



Morphological Features of the Pelvis of Female Students of a Special Medical Group

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Abstract

This research article presents the results obtained and analysis of studies conducted on the characteristics of the pelvis and its size, as well as the individual characteristics of narrow pelvises and the degree of their narrowing, among female medical university students assigned, according to the state of their somatic health, to a special medical group.

Keywords: Female Students; Special Medical Group; Anthropometry; Pelvimetry; Pelvis; Somatotypes; Morphological Index

Abbreviation

WP: The Width of The Pelvis; WS: Width of the Shoulders; PI: Pelvic Index; ANP: Anatomically Narrow Pelvis; PBI: The Pelvic Bone Index

Introduction

The study of the reproductive health of female students as future mothers is primarily associated with the unfavorable medical and demographic situation in many countries [1,2]. Anthropometric body composition may cause one or another form of pelvic narrowing. Therefore, relevant studies are devoted to the formation of the bone pelvis at this age, taking into account their constitution and distribution by sexual somatotypes, taking into account the classification of J. Tanner [3].

Aim of study

The purpose of the study is to determine the anatomical, anthropological and morphological features of the body and the size of the pelvis of female students, in accordance with the classification of J. Tanner.

Material and Methods

When conducting this study, its author used the following research methods: literary-critical analysis of all available sources of information on the issue under study; anthropometry; pelvimetry; method for calculating indicators of a number of morphofunctional index values; method of mathematical statistics.

To conduct the study, during a medical examination of first-year students at Zaporozhye State Medical University, Ukraine, a group of female students ($n = 130$) was identified who were assigned to a special medical group.

Results and Discussion

The female students belonged to two age periods: adolescence and the beginning of the first mature age. They did not have significant differences in age (20.73 ± 0.20 years), but they differed in body length and weight ($p < 0.05$). Body length in the group was 165.05 ± 0.55 cm, body weight- 57.92 ± 0.89 kg. The body mass index value in the group corresponded to the norm- 21.25 ± 0.31 kg/m² ($p < 0.05$) [2]. Before conducting studies related to the characteristics of the bone pelvis, somatotyping was performed using

the values of sexual somatotypes according to the classification of J. Tanner. Somatotyping of women is based on the principle of determining the somatic type of a person's sex, using the values of the width of the pelvis (WP) and width of the shoulders (WS), which allows us to classify women as gynecomorphs, mesomorphs and andromorphs [2].

We obtained the following indicators: in the entire group, the value of the pelvic width corresponded to 25.74 ± 0.21 cm ($p < 0.05$), which is within the acceptable obstetric and anatomical norm and is 30-32 cm [2]. In the entire group ($n = 130$), the values of shoulder length were 37.21 ± 1.79 cm ($p < 0.05$). In the study group, the width of the shoulders in relation to the width of the

pelvis corresponds to the male structure - with wide shoulders and a narrow pelvis [2].

As a result of somatotyping in the group we studied, all girls were divided into 3 groups: andromorphic sexual somatotype - 34 (26.15%), mesomorphic - 42 (32.81%), gynecomorphic - 54 (41.54%) students. The average value of the indicator is 76.42 ± 1.05 ($p < 0.05$), which corresponds to the indicators of the mesomorphic type of constitution [3]. Of the 130 students involved in the study, 76 (58.46%) do not correspond to the typical female gender somatotype [3]. In 34 (26.15%), an andromorphic sexual somatotype was identified [3]. After somatotyping, pelviometry was performed. Pelvic size data is given in the following table.

No	Name indicator	Andromorphic somatotype (n = 42)	Mesomorphic somatotype (n = 34)	Gynecomorphic somatotype (n = 54)
1.	D. spinarum. cm	23.71 ± 0.45	23.39 ± 0.33	23.10 ± 0.32
2.	D. cristarum. cm	26.18 ± 0.48	25.87 ± 0.32	25.37 ± 0.32
3.	D. trochanterica. cm	31.79 ± 0.43	31.29 ± 0.29	31.30 ± 0.27
4.	C. externa. cm	19.62 ± 0.39	18.70 ± 0.28	18.97 ± 0.35
5.	C. vera. cm	11.44 ± 0.53	10.35 ± 0.21	10.49 ± 0.27

Table 1: Pelviometry data in somatotypes ($M \pm m$) at a value of ($p < 0.05$).

Analysis of the obtained pelviometry results with the determination of two transverse (d. spinarum, d. cristarum) and 1 direct size (c. externa) reliably ($p < 0.05$) indicates that representatives of all three sexual somatotypes have indicators less than those generally accepted in morphology, anthropology and obstetrics of the anatomical norms of the external dimensions of the bony pelvis: they have the following meanings: d. spinarum-25-26 cm; d. cristarum-28-29 cm; c. externa-20-21 cm [4, 5]. The exception is the indicators of the intertrochanteric distance (d. trochanterica), which in all three somatotypes corresponds to normal values (30-32 cm) [4,5]. Data on the values of the true conjugate (c. vera) reliably indicate ($p < 0.05$) that in groups of female students with mesomorphic and gynecomorphic somatotypes, they are less than the generally accepted norm - 11 cm [4, 5], and in the group with andromorphic sexual somatotype slightly more. In all three groups of somatotypes, the phenomena of anatomically narrow pelvis (hereinafter referred to as AUT) were reliably determined ($p < 0.05$) in 97 (74.62%), mainly with degrees I-II of its narrowing in 56 (43.08%) of all female students.

