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Research Article

The Study of The Distribution of Menstrual Cycle Disturbances in Gender Somatotypes of Athletes in A Number of Female Game Sports

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Received Date: 14 August 2023 **Accepted Date**: 24 August 2023 **Published Date**: 04 September 2023.

Citation: Bugaevsky KA, (2023), The Study of The Distribution of Menstrual Cycle Disturbances in Gender Somatotypes of Athletes in A Number of Female Game Sports, *Clinical Research and Clinical Reports*, 2(5); **DOI:**10.31579/2835-8325/037

Abstract

The article presents the results of a study, the purpose of which was to study and analyze the characteristics of the ovarian-menstrual cycle in elite athletes of the first mature (reproductive) age, who is going in for sambo, judo and pankration. The frequency of manifestations of hypomenstrual syndrome and secondary amenorrhea, in the sexual somatotypes of female athletes, in the three study groups is considered.

Keywords: sportswomen; volleyball; basketball; handball; i reproductive age; menstrual irregularities; amenorrhea; hypomenstrusl syndrome

Introduction

Reproductive problems of women's sports of the highest achievements are directly related to the participation in the training of athletes of all age groups, not only the coaching team, but also specialists in many biomedical areas. The study of the functioning of all internal organs and systems of female athletes is the subject of study and analysis of a large number of scientists, theorists and practitioners, doctors, anatomists, physiologists, morphologists and sports physicians, as well as specialists from many parallel disciplines. All this is directly related to the training of athletes of different age groups in women's team sports. The intensity of the training of female athletes, the frequency and volume of their training, intense physical and psychological stress, the nature of rest and the balance of nutrition, adaptation and its manifestations, this is far from the full scope of issues that are studied by specialists in the field of sports medicine and morphology [1-15]. When adaptive changes are detected during sports that occur in the female body, including athletes involved in various game sports, in the organs of the endocrine and reproductive systems, a serious adaptive restructuring is observed. These adaptation processes can be traced in athletes of all age groups. The most common reproductive problem in them is ovarian-menstrual cycle (OMC) – menstrual disorders (MD), among which hypomenstrual syndrome and secondary amenorrhea dominate [1-3; 6; 8]. In this regard, many modern researchers of women's sports actively support the idea of mandatory consideration of the individual dynamics of the OMC of athletes, their active dispensary observation, in athletes with various types of menstrual irregularities, in their different age periods [3, 8, 9, 13, 15].

Aim of the work

The aim of our study is to study the prevalence of these types of menstrual disorders (MD) among elite female athletes of the first mature (reproductive) age involved in such team sports as volleyball, handball and basketball.

Abbreviations

- **OMC** - ovarian-menstrual cycle**;**
- **MD** - menstrual disorders;
- **PMS** - Premenstrual syndrome;
- **Me** – menarche - first menstruation;
- **CMC** - candidate for master of sports and **MS** - master of sports;
- **SDI** - sexual dimorphism index;
- **MB** - menstrual bleeding;
- **SA** - Secondary amenorrhea;
- **WS** - width of the shoulders;
- **WP** - width of the pelvis.

Object, material and methods of research, and organization of the study

When writing this article, the author of the study used the following methods: literary-critical analysis of available domestic and foreign sources of information; anthropometric method; pelvimetry - measurement of the external dimensions of the pelvis% method of indices, with the determination of a number of morphological and functional indices required in this study; questioning and interviewing athletes; method of mathematical statistics.

The study involved 138 athletes. Of these: volleyball - 45 athletes, handball - 47 athletes, and basketball - 46 athletes training in Ukraine (Nikolaev, Kherson, New Kakhovka). This study was conducted in 2021 and 2022. All female athletes participating in this ongoing study gave their voluntary consent. According to age indicators, the athletes belonged to the I mature (reproductive) age. The average age of athletes in the group of volleyball players was 23.67±0.59 years, in the group of handball players - 24.46±1.04, in the pankration group - 24.27±1.03 years. The terms of sportswomen training in these team sports range from 4.5 years to 9 years - in the CMS

group, from 9 or more years - for sportswomen of the master of sports level. The sports qualification of athletes is presented as follows: Masters of Sports (MS) - 39 (28.26%) athletes, Candidates for Master of Sports (CMS) - 99 (71.74%) athletes. The number of trainings - from 4-5 times a week, for handball and volleyball players, 2.5-3 hours, up to 5-6 times a week, 2-3.5 hours for basketball players.

In this study, anthropometric methods included measuring the body parameters needed to mathematically determine the sexual dimorphism index (SDI) in female athletes, such as biacromial diameter, or shoulder width and intercrest diameter (pelvic width). To determine the MD, the author's questionnaire for the study of the ovarian-menstrual cycle (OMC) and its disorders was used (author - Bugaevsky K.A., 2018 ©) [2]. To describe the identified disorders in the reproductive system of female athletes, in particular the menstrual cycle, and to better understand the specific medical terminology for readers, we used the criteria and definitions of terms used in modern medicine [4, 5, 10-12], namely:

Hypomenstrual syndrome is a violation of the menstrual cycle, characterized by a triad of symptoms: meager (less than 50 ml - hypomenorrhea) and short (less than 3 days - oligomenorrhea); irregular menstruation, with a tendency to delay from several weeks to 6 months, rare menstrual bleeding - MB (duration of OMC more than 42 days) - opsomenorrhea [4, 5, 10-12].

Amenorrhea is the absence of menstrual bleeding (MB), 6 months or more, in women of reproductive age who previously had menstrual bleeding [4, 5, 10-12]. At the same time, amenorrhea is not a separate, independent diagnosis, but is a set of symptoms characteristic of various etiological and pathogenetic factors [4, 5, 10-12].

