

Research Article

# Studying Individual Features of the Formation of the Menstrual Cycle in Young Women Playing Basketball

Konstantin Anatolyevich Bugaevsky\*

\*Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Nikolaev, Ukraine.

**Corresponding Author:** Konstantin Anatolyevich Bugaevsky, Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Nikolaev, Ukraine.

Received: 📅 2024 Feb 01

Accepted: 📅 2024 Feb 20

Published: 📅 2024 Mar 01

## Annotation

In this original research article, I would like to present the comparative results of a study to determine the existing changes in the formation and dynamics of the ovarian-menstrual cycle in teenage female athletes involved in basketball. Results of the study: the data obtained were reviewed and analyzed, indicating that in the study group of female athletes there were various, including combined, menstrual cycle disorders, according to its duration, the volume of menstrual bleeding and its duration, time intervals between menstrual bleeding. Also, both somatic and psychological disorders were studied in this group of female athletes, both during the period of menstrual bleeding itself, and before and after the menstrual bleeding itself, in young athletes involved in such a game sport as basketball.

Based on the results of the study, it was determined that in the study group there were manifestations of such types of ovarian-menstrual cycle disorders as hypomenstrual syndrome, with clinical manifestations of oligo-opsomenorrhea, algodysmenorrhea, and premenstrual syndrome. We believe that the individual menstrual cycle disorders identified in female athletes, both with somatic and psychological changes in young female athletes, are due to individual adaptive changes in their bodies, and are directly related to the physical and psycho-emotional stress they experience when engaging in this game type sports. The identified changes, with the formation of ovarian-menstrual-menstrual cycle disorders in female athletes in the form of hypomenstrual syndrome, require revision by the coaching team, with the participation of a sports doctor, of individual loads when planning training and competitive algorithms in micro-, meso- and macrocycles.

**Keywords:** Female Athletes, Basketball, Adolescence, Young Age, Menarche, Formation of the Ovarian-Menstrual Cycle, Menstrual Irregularities.

## 1. Introduction

In the modern world of elite sports, especially in that part where representatives of different age groups engage in sports, scientific research aimed at studying the medical and biological characteristics and reserve capabilities of the female body will be very relevant and constantly in demand. This statement, without a doubt, also applies to the participation of female athletes of different age groups in team sports, incl. and basketball [1-7]. In particular, already at the stage of selecting girl candidates, the coaching team considers such parameters as age, length and weight of the body, anatomical and morphological parameters, the period of puberty with the individual characteristics of the reproductive and endocrine systems [as well as other body systems] [8-15].

In girls of puberty and later adolescence, an important medical and biological aspect is the presence or absence of menarche [Me], the first menstruation, during this period,

the physiological stages of the formation and development of OMC, both during training and competitions [1-7]. In this regard, this work is one of the stages of a multifaceted study of adaptive changes in the body of female athletes, under the influence of intense physical and psycho-emotional stress on their body, at different age periods. In our opinion, the problem of adaptive changes and individual reserve adaptation capabilities, with dynamic somatic and psycho-emotional shifts, both in sexual somatotypes and in the gender self-identification of female athletes, in masculine and conditionally masculine sports, is one of the ends of the studied problems, medical and biological research of modern women's sports.

### 1.1. Aim of Study

The purpose of the study is to present the comparative results of the study conducted to determine the existing changes in the formation and dynamics of the ovarian-menstrual cycle in adolescent female athletes involved in basketball.

### 1.2. Objectives of the Study

To identify and analyze the somatic and psychological changes in the formation and dynamics of their ovarian-menstrual cycle [OMC] among adolescent female athletes involved in basketball.

For this:

- Conduct individual surveys and extended interviews.
- Based on the data received, conduct an analysis and determine the existing changes in their OMC, highlighting the types and groups of somatic and psychological disorders.
- After analyzing the obtained violations of the OMC, try to establish their relationship with the existing adaptive changes in young basketball players.

### 1.3. Research Hypothesis

young female athletes who began to play sports professionally, including basketball, in the period before their first menstruation [menarche], quite often experience disturbances in the dynamics of the formation of their normal OMC.

## 2. Material and Methods

Materials and methods of research: analysis of scientific and methodological literature; questioning of young female athletes on the characteristics of the menstrual cycle [author's questionnaire - Bugaevsky K.A., 2018©], extended interviewing, method of mathematical statistics. This study was conducted on the basis of a number of sports clubs and sports sections in Ukraine, namely in the cities of Nikolaev, Zaporozhye, Kherson and Novaya Kakhovka, training athletes of different age groups involved in such a game sport as basketball. The study involved female adolescent/young female athletes (n=97), actively involved in this sport, and also, as a control group, adolescent/young girls (n=97) not involved in sports were involved.

