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WEIGHT, HEIGHT AND BLOOD PRESSURE IN HUNGARIAN STUDENTS

This investigation had the objective to analyse correlation between blood pressure and body weight and height in a juvenile population characterized in general by:

- stable blood pressure, peculiar to this age;
- exemptness from overweight;
- absence of damages due to civilization stresses.

MATERIAL AND METHODS

Of the 1860 first-year students enrolled in 1971/72 at the Technical University, Budapest, data obtained on 945 male students aged 19 to 21 and on 311 female students aged 19 to 20 have been analysed, omitting foreign citizens, younger and older age groups of minor number, as well as those with deficient data.

Blood pressure has been measured by the auscultation method once, in the morning hours, using a Riva-Rocci sphygmomanometer, and normal-size cuff. Relationships have been analysed by linear regression analysis.

RESULTS

Tables 1 and 2 present the material divided into age groups, and into groups of those born in Budapest and elsewhere in the country. These data already show the rather homogeneous character of the sample, in general with no significant difference of averages neither between age groups, nor between Budapest and country residents. The groups have been therefore united for each sex.

For male students, the correlation coefficient of both systolic and diastolic blood pressure and body weight is much higher than between both blood pressures and body height. At the same time it is significant at a level of 1 %. For female students, the correlation between systolic blood pressure and body weight (Table 3) is significant at 1 % level, for the diastolic blood pressure there is no significant correlation. At the same time, there is a slight significant correlation (at 5 % level) between diastolic blood pressure and body height.

Weight, height and blood pressure in male students

TABLE 1

| | Budapest | | | | Country | | | |
|--------------|----------|--------|----------|-----------|---------|--------|----------|-----------|
| | Weight | Height | Systolic | Diastolic | Weight | Height | Systolic | Diastolic |
| Age 19 years | | | | | | | | |
| n | 100 | 100 | 100 | 100 | 63 | 63 | 63 | 63 |
| M | 68.29 | 177.78 | 121.01 | 70.31 | 69.11 | 178.56 | 120.29 | 71.60 |
| SD | 10.90 | 7.03 | 11.39 | 9.77 | 11.47 | 8.72 | 12.41 | 10.45 |
| SE | 1.09 | 0.70 | 1.14 | 0.98 | 1.44 | 1.10 | 1.56 | 1.32 |
| Age 20 years | | | | | | | | |
| n | 292 | 292 | 292 | 292 | 305 | 305 | 305 | 305 |
| M | 70.58 | 178.12 | 121.80 | 72.14 | 69.43 | 176.48 | 120.40 | 72.04 |
| SD | 8.39 | 6.16 | 11.35 | 8.62 | 8.37 | 6.54 | 12.56 | 9.58 |
| SE | 0.49 | 0.36 | 0.66 | 0.50 | 0.48 | 0.37 | 0.72 | 0.55 |
| Age 21 years | | | | | | | | |
| n | 88 | 88 | 88 | 88 | 97 | 97 | 97 | 97 |
| M | 69.03 | 176.76 | 119.85 | 71.20 | 68.45 | 175.25 | 119.41 | 71.36 |
| SD | 7.77 | 5.80 | 10.05 | 9.18 | 8.22 | 6.50 | 11.22 | 9.43 |
| SE | 0.83 | 0.62 | 1.07 | 0.98 | 0.83 | 0.66 | 0.14 | 0.96 |

Also frequency of hypertonicity within the sample has been tested. Neither males, nor females exhibited blood pressures over the pathologic limit of 160/95 tor. Ten cases of boys (at a 1 % frequency) exhibited systolic values over 160 tor but no diastolic value over the limit was found. Female students exhibited no pathological cases.

DISCUSSION

Blood pressure examinations in populations have in general two aims. The blood pressure value is a measure of the variation of a human physiological feature in dependence on age, sex and other factors, while frequency of those with a pathologically high blood pressure—of hypertonics—is a true indication of the efficiency of environmental harms on the population.

Individual hypertony values depend on many endogenous and exogenous factors (Ripka, 1967). Great many examinations on twins and families support genetic origin of both normotony and hypertony (Jørgensen, 1972). As against this, exogenous effects are of universal, hence of population level. Thus, rather than from genetic factors alone differential blood pressure values between populations result largely from exogenous, so-called civilization factors, such as the increased consumption of meat, egg and animal fats, urban stress effects, unhealthy way of

life, and many others. This is evidenced by the frequency of diabetes mellitus, similar to that of essential hypertony—for instance, it is much more frequent among negroids in the USA than in Africa, and the same is true for Chinese living in the USA and in China (Jørgensen, 1972).

Blood pressure values of each population are differently affected by the factors of age and sex, while body weight and height are of rather indirect and differential effect.

Our results conform empirical statements by Boe et al., 1957; Master et al., 1958; Wright, 1963; Ripka, 1967; and others stating blood pressure to be significantly affected by weight and slightly by height.

ABSTRACT

Correlation between systolic and diastolic blood pressure and body weight and height has been investigated in 1256 first-year students at the Technical University, Budapest in the academic year 1971/1972. In male students systolic and diastolic blood pressure is significantly correlated to the body weight but not to the body height. In female students, body weight is significantly correlated to the systolic, but not to the diastolic blood pressure, at the same time there is a poorly significant correlation (at 5 % level) between body height and diastolic blood pressure.

Weight, height and blood pressure in female students

TABLE 2

| | Budapest | | | | Country | | | |
|--------------|----------|--------|----------|-----------|---------|--------|----------|-----------|
| | Weight | Height | Systolic | Diastolic | Weight | Height | Systolic | Diastolic |
| Age 19 years | | | | | | | | |
| n | 143 | 143 | 143 | 143 | 103 | 103 | 103 | 103 |
| M | 56.65 | 163.55 | 113.94 | 69.98 | 57.05 | 162.82 | 112.45 | 68.50 |
| SD | 7.30 | 5.08 | 10.80 | 9.25 | 6.89 | 6.07 | 8.27 | 8.53 |
| SE | 0.61 | 0.42 | 0.90 | 0.77 | 0.68 | 0.60 | 0.81 | 0.84 |
| Age 20 years | | | | | | | | |
| n | 37 | 37 | 37 | 37 | 28 | 28 | 28 | 28 |
| M | 55.43 | 162.16 | 113.35 | 69.84 | 55.82 | 162.96 | 112.79 | 69.46 |
| SD | 6.57 | 5.36 | 11.49 | 9.60 | 5.74 | 6.15 | 7.03 | 7.72 |
| SE | 1.08 | 0.88 | 1.89 | 1.58 | 1.09 | 1.16 | 1.33 | 1.46 |

Linear regression of blood pressure on weight and height. The correlation coefficient r, their significance level p, the regression coefficient b and the absolute constant a of the regression model $y = bx + a$ are shown

TABLE 3

| | Male students | | | | Female students | | | |
|--------------|---------------|--------|--------|----------|-----------------|--------|--------|---------|
| | r | p | b | a | r | p | b | a |
| Syst/weight | 0.1623 | < 0.01 | 0.2159 | 105.7341 | 0.2083 | < 0.01 | 0.2939 | 96.6393 |
| Diast/weight | 0.1528 | < 0.01 | 0.1607 | 60.5685 | 0.1014 | > 0.05 | 0.1294 | 62.1868 |
| Syst/height | 0.0442 | > 0.05 | 0.0784 | 106.8888 | 0.1027 | > 0.05 | 0.1825 | 83.4968 |
| Diast/height | 0.0304 | > 0.05 | 0.0427 | 64.1762 | 0.1169 | < 0.05 | 0.1878 | 38.8867 |

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