Secondary amenorrhea (SA) is a pathological process associated with the time of onset, in relation to menarche and the presence, earlier in history, of one or more MB [4, 5, 10-12]. In other words, it is the absence of UA in women who have previously menstruated [4, 5, 10-12]. In many cases, the development of secondary amenorrhea and hypomenstrual syndrome have common causes, while, as a rule, menstrual dysfunction occurs first according to the type of hypomenstrual syndrome, then turning into a complete cessation of menstruation [4, 5, 10-12].

Results of the study and discussion

After carrying out the necessary anthropometric measurements, we obtained the values of the width of the shoulders (WS) and the width of the pelvis (WP), which are given in Table. 1, at $p<0.05$:

Name of indicator	Biacromial diameter, cm	Interridge diameter, cm
Female athletes playing volleyball (n=45)	33,47±0,52	27,39±0,36
Female athletes playing handball (n=47)	34,75±0,74	27,56±0,31
Female athletes playing basketball (n=46)	34,23±0,84	27,07±0,86

Table 1: The values of the width of the shoulders and pelvis in athletes (n=121)

An analysis of the obtained anthropometric values shows that all these dimensions, in the three studied groups, are practically similar, at $p<0.05$, but the dimensions of the shoulder width exceed the dimensions of the pelvis, despite the fact that in all groups of athletes, the dimensions of the pelvis are less than generally accepted, in obstetrics and morphology, standard values, at 28-29 cm [1, 3, 7]. The revealed values of the shoulder and pelvis width indicators allowed to determine the values of the index of sexual dimorphism, according to the classification of J. Tanner and W. Marshall, with the subsequent division of athletes according to sexual somatotypes and, with the allocation of gynecomorphic, mesomorphic and andromorphic sexual somatotypes [1, 3, 7]. Mesomorphic and andromorphic sexual somatotypes refer to inversions, or pathological displacements that are not characteristic of the basic female, gynecomorphic sexual somatotype [1, 3, 7]. The distribution of female athletes of all groups, by gender somatotypes, based on the obtained values of SDI, is presented in Table. 2, at a value of $p<0.05$

Name of indicator	Female athletes playing volleyball (n=45)	Female athletes playing handball (n=47)	Female athletes playing basketball (n=46)
Gynecomorphic sexual somatotype (less than 73.1 c.u.)	–	–	–
Mesomorphic sexual somatotype (73.1–82.1 c.u.)	42 (93,33%)	45 (95,74%)	37 (89,13%)
Andromorphic sexual somatotype (more than 82.1 c.u.)	3 (6,7%)	2 (4,26%)	5 (10,87%)

Table 2: Variants of sexual somatotypes in female athletes in groups (n=121)

The analysis of mathematically calculated indices for female athletes of different team sports showed that the average value of SDIis within the range of the values of the transitional for women, mesomorphic sexual somatotype. Thus, the value of SDI in volleyball players was 74.22±0.23 c.u.; for handball players - 77.34±0.17 c.u.; for athletes involved in basketball - 78.54±0.37 c.u. [1, p. 3, 7]. At the same time, in all 3 groups, there is not a single female athlete with a gynecomorphic sexual somatotype, which is initial for women, and a pathological andromorphic sexual somatotype is present in each of the groups. In total, the andromorphic sexual somatotype was determined in 10 (13.80%) female athletes from the three studied groups.

Based on the results of the survey aimed at identifying such MD as hypomenstrual syndrome and secondary amenorrhea, the results were obtained, which are presented, in%, in Table. 3:

Name of indicator	Hypomenstrual syndrome	Secondary amenorrhea
Female athletes playing volleyball (n=45)	41 (91,11%) female sportsmens	4 (8,89%) female sportsmens
Female athletes playing handball (n=47)	44 (93,62%) female sportsmens	3 (6,38%) female sportsmens
Female athletes playing basketball (n=46)	40 (86,96%) female sportsmens	6 (13,04%) female sportsmens

Table 3: OMC disorders in female wrestlers (n=121), %

Analysis of the obtained results showed that none of the 138 female athletes of the first mature (reproductive) age in all three studied groups of female athletes involved in team sports has physiological parameters of the OMC. At the same time, secondary amenorrhea, from 6 months or more, is present in 13 (9.42%) of all studied athletes, and hypomenstrual syndrome, with all its clinical manifestations, was detected in 125 (90.58%) of all athletes, and

is dominant pathology, with its triad of OMC disorders (hypomenorrhea, oligomenorrhea and opsomenorrhea) [4, 5, 9-11]. Also, we found that the most pronounced hypomenstrual syndrome and, all cases of secondary amenorrhea, are present in athletes with a certain andromorphic sexual somatotype and, with IPD values that are within the upper limits of the mesomorphic sexual somatotype.

The same sportswomen, who have the longest experience in playing these game sports (from 8.5-9 years or more) and the highest level of skill, are masters of sports and candidates for masters of sports. Athletes with less sports experience (4-5 years) are characterized by a mesomorphic sexual somatotype, with initial and, partially, with its average values. In female athletes, with an experience of training from 5.5 to 8 years, the values of the index of sexual dimorphism had average mesomorphism.

Conclusions

1. For the vast majority of female athletes of this age group, with a sufficiently long experience in these types of team sports and with their intensity and frequency of training, a transitional mesomorphic sexual somatotype has adaptively formed.
2. It was established that in 10 (13.80%) female athletes, from the three studied groups, a pathological, inverse andromorphic sexual somatotype was determined, which was established in individuals with the greatest sports experience, intensity and frequency of training.
3. All athletes from the three studied groups do not have a physiological ovarian-menstrual cycle.
4. It was determined that hypomenstrual syndrome, with all its clinical manifestations, is present in 125 (90.58%) athletes, and secondary amenorrhea, in 13 (9.42%) of all studied female athletes.

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