The variants of the identified different types of pelvis in the entire group are as follows:

- Narrow pelvis- 87 students, or 66.92%.
- Normal pelvic sizes - 33 female students, 25, 39%.
- Wide pelvis - 10 students, or 7.68%.

We also used in the study such an informative morphological indicator as the pelvic index (PI) [4,5]. In the entire group, we obtained an PI value of 99.44 ± 0.65 ($p < 0.05$), which corresponds to the indicators of the narrow pelvis in the entire group [4,5]. When considering the obtained values, the following indicators were obtained: among students with an andromorphic somatotype ($n = 34$), the pelvic index was 101.15 ± 1.48 , in the group with a mesomorphic somatotype ($n = 42$)- 99.13 ± 0.96 , in group of female students with gynecomorphic somatotype ($n = 54$)- 98.61 ± 1.01 . As a result of the analysis of the obtained PI values in the entire group ($n = 130$), it was reliably established that they are below acceptable normative indicators, especially among students with a gynecomorphic somatotype.

The values of the pelvic index in all sexual somatotypes correspond to a narrow pelvis. This confirms the data obtained as a result of pelviometry, indicating the presence of values of anatomically narrow pelvis (ANP) in the entire group of female students studied. Analysis of pathological variants of narrow pelvises with different degrees of narrowing showed: in the group with an andromorphic sexual somatotype (n = 34), we determined that 22 (64.71%) of the girls in this group had normal dimensions of the entrance to the small pelvis (11 cm). group, more than 11 cm and increased external dimensions of the pelvis (wide pelvis) - 2 (5.88%) students, normal pelvic dimensions - 3 (8.82%), generally uniformly narrowed pelvis - 4 (11.77%), simple flat pelvis-4 (11.77%) and transversely narrowed pelvis-21 (61.77%). ANP was determined in 29 (85.29%), "erased" forms of the pelvis - 17 (50.00%), I degree of pelvic narrowing-4 (11.77%), II degree-5 (14.71%), III degree-1 (2.94%).

In the group of gynecomorpha (n = 54), we obtained the following data: normal pelvic sizes were determined only in 2 (3.70%) students, in 3 (5.56%) - a wide pelvis, in 49 (90.74%) - various options for a narrow pelvis. Thus, a generally uniformly narrowed pelvis was identified in 3 (5.56%) female students, a simple flat pelvis - in 16 (29.63%), and a transversely narrowed pelvis - in 30 (55.56%) of all gynecomorphic students. Among all female students with a narrow pelvis in a given gender somatotype (n = 49), 37 (75.51%) had I degree of pelvic narrowing, 11 (22.45%) had II degree of narrowing, 1 (2.04%) had III degree). ANP, with a decrease from 1 to all external dimensions of the pelvis, was determined in all 49 (100.00%) students with a narrow pelvis, "erased" forms of the pelvis ("unisex" pelvis)-in 43 (87.76%) gynecomorphic students with a narrow pelvis and in 79.63% of gynecomorpha.

In the group of mesomorpha (n = 42), it was found that in 23 (54.76%) the value of the direct entrance to the small pelvis (c. vera), corresponding to the norm of 11 cm. At the same time, all normal dimensions of the pelvis were established only in 2 (4.76%), wide pelvis-in 1 (2.38%) female students. Simple flat pelvis-in 5 (11.91%), generally uniformly narrowed pelvis in 4 (9.52%), transversely narrowed pelvis-in 30 (71.43%). ANP was determined in 39 (92.86%), "erased" forms of the pelvis-in 19 (45.24%) students with a mesomorphic sexual somatotype. I degree of pelvic narrowing in 17 (40.48%), II degree-11 (26.19%), III degree-2 (4.76%).

The degrees of pelvic narrowing in each of the somatotypes were as follows

- **Andromorphic sexual somatotype (n = 34):** first degree of pelvic narrowing-4 female students, or 11.77%; second degree of pelvic narrowing-5 female students, or 14.71%; third degree of pelvic narrowing-1 female student, or 4.76%.
- **Mesomorphic sexual somatotype (n = 42):** first degree of pelvic narrowing-17 female students, or 40.48%; second degree of pelvic narrowing-11 female students, or 26.19%; third degree of pelvic narrowing-2 female students, or 4.76%.
- **Gynecomorphic sexual somatotype (n = 54):** first degree of pelvic narrowing-37 female students, or 75.52%; second degree of pelvic narrowing-11 female students, or 22.45%; third degree of pelvic narrowing-1 female student, or 2.04%.