To achieve the goal of the study, we used such research methods as conducting a survey, both using a paper version of the questionnaire and an on-line survey, as well as conducting extensive interviewing of young athletes to clarify a number of aspects of their individual characteristics of the formation and dynamics of their OMC and its components. After sum-

ming up all the research data obtained, its analysis was carried out, highlighting its results [both positive and negative], their systematization, statistical processing, and comparison with the results of similar domestic and foreign researchers. It was found that the sports qualifications of the athletes who took part in the study ranged from III-I category, to candidate master of sports [CMS] and master of sports [MS].

Among the total number of young female athletes (n=97), there were 6 (6.19%) athletes with the title of master of sports, 17 (17.53%) candidates for master of sports, 38 (39.18%) [young female athletes with the 1st sports category %], II sports category – 21 (21.65%), III sports category – 15 (15.46%). Experience in this sport ranges from 2.5 to 9.5 years. Training frequency – 4-6 times a week, from 1.5 to 3 hours. The study was conducted in compliance with the basic bioethical provisions of the Council of Europe Convention on Human Rights and Biomedicine [dated April 4, 1997], the World Medical Association Declaration of Helsinki on Ethical Principles for Scientific Medical Research Involving Human Subjects (1964-2008), as well as the Order Ministry of Health of Ukraine No. 690 dated September 23, 2009. All participants who took part in the study, both athletes and non-athletes, gave their voluntary, written consent to it.

## 3. Results and Discussion

In the group of female youth athletes (n=97) involved in basketball, after processing and analyzing the received research materials, we obtained the following results: the average age among female youth athletes is  $19.35 \pm 0.12$  years, and among girls who are not athletes from control group –  $19.51 \pm 0.83$  years. The average body length in the group of young basketball players was  $179.56 \pm 1.23$  cm, and for girls in the control group -  $169.87 \pm 1.08$  cm. On average, in the group of female athletes, body weight was  $71.43 \pm 1.27$  kg, for non-athletes –  $69.97 \pm 0.93$  kg. Also, to compare the basic characteristics of the formation and dynamics of OMC, we involved in the study a group of female students who do not go in for sports, of the same age category (n = 97). The obtained values of the OMC parameters for basketball players and girls, non-athletes from the control group, are presented in Table. 1, at  $p \leq 0.05$ :

**Table 1: Data on the Formation and Dynamics of CMC in the Study and Control Groups**

Indicator name	Female athletes (n=97) of adolescence	Non-athletes (n=97) adolescents
Timing of the first menstruation - Me, (age)	$13,56 \pm 1,13$ years	$12,78 \pm 0,87$ years
Time frame for establishing the OMC, (months, years)	$2,59 \pm 0,87$ years	$1,48 \pm 0,53$ years
Duration of OMC, (days)	$44,57 \pm 1,32$ days	$29,73 \pm 1,07$ days
Duration of menstrual bleeding, (days)	$2,36 \pm 0,24$ days	$4,87 \pm 0,89$ days

Analysis of the indicators obtained as a result of the survey on the dynamics of OMC in both groups of adolescent girls showed that in the group of young basketball players, the timing of menarche, although within the physiologically acceptable norm adopted in Ukraine [the average age of onset of Me is 12, 45-13.85 years], but still later than the average in the population [Me 12-12.85 years] and among girls of the same age from the control group [1-7]. The results of the formation and dynamics of OMC in the control group correspond, according to all the indicators obtained, to the generally accepted values of OMC accepted both in Ukraine and in the world [8-15].

In order to better understand the existing types and forms of OMC disorders, I would like to give a brief definition of the specific gynecological terminology presented below [1-7].

- Hypomenstrual syndrome – a combination of opsomenorrhoea, hypomenorrhoea and oligomenorrhoea.
- Opsomenorrhoea – rare menstruation > 35 days and up to 3 months.
- Hypomenorrhoea – scanty menstruation, less than 50 ml, occurring on time.
- Oligomenorrhoea – short menstruation, less than 3 days – 1-2 days.

- Secondary amenorrhoea – absence of urinary tract for 6 months and pain.
- Hypermenstrual syndrome – a combination of hyper- and polymenorrhoea.
- Proyomenorrhoea – frequent menstruation, less than 21 days of OMC.
- Hypermenorrhoea – heavy menstruation, with the release of more than 100-150 ml of blood during all days of this MK.
- Polymenorrhoea – painful uterine bleeding for more than 7 days.
- Algo-dysmenorrhoea – painful, often irregular periods.

