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Female Students with Low Body Mass Index Values: Consideration and Analysis of a Number of Anthropometric and Morpho functional Index Values, and their Individual Indicators of the Menstrual Cycle

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Abstract

In this research article, the author presents the results of his study concerning the consideration of a number of anthropometric and morpho functional index values, as well as individual characteristics of the ovarian-menstrual cycle and their analysis, in female students of a medical university, with low values of the body mass index.

Keywords: Female students; low body mass index; anthropometric indicators; morpho functional index values; ovarian-menstrual cycle

Aim of the article

The purpose of this research article is to present the results of the conducted study and their analysis, to identify individual and group characteristics, both a number of anthropometric indicators and morphofunctional index values, as well as their ovarian-menstrual cycle.

Hypothesis of the article

During the preparation period for this study, its author developed a working hypothesis, the essence of which was as follows: a number of female students who took part in the study and had a low level of body mass index indicators may have pathological indicators of both anthropometric indicators, morphofunctional index values, and the ovarian-menstrual cycle.

Method and Materials of The Study

In conducting this study and subsequent writing of the research article based on its results, its author used such methods as literary-critical analysis of available research and scientific-methodical, both domestic and foreign works on the issue under study. Also, all available medical documentation of the athletes who took part in the study was studied, for participation in which they all gave their voluntary and written consent. The author conducted all the anthropometric measurements necessary for this study, and calculated the necessary morphofunctional index values. In addition, the author's original questionnaire was used to identify individual characteristics of their ovarian-menstrual cycle. All the obtained indicators and values, using the method of mathematical statistics, were processed, taking into account the requirements for determining the Student criterion.

During the annual medical examination of first-year students of Zaporizhzhya State Medical University, a group of female students (n=91) with body mass index (BMI)<18.5 kg/cm^2 was identified. The average age of the female students was 18.4±0.14 years. In addition, we used such research methods as anthropomorphometry, pelvimetry, index method, and questionnaires. After completion of the study, calculations, statistical processing, and analysis of the obtained results were made. Body mass index (BMI) was determined using the classical formula. With a BMI of 16.0 kg/cm^2 or less - a pronounced body mass deficit, 16.0-18.5 kg/cm^2 - chronic energy deficiency [2,3,5]. We also used a new index (IOT) proposed by Richard Bergman [4].

Physical development is one of the main characteristics of the development of the reproductive system of a girl. Its important assessment indicator is body weight, which indirectly characterizes the amount of adipose tissue in the body [3,6]. Analysis of specialized literature shows that body weight deficit is widespread among modern girls [1,2,5]. Low body weight in women of reproductive age is considered a biological marker of somatic and reproductive ill-being, and body weight deficit is associated with the development of sexual development disorders and menstrual cycle disorders [1,3].

Results of the study and discussion

During the annual medical examination of first-year students of Zaporizhzhya State Medical University, a group of female students (n=91) with body mass index (BMI)<18.5 kg/cm^2 was identified. The average age of the female students was 18.4±0.14 years. We used such research methods as anthropomorphometry, pelviometry, index method, and questionnaires. After completion of the study, calculations, statistical processing, and analysis of the obtained results were made.

The body mass index (BMI) was determined using the classical formula. A BMI of 16.0 kg/cm^2 or less indicates severe body mass deficit, 16.0-18.5 kg/cm^2 indicates chronic energy deficiency [2,3,5]. We also used a new index, the body obesity index (BOI), proposed by Richard Bergman [4].

After conducting anthropometric measurements, the height indicators in the group of first-year female students were 163.45±0.61 cm, body weight 51.76±0.61 kg. When analyzing the values of the body mass index (BMI), it was found that it was 15.84±0.16 in the entire group. A detailed examination of the results of the BMI indicators revealed that underweight (<18 kg/m^2) was recorded in 85 (93.41%) female students, and severe underweight (<16 kg/m^2) was recorded in 41 (45.1%) female students. The BOI (body obesity index) indicator was 7.0±0.29. In all 100% of female

students, this indicator was below the norm, which indicates the presence of underweight due to adipose tissue deficiency [4].

