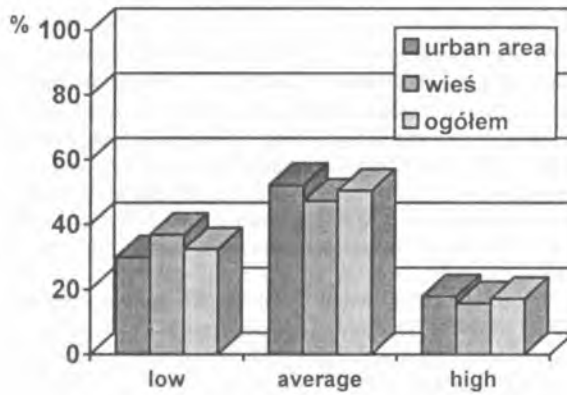
Taking into consideration subjective perception of one's own health, it could be stated that the majority of examined individuals declare well-being (54.28%). Definitely the smallest number of students define their general feeling as very good or bad. It should be also noted that women from urban agglomerations are characterized by more positive perception of their own health than women from rural areas (Fig. 2).

Another aspect analyzed in light of environmental differences was physical activity. It can be said, that the vast majority of examinees, from both urban and rural areas declare average level of physical activity (50.47%). The smallest number of questioned girls declared high level of physical activity (Fig. 3). The most popular form of spending leisure time was walking (65.4% of questioned), aerobic (9.2%), and jogging (5.34%). However, it should be emphasized, that all forms of their motor activity are undertaken rarely and irregularly, most commonly on days free from classes and lectures or during holidays.



$$\chi^2 = 17.815 > \chi^2_{0.001,3} = 16.268 \quad H_0 \neq 0 \quad r_c = 0.38$$

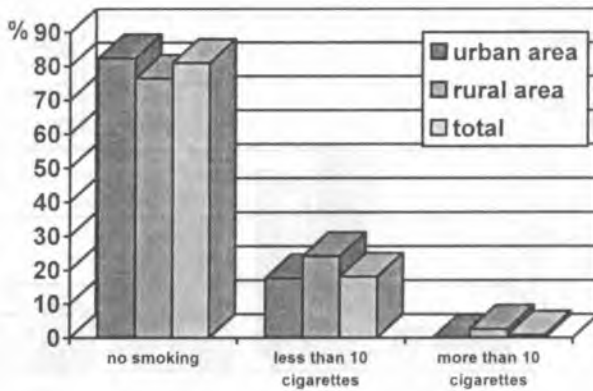
Fig. 2. Health in the opinion of examined female students with regard to the place of residence



$$\chi^2 = 0.574 < \chi^2_{0.05,2} = 5.991 \quad H_0 = 0 \quad r_c = 0.07$$

Fig. 3. Physical aptitude in the opinion of examined female students with regard to the place of residence

One of the numerous health-disturbing factors that influence the level of physical aptitude, and most importantly the level of physical capacity is nicotine addiction. As much as 80.97% female physiotherapy students declare non-smoking. In groups from both environments similar percentage is observed (Fig. 4).



$$\chi^2=1.778 < \chi^2_{0.05,2}=5.991 \quad H_0=0, \quad r_c=0.1$$

Fig. 4. Cigarette smoking among examined female students with regard to the place of residence

DISCUSSION

The above presented results are related to environmental variability of specific traits which characterize morphofunctional development and certain aspects of health behavior. It should be remarked, that many current auxologic publications underline the enormous significance of place of residency as a main modifying factor which has influence on somatic traits in adolescents. Significant developmental distance between youth from rural areas and those living in large towns is also noted. (2,3). The conclusion from research carried out on the population of students from Świętokrzyska Academy by Jopkiewicz shows that differences between height and body mass, chest circumference and BMI have a broader range and in the majority of cases are statistically significant (3).

The outlined picture of environmental variability among the examined first-year physiotherapy students is quite different. This may probably result from the presence of other powerful socio-economic factors, which, in case of this study, allowed to more completely realize biological potential of the examined persons. It should be underlined that the social status of students' families was quite high. More than 50% of parents had at least secondary education. In addition, the majority of girls came from families with one or two children.