In the group of female basketball players, physiological OMC was determined in 13 (13.40%) girls with 2.5 years of sports experience and an III sports category. In the control group, among adolescent girls who were not athletes (n=97), a physiological menstrual cycle was determined in 32 (32.99%) of them. When considering the identified violations of the OMC, both in the study group of female athletes and in the control group, the results presented in Table 1 were obtained. 2, at  $p \leq 0.05$

**Table 2: Identified Disorders of OMC in the Study and Control Groups**

Indicator name	Female athletes (n=97) of adolescence	Non-athletes (n=97) adolescents
<b>Hypomenstrual syndrome</b>		
Opsomenorrhoea	23 (23,71%)	9 (9,28%)
Hypomenorrhoea	23 (23,71%)	10 (10,31%)
Oligomenorrhoea	23 (23,71%)	9 (9,28%)
Secondary amenorrhoea	2 (2,06%)	no
<b>Hypermenstrual syndrome</b>		
Proyomenorrhoea	no	6 (6,19%)
Hypermenorrhoea	no	5 (5,16%)
Polymenorrhoea	no	4 (4,12%)
Algo-dysmenorrhoea	59 (60,83%)	22 (22,68%)

The analysis of the survey results showed that in the group of teenage basketball players, 23.71% of them had clinical manifestations of hypomenstrual syndrome, with the phenomena of opsomenorrhoea, hypomenorrhoea and oligomenorrhoea. In this group, the occurrence of opsomenorrhoea was  $44.37 \pm 1.12$  days in the delirium. 2 (2.06%) female athletes have no longer had periods for more than 8 months, which was clinically diagnosed as secondary amenorrhoea. The girls are registered with a gynecologist at their place of residence and are monitored by their sports doctors, and undergo appropriate etiopathological therapy. At the same time, a larger number of female athletes – 60.83% – have painful menstrual bleeding. The phenomena of hypomenstrual syndrome predominate among athletes with the highest level of qualifications, with sports experience of more than 2.5 years and who have the most intense physical activity, both during training and competitions. In turn, in the control group, there were more

than 2 times more girls with physiological OMC and pain than in the group of female athletes. But, at the same time, in the control group, girls were identified with both hypomenstrual syndrome - 9 (9.28%), and hypermenstrual syndrome - 5 (5.16%), and 22 (22.68%) girls with phenomena algo-dysmenorrhoea, and there are no girls with symptoms of secondary amenorrhoea.

In addition, both somatic and psychological manifestations of premenstrual syndrome (PMS) were identified in both a number of athletes and non-athletes from the control group. According to modern scientific data and scientific research materials, somatic manifestations that are most pronounced in young, menstruating women include pain in the lower abdomen, in the right or left groin areas, headache, a feeling of paresthesia [numbness] in the upper and/or or lower extremities, general weakness, nausea, dizziness, and a number

of other somatic manifestations that occur less frequently [3, 4, 5, 11, 15]. The psychological manifestations of PMS most often include: irritability, sleep disturbances [drowsiness during the day, anxious, fragmentary sleep, difficulty falling asleep], lethargy, decreased performance, lethargy, indiffer-

ence, even apathy, and a number of other psychological, less common manifestations [3, 4, 5, 11, 15]. Data on the manifestations of PMS in both groups of teenage girls are presented in Table. 3, at  $p \leq 0.05$ :

**Table 3: PMS Phenomena in the Group of Female Athletes and in the Control Group**

Indicator name	Female athletes (n=97) of adolescence	Non-athletes (n=97) adolescents
Somatic manifestations of PMS	73 (75,26%)	29 (29,90%)
Psychological manifestations of PMS	69 (71,13%)	9 (9,28%)
Combined manifestations of PMS	24 (24,74%)	38 (39,18%)

Analysis of the results obtained from studying the presence and manifestations of PMS, both in young basketball players and their peers in the control group, showed that in both groups there are both somatic and psychological, as well as mixed, combined [somatic and psychological] manifestations of PMS. At the same time, it was found that in female athletes, somatic manifestations are more than 2.5 times more likely to be present in basketball players, and psychological manifestations of PMS are 1.7 times more common in them than in non-athletes. At the same time, in girls who do not play sports, combined manifestations of PMS are 1.58 times more common than in their peers who play basketball. Naturally, the presence of somatic and psychological manifestations of PMS significantly reduce the effectiveness of the training process and significantly affect the performance of female athletes during competitions.

Also, as a result of a survey and additional interviews, it was found that most of the identified violations of the OMC, in all their diversity, as well as manifestations of PMS, both somatic and psychological, were encountered among athletes who began their sports activities, or before the onset of they have Me, or in the first 1-2 years of their development of OMC.