Also, the following variants of I-III degrees of pelvic narrowing in female students were identified:

- First degree of pelvic narrowing-58 students, or 44.62%;
- Second degree of pelvic narrowing-27 students, or 20.77%;
- Third degree of pelvic narrowing-4 female students, or 3.08%;
- 41 female students, or 31.54% of female students, have sizes c. vera, were 11 cm or more - without a degree of pelvic narrowing.

In all three groups with sexual somatotypes according to J. Tanner's classification (n = 130), the following statistics of identified pelvic forms take place:

- Normal pelvic sizes-7 (5.39%) female students.
- Wide pelvis-6 (4.62%) female students.
- "Erased" pelvic shapes-79 (60.77%) female students.
- Anatomically narrow pelvis-117 (80.00%) female students.

A more detailed examination of the obtained indicators revealed the following variants of the anatomical structure of the pelvis: only every fourth student has normal pelvic dimensions, despite the fact that in 66.92% of all female students, stenopyelia, or a narrow pelvis, occurs. That is, for the vast majority of female students, it was reliably established that their shoulder width is greater than the width of the pelvis [2,5]. Of great importance for conducting a study of the degree of maturity and formation of the pelvic bones is the determination of the values of the indicators of a new morphological indicator - the pelvic bone index (PBI), proposed by N.I. Kovtyuk (2003) [1].

According to her calculations, in order to identify deviations in the formation of the pelvic bones, we determine the values of PBI as an integral indicator of the formation of the pelvic bones in girls of adolescence and first reproductive age [1]. As a result of the study, the average ICT value for the entire group was 41.09 ± 0.55 cm, which corresponds to the norm (from 30 to 50) [1]. The obtained indicators of the values of the pelvic bone index (PBI) in female students in three sexual somatotypes, taking into account the constitution according to J. Tanner, were as follows: of the total number of female students ($n = 130$), 129 (98.15%) students had PBI indicators that corresponded to the normative values and/or were superior to them. Only 1 (1.85%) girl, a representative of the gynecoid somatotype, had an indicator of 29.00, which is slightly below the norm. This PBI value, taking into account her age, indicates that the process of completing the ossification of the pelvis has not yet been completed. Presumably, this may be due to existing hormonal changes in the form of hypoestrogenism [1].

In the entire group ($n = 130$) we obtained the following PBI indicators - 41.09 ± 0.55 ($p < 0.05$). At the same time, the ICT value is less than 30 - 1 (1.85%), from 30 to 39 - 61 (46.92%), from 40 to 49 - 55 (42.31%), from 50 or more - 13 (10.00%). In somatotypes, the distribution of PBI values was as follows: in the group of andromorphic female students ($n = 34$), PBI was 42.24 ± 1.08 ($p < 0.05$). At the same time, there are no values of the PBI indicator less than 30, from 30 to 39 - 13 (38.24%), from 40 to 49 - 17 (50.00%), from 50 or more - 4 (11.77%). In the group with mesomorphic somatotype ($n = 42$), the indicator was 40.63 ± 0.90 ($p < 0.05$). PBI values less than 30 - no, from 30 to 39 - 20 (47.62%), from 40 to 49 - 19 (45.24%), from 50 or more - 3 (7.14%).

In the group of female students, representatives of the gynecoid somatotype, the following indicators were obtained: in the entire group ($n = 54$) PBI was 40.72 ± 0.91 ($p < 0.05$). PBI values are less than 30 - 1 (1.85%), from 30 to 39 - 28 (51.85%), from 40 to 49 - 19 (35.19%), more than 50 - 6 (11.11%). The most stable indicators of PBI values were in the group with a mesomorphic sexual somatotype, then in female students of the groups with andromorphic and gynecomorphic sexual somatotypes.

Conclusions

- The results of the study showed that 58.46% of the studied female students of the special medical group do not corre-

spond to the gynecoid somatotype according to the results of the obtained values of the sexual dimorphism index according to J. Tanner's classification.

- As a result of the analysis of the obtained values of the pelvic index (both in the entire group and in the three sexual somatotypes), it was found that they are below acceptable normative indicators, especially among students with a gynecomorphic somatotype and correspond to the values of a narrow pelvis.
- In all three groups of somatotypes, as well as in the entire group as a whole, the phenomena of anatomically narrow pelvis were reliably identified - 74.62%, mainly with indicators of I (36.92%) and II (20.77%) degrees of its narrowing.
- Among the variants of pathological forms of a narrow pelvis, the transversely narrowed pelvis predominates - 62.31% and "erased" forms of the pelvis - 60.77%.
- In 98.15% of all female students, in all three somatotypes, the process of bone maturity of the pelvis is completed and corresponds to their age aspect.

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