Physical aptitude of adolescents shows environmental variability. The current opinion is, that positive changes concerning somatic development are accompanied by negative changes in aptitude and physical capacity (5,7,8). Girls present specifically low aptitude physical potential (5). The above signalized changes are expressed with different intensity depending on place of residence. According to Przewęda, at the moment we are faced with the changing structure of human motor abilities rather than with a lower level of aptitude. That is why we can distinguish endurance-strength type of aptitude dominating among urban adolescents and speed-agility type which characterizes adolescents from rural areas (8). However, the results acquired by a majority of researchers confirm the direction of environmental differences which is compliant with current social gradient, which means that a higher level of aptitude is exhibited by adolescents brought up in the urban environment (8). Quite opposite results were published by Mleczko (7), who pointed out insignificant environmental variability of some motor abilities, including coordination, and higher level of development in lower status groups. Our own research gives little confirmation to data from literature. It is possible that the physical activity factor had a unifying influence on the

level of aptitude and physical capacity of the examined female students as during their studies they realize a physical exercise programme (on average 4 hours a week).

Health behaviour patterns show some positive tendencies among the examined group. The majority of girls perceive their health positively, exhibit average physical activity and non-smoking. There are some environmental differences concerning the behaviors described above, especially subjectivity of opinions. Female students from rural areas more often expressed critical opinions about their socio-economic conditions as well as about their perception of health and physical activity level.

Studies carried out on APS students in Warsaw by Mięsowicz and Palus (6), revealed insignificant differences in self-esteem and significant differences in cigarette smoking in relation to place of residence. It should be pointed out that among the examined female students, as well as among their colleagues from APS there are powerful health-supporting behaviours (high percentage of non-smokers). Among the students of Zielonogórski University there are marked differences in self-evaluation of physical aptitude and smoking in correlation with their place of origin (4). Studies on self-evaluation of health among people aged 25–35 years show that the main factors that influence this pattern are socio-economic status and education. The examined people without economic problems and with higher education were much more optimistic (9).

CONCLUSIONS

1. There were observed small differences in the development of the discussed somatic traits in relation to place of residence among the examined, 19-year-old women.

2. The level of development of physical aptitude is similar in both compared groups. However, there is observed a lesser tendency to achieve the higher development of physical work adaptation indexes and power aspects in the rural area group.

3. Subjective evaluation of health is only one of the analyzed indicators that exhibits its relationship with place of residence.

REFERENCES

1. Astrand P.O.: Work Test Bicycle Ergometer. Monak, Vaarberg 1965.
2. Bielicki T.: Nierówności społeczne w oczach antropologa. Nauka Polska, 1, 13, 1989.
3. Jopkiewicz A., Przychodni A.: Poziom rozwoju fizycznego studentów Wyższej Szkoły Pedagogicznej w Kielcach a sytuacja ekonomiczno-społeczna rodziny i miejsce zamieszkania. W: Uwarunkowania rozwoju fizycznego dzieci i młodzieży wiejskiej. J. Zagórski, i wsp. (red.) Rocznik Naukowy, t. VI, sup. Nr 1, 51, Biała Podlaska 1999.
4. Kowalski M., Kowalski P.: Czynniki społeczne a zachowania prozdrowotne studentów. W: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. J. Zagórski, M. Skład (red.) IMW, 225, Lublin 2003.
5. Markowska M.: Środowiskowe uwarunkowania wydolności fizycznej studentów. W: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej, J. Zagórski, M. Skład (red.) IMW, 453, Lublin 2003.
6. Mięsowicz I., Palus D.: Wiedza dotycząca zachowań prozdrowotnych studentek Akademii Pedagogiki Specjalnej w Warszawie. W: Uwarunkowania rozwoju dzieci i młodzieży wiejskiej. J. Zagórski, M. Skład (red.), IMW, 216, Lublin 2003.
7. Młeczko E.: Przebieg i uwarunkowania rozwoju funkcjonalnego dzieci krakowskich między 7 a 14 rokiem życia. Monografia nr 44, AWF, Kraków 1991.
8. Przewęda R.: Środowiskowe uwarunkowania motoryczności człowieka. W: Motoryczność człowieka – jej struktura, zmienność i uwarunkowania. Monografie, podręczniki, skrypty, nr 310. AWF. 161. Poznań 1994.

