

BODY COMPOSITION AND BLOOD PRESSURE OF MEDICAL STUDENTS

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Abstract

The purpose of the present study was to provide data relating to the question of whether or not a higher relative fat content is associated with a tendency for higher blood pressure to develop. Data were measured on medical students (158 females and 180 males, aged 24 yrs).

Body fat content and systolic and diastolic blood pressure were determined. Intergroup differences were analysed by the t-test on independent samples.

Both the systolic and the diastolic blood pressure means were significantly higher in the students with a higher relative body fat content, and the relative body fat content was significantly higher in the male and female subgroups displaying higher mean systolic and diastolic blood pressures.

The correlations between body fat content and blood pressure for the overall material confirm the positive relationship postulated, though the coefficients were moderate in both genders.

Key words: students, blood pressure; body fat content.

Introduction

In comparison with university students in general medical students have been found to be both heavier and markedly fatter (TILL and GYENIS, 1973; GYENIS and TILL, 1981; BODZSÁR et al., 1987). On the other hand, the blood pressure of medical students was reported not to differ from that of their peer population.

In view of such observations, the purpose of the present study was to provide data on the question of whether or not a higher relative fat content is associated with a tendency for a higher blood pressure to develop among medical students.

For a better insight, the present study compared medical students in respect of:

1. the systolic and diastolic blood pressure means, by creating three subgroups of the material on the basis of fat content, the grouping limits being mean fat% plus and minus one S.D.; and

2. the body fat content means, by creating three subgroups on the basis of systolic and diastolic blood pressure, the grouping limits again being plus and minus one S.D. from the mean pressures.

Only comparisons between the respective farthest subgroups are reported here.

Material and methods

The subjects were medical students attending the 10th semester at Semmelweis Medical University in Budapest (N = 158 females, aged $\bar{X} = 24 \pm 0.18$ yrs and N = 180 males, aged $\bar{X} = 24 \pm 0.37$ yrs).

Students with an impaired health status were not included.

Relative body fat was estimated by using the formulas of DURNIN and RAHAMAN (1967) and of SIRI (1956). Systolic and diastolic blood pressure were determined by the auscultation method. Intergroup differences were analysed by the t-test for independent samples at the 5% level of random error.

Results and conclusions

All intergender differences in examined characters were significant (Table 1). The female students had a higher body fat content and a lower blood pressure than the male age-mates.

Table 1. Descriptive statistics of the studied parameters

VARIABLE	BOYS		GIRLS	
	MEAN	S.D.	MEAN	S.D.
BF%	22.0	4.8	30.7	4.4
TBF/FFM[%]	28.7	8.2	45.0	9.3
S.PR.[mmHg]	122.3	13.8	111.0	10.3
D.PR.[mmHg]	80.6	7.8	75.2	7.8

Abbreviations: B F % = body fat percentages; TBF= total body fat [kg];

FFM= fat-free mass[kg]; S.PR.= systolic pressure; D.PR.= diastolic pressure.

Note: All intergender differences were significant at the 5% level.

Statistically, both the systolic and diastolic blood pressure means were significantly higher in the students with a higher relative body fat content. Physiologically, the mean blood pressure was higher only in the males in the high body fat subgroup, while all female means were slightly hypotensive (Table 2).

Table 2. Body fat percentages for the low and high blood pressure subgroups.

SUBGROUPS	BOYS		GIRLS	
	MEAN	S.D.	MEAN	S.D.
SYSTOLIC PRESSURE				
LOW	18.7	3.2	28.2	4.8
HIGH	25.9	4.6	32.2	4.7
DIASTOLIC PRESSURE				
LOW	19.7	3.6	26.5	3.6
HIGH	24.2	5.0	31.6	4.5

Conversely, the mean relative body fat content was statistically significantly higher in the male and female subgroups displaying higher mean systolic and diastolic blood pressures (Table 3). Accordingly, the relationship between elevated blood pressure and body fat content appears to hold only for intragender comparisons.

Table 3. Blood pressures for the low and high body fat subgroups.

	SYSTOLIC		DIASTOLIC		SYSTOLIC		DIASTOLIC	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
	BOYS				GIRLS			
BODY FAT%								
LOW	118.7	12.8	79.5	8.6	106.2	8.7	69.6	8.6
HIGH	130.4	13.7	87.1	8.6	112.0	9.8	76.0	5.9
BODY FAT/FATFREE MASS%								
LOW	118.3	13.6	78.4	8.8	106.2	8.7	69.6	8.6
HIGH	130.4	13.7	87.1	8.6	112.3	9.7	76.1	5.9

Linear correlations between body fat content and blood pressure for the total material confirm the positive relationship postulated, though the coefficients were moderate in both genders (Table 4).

Table 4. Linear correlation coefficient between body fat% and blood pressure.

VARIABLE	TBF%	TBF/FFM%	SYSTOLIC	DIASTOLIC
TBF%	-	.99	.29	.30
TBF/FFM%	.99	-	.31	.34
SYSTOLIC	.27	.27	-	.68
DIASTOLIC	.32	.30	.77	-

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