## Conclusions

Based on the results of determining the formation and dynamics of OMC in young basketball players, they are more likely and to a greater extent to have various types and forms of OMC disorders, mainly of the type of hypomenstrual syndrome.

Algodysmenorrhea was identified in 59 (60.83%) female athletes, and in 2 (2.06%) female athletes who have been involved in basketball for the longest and most intensively [from 7 to 9.5 years], secondary amenorrhea was recorded, with the absence of menstruation for more than 8 months.

In the group of female basketball players, compared with their peers from the control group, somatic manifestations of PMS predominate - in 73 (75.26%) and psychological manifestations of PMS - in 69 (71.13%), if present, in almost every fourth female athletes, combined [somatic and psychological] manifestations of PMS.

It has been established that most often, disorders of the OMC and manifestations of PMS appear in those. Female athletes young age, who began their sports activities either before

the onset of menarche, or in the 1-2 year of their development of OMC.

## References

1. Abramov V.V., Shevchenko I.M., & Krishen V.P. (2011). Routine analysis of the pace of biological development of female athletes in the dynamics of rhythmic gymnastics and basketball. *Bulletin of problems of biology and medicine*, 4(90):239-242.
2. Akbarova G.Kh. (2015). Biological maturation of girls involved in sports. *Bulletin of RGMU*. №2. Retrieved from URL.
3. Atamanyuk, S.I. (2013). Efficiency of training of elite female athletes in athletic aerobics considering the functional state. *Physical culture, sport and national health*, 273-278.
4. Bugaevsky K.A. (2019a). Consideration of a number of physical and psychological manifestations of the pathological menstrual cycle in female athletes in a number of sports. "Current problems of physical culture, sports and physical rehabilitation in modern minds": Proceedings of the All-Ukrainian Scientific and Practical Conference. View "Nova Ideology", Dnipro, 27-33.
5. Bugaevsky K.A., & Cherepok A.A. (2019). Studying the characteristics of the manifestations of premenstrual syndrome in athletes of different age groups. Promising direct development of current medical and pharmaceutical sciences: Collection of materials from the international scientific and practical conference (M. Dnipro, February 8-9, 2019). - Dnipro: Organization of scientific medical research "Salutem", 18-25.
6. Bugaevsky K.A. (2019b). Sports activities: relationship with the onset of menarche and the dynamics of the ovarian-menstrual cycle. Current problems of physical culture and sports in modern socio-economic conditions: materials of the International. scientific-practical conf., January 22-23, 2019 - Federal State Budgetary Educational Institution of Higher Education Chuvash State Agricultural Academy, Cheboksary. 273-278.
7. Bugaevskij, K. A., & Cherepok, A. A. (2018). Osobennosti reproduktivnyh pokazatelej u sportsmenok rjada igrovyh vidov sporta [Features of reproductive indicators in athletes of a number of game sports]. *Sportivnye igry [Sports games]*, (1-7), 4-12.
8. Vasin S.G. (2016). Features of the training process of women considering the course of the ovarian-menstrual cycle. *Innovative Science*, 8-3:114-116.

9. Davydova L.A. (2019). The influence of various sports on the biological cycle of female athletes. International student scientific bulletin. №3; Retrieved from URL.
10. Shakhlina, L., Futorni, S., Sokha, T., Maslova, O., Chistyakova, M., et al. (2023). Medical and biological fundamentals of young athletes' training. Slobozhanskyi Herald of Science and Sport, 27(4), 185-192.
11. Fazletdinova I.R., & Fazletdinov R.Z. (2009). Assessing the reproductive and mental health of young female athletes. Proceedings of the Third International Congress on Reproductive Medicine, Moscow, 24-25.
12. Frolov E.V., & Sentyabrev N.N. (2017). The use of methods for optimizing the functional state in the training process of women's basketball teams of universities. // Modern problems of science and education. №6. Retrieved from URL.
13. Charniga, B., & Solonenko, O. (2014). The training of the female weightlifter and the menstrual cycle. Sportivny Press Olymp, 3, 28.
14. Jurczyk, M., & Borawska, A. (2010). Ocena wpływu wysiłku fizycznego na zaburzenia cyklu menstruacyjnego u sportswomek i pozostałych kobiet. Ginekol. Prakt, 1, 20-22.
15. Wodarska, M., Witkoś, J., Droszol-Cop, A., Dąbrowska, J., Dąbrowska-Galas, et al. (2013). Menstrual cycle disorders in female volleyball players. Journal of Obstetrics and Gynaecology, 33(5), 484-488.