9. Wojtaszczyk P.: Samoocena stanu zdrowia polskich pracowników. W: Między profilaktyką a medycyną kliniczną. A. Klimberg, J. T. Marcinkowski (red.), PTH, Warszawa 2003.

SUMMARY

The aim of the studies was to compare biological development, physical aptitude and capacity and to establish the level of chosen aspects of health behaviours of women from different environments. The study carried out in 2002–2004 examined 503 female physiotherapy students of Świętokrzyska Academy in Kielce. The age of the involved persons ranged from 19 to 23 years. This analysis is restricted to results acquired from first-year day-students ($n=105$). The research revealed physical development, physical aptitude and capacity as well as chosen aspects of health behaviours (physical activity, cigarette smoking, subjective self-evaluation of health). Evaluation of social differences in morphofunctional development level was based on information about residency place environment. Results obtained from the study were subjected to statistical analysis (\bar{x} , s) in groups separated according to chosen environmental factors (place of residency). The significance of differences between groups were evaluated using the t-Student test. The strength of association between health behaviour and place of residence was evaluated using the non-parametric χ^2 test. There were observed small differences in the development of the discussed somatic traits in relation to place of residence among the examined, 19-year-old women. The level of development of physical aptitude is similar in both compared groups. However, there is observed a lesser tendency to achieve the higher development of physical work adaptation indexes and power aspects in the rural area group. Subjective evaluation of health is only one of the analyzed indicators that exhibits the relationship with the place of residence.

Rozwój fizyczny, sprawność i wydolność fizyczna oraz wybrane zachowania zdrowotne młodych kobiet w aspekcie różnic środowiskowych

Celem badań jest porównanie rozwoju biologicznego, sprawności i wydolności fizycznej oraz określenie poziomu wybranych aspektów zachowań zdrowotnych kobiet z różnych środowisk zamieszkania. Badaniami, które zostały przeprowadzone w latach 2002–2004 objęto 503 studentki kierunku fizjoterapii Akademii Świętokrzyskiej w Kielcach. Wiek badanych wahał się w przedziale 19–23 lata. W pracy poddano analizie jedynie wyniki studentek przyjętych na I rok studiów stacjonarnych ($n=105$). Badania dotyczyły rozwoju fizycznego, sprawności i wydolności fizycznej oraz wybranych aspektów zachowań zdrowotnych (aktywność ruchowa, palenie papierosów, subiektywna ocena własnego zdrowia). W ocenie społecznego zróżnicowania poziomu rozwoju morfofunkcjonalnego wykorzystano dane o środowisku zamieszkania. Uzyskane wyniki stanowiły podstawę do obliczeń statystycznych (\bar{x} , s) w grupach wydzielonych według wybranych czynników środowiska (miejsce zamieszkania). Istotność różnic międzygrupowych określono przy użyciu testu Studenta. Siłę związków pomiędzy zachowaniami zdrowotnymi i środowiskiem zamieszkania określono testem nieparametrycznym χ^2 . U badanych kobiet w wieku 19 lat występują niewielkie różnice w poziomie rozwoju omawianych cech somatycznych w zależności od miejsca zamieszkania. Poziom rozwoju sprawności i wydolności fizycznej jest zbliżony w obu porównywanych grupach. Zauważa się jednak niewielką tendencję do osiągania wyższego zaawansowania rozwojowego wskaźników określających zdolności adaptacyjne do wysiłków fizycznych oraz w aspektach siły w grupie badanych zamieszkujących środowisko wiejskie. Spośród analizowanych wskaźników zachowań zdrowotnych jedynie subiektywna ocena zdrowia wykazuje związek z miejscem zamieszkania.