When conducting the study, it was taken into account that body weight less than 47-45 kg is a predictor of menstrual cycle disorders [1,3]. Body weight below 47 kg was found in 23 (25.28%) female students, of which 11 (12.09%) weighed 38-45 kg. All of them had different types of menstrual cycle disorders, 17 (18.68%) had secondary amenorrhea, with the absence of menstrual bleeding for more than 6 months. The age of menarche in female students was 12.6±0.7 years.

The duration of the menstrual cycle in female students is within the normal range – 26.6±0.28 days [1,3]. When determining the time of establishment of stability of the menstrual cycle, it is 1.2±0.34 years in the entire group. In 11 (12.09%) female students, the menstrual cycle has not yet been established and is within 42-104 days, which corresponds to proiomenorrhea [1,3].

The types of ovarian-menstrual cycle disorders identified in this group of female students were as follows:

• Oligomenorrhea was identified in 47.25% of female students; • Algomenorrhea was identified in 91.21% of female students;
• Dysmenorrhea was identified in 97.80% of female students;
• Premenstrual syndrome (PMS) was identified in 80.72% of female students;
• Proiomenorrhea was identified in 12.09% of female students;
• Secondary amenorrhea was identified in 18.60% of the female students studied.

Also, it was reliably established that the duration of menstrual bleeding in the entire group is 5.4 ± 0.2 days ($p < 0.05$), but upon closer examination it was found that in 43 (47.25%) students it is less than 3 days, which corresponds to oligomenorrhea [1.3]. In 38 students (41.76%) it is 3-7 days, which corresponds to the norm [1.3]. In 8 students (8.79%) the duration of MC was within 8-9 days. In 83 (91.21%) girls there is a pain component. Dysmenorrhea was recorded in 89 (97.8%) students, 73 (80.22%) note premenstrual syndrome, in 18 (19.78%) it is not. In 100% of students there are various disorders of menstrual function.

During pelvimetry, with determination of 3 transverse and 1 direct sizes of the bony pelvis, with subsequent determination of the direct size of the entrance to the small pelvis (c. vera), it was found that all 100% of female students have a narrow pelvis. Using the obtained values of 4 external sizes of the bony pelvis of female students and taking into account the obtained indicators of the true conjugate, the existing types of narrow pelvis and the degrees of narrowing of the narrow pelvis were determined. All 100% of female students had a decrease in 1-3 external sizes of the pelvis by 1.5-2 cm, which is interpreted as an anatomically narrow pelvis (ANP) [2,4,5]. Narrowing of the pelvis of the 1st degree was determined in 49 (53.85%), 2nd degree in 37 (40.66%), 3-IV degrees in 5 (5.5%).

The types of narrow pelvis identified in female students during the study are as follows: • Transversely narrowed pelvis was identified in 73 (80.22%) of the studied female students;
• Flat-rachitic pelvis was identified in 5 (5.50%) of the studied female students;
• Simple flat pelvis was identified in 13 (14.29%) of the studied female students.

Also, in our study we obtained the results of the values of the relative pelvic width index (RPWI): the average RPI in the entire study group (n=91) is 13.5±0.11 cm. In 100% of female students, the RPWI corresponded to the values of stenopyelia (narrow pelvis) [2.5]. To assess the formation of pelvic bones and determine their relationship with the indicators of sexual maturity, the pelvic bone index (PBI) proposed by N.I. Kovtyuk [4] was used. In all female students, the PBI was 38.64±0.61 cm, which corresponds to the average value of the indicator for this age group. In 4 female students (4.4%), this indicator is less than 30 cm - these students are at risk for age-related rates of formation of bone maturity of the pelvic bones [4].

Conclusions

1. Among the identified menstrual dysfunctions in female students, the following are prevalent: algomenorrhea - 91.21%, dysmenorrhea - 97.8%, severe premenstrual syndrome (PMS) - 80.22%.
2. All 100% of female students with low body mass index have various types of narrow pelvis with I-III degree of its narrowing.
3. The obtained results of the conducted study fully confirmed the hypothesis of this study proposed by the author.

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