

Analysis of psychological state of qualified female handball players depending on the phase of the ovarian-menstrual cycle

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Abstract

The purpose of the research – to determine the characteristics of the subjective perception of diseases symptoms for female handball players in different phases of their menstrual cycles. *Material and Methods.* The assessment of psychological status of highly qualified female handball players was conducted on "Karpaty" (Uzhgorod) and "Galychanka" (Lviv) (32 qualified handball players aged 19-21 years old). They were selected under the condition that they had the 28-days menstrual cycle. The group of female handball players was diagnosed by procedures: Giessen questionnaire; methodic emotional feeling, mood and physical activity (EMPA). Pearson coefficient has been used in the study. *Results.* We recorded changes in indicators of the psychological status of qualified female handball players, depending on the phases of the ovarian-menstrual cycle (OMC). According to studies by the method of subjective perception level malaise proved the presence of the tight relationship between the degree of manifestation of the predominant complaint and the phase of OMC for female players. However, the relationship between the density level of EMPA and the phase of OMC indicated an important addition and necessity in female handball. *Conclusion.* The high level of subjective perception of symptoms of various diseases, negative emotion, mood, and physical activity is observed in the menstrual, ovulatory and premenstrual ovarian-menstrual cycle phases. It was determined that due to OMC phases values of practically all EMPA indicators correspond to a low level or are evaluated below the norms.

Key words: handball, female, ovarian-menstrual cycle

Introduction

The analysis of scientific literature has shown that a training load of the intensity especially in team sports, has different effects on both genders [Borresen & Lambert, 2009; Bompa & Buzzichelli, 2015]. Besides that, mental stress, resulting on the training, aggravates to the maximum level during a competition and causes different manifestation of mental conditions in men and women [Stone & Kilding, 2009; Evhen & Valeria, 2017]. Thus, gender sensitivity in sports training is one of the factors to increase its effectiveness in ensuring the calculation for the coaches on the individual psychological and personal qualities of athletes with whom they work [Sallis et al, 2001; Lemmer et al, 2000; Tyshchenko, Hnatchuk et al, 2018].

In high performance and professional sports, there have been known the bound and interaction between the athlete's physical abilities and his mental condition [Valeria & Olexander, 2015; Yuriy et al, 2016]. In this regard, the definition of the total evaluation of intensity in emotive complaints, about the physical condition of the athlete, forms an important factor that determines the psychological state of his personality [Covassin & Pero, 2004; Weinberg & Gould, 2018]. It has been established that the success of an athlete, in training and competitive process, depends not only on his level of athletic preparation. An essential meaning has social and psychological factors, among which are those that are perceived subjectively, namely somatic ailments (especially in women due to the significant functional changes in the menstrual cycle) are important enough for athletes [Constantini et al, 2005; Davies et al, 1991; Shakhlina et al, 2016].

In many researches, the data that is directly related to the influence of sports training on the generative function of the woman's body and warns of the need for female athletes to "listen" to the state of their own health, especially to the symptoms that have not yet fully expressed [Märker, 1981]. However, analysis of the literature witnesses that the studies that have addressed the need to resolve issues subjective perception of symptoms in various diseases for handball players hasn't been performed.

Materials and Methods

Participants

The study was conducted based on the participation of teams of Super League Handball. The assessment of psychological status of highly qualified female handball players was conducted on two teams; sport club "Karpaty" (Uzhgorod), and handball club "Galychanka" (Lviv) (32 qualified handball players aged 19-21 years old).

All athletes volunteered to participate in the research. Prior to the testing, the procedures were explained to all of them, including possible risks involvement, and after the explanation, an informed consent form was signed. The experiment has been done after every participant was tested. The athletes were free from any injuries or neuromuscular disorder. The study has been approved by the Institutional Ethics Committee, complied with all the relevant national regulations and institutional policies, followed the tenets of the declaration of Helsinki, and it has been approved by the authors' institutional review committee.

Purpose, Methods and Procedures

The purpose of the research – to determine the characteristics of the subjective perception of diseases symptoms for female handball players in different phases of their menstrual cycles.

Methods and Procedures of the research.

Female handball players were selected under the condition that they had the 28-days menstrual cycle. During the whole cycle, the players have been receiving physical load in the training process. The phases of ovarian-menstrual cycle (OMC) are the distribution of the following: menstrual – 5 players; postmenstrual – 7; ovulatory – 3; postovulatory – 8; premenstrual – 9.

The group of female handball players was diagnosed by procedures: Giessen questionnaire adapted in Psycho-Neurological Institute, V.Behtereva [Raygorodskii, 1998]; methodic (EMPA) (emotional feeling, mood, physical activity) [Biddle, 2003].

Mathematical and statistical analysis of the survey results have been conducted using computer files with programs MS Excel "Statistic 6.0". The following methods have been used: the method of averages and selective method. Calculated arithmetic mean (\bar{X}), the deviations from the arithmetic mean (m). The value of $p < 0.05$ was considered statistically significant.

To study the relation between the density of the variables represented in scale of measurement, Pearson coefficient has been used, which is calculated on the basis of the frequency (n_{xy} , n_x , n_y) of contingency tables [Sedgwick, 2012].

$$C = \sqrt{\frac{\varphi^2}{1+\varphi^2}} \quad (3.1)$$

$$\text{where } \varphi^2 = \sum \left(\frac{\frac{n_{xy}^2}{n_x}}{n_y} \right)$$

Results of the research

In the context of this study, it is very important to determine the statistical indicators of female handball players, grouped by appropriate OMC phase (Table. 1). Processing of diagnostic results showed differences in the subjective perception of symptoms in various diseases. Thus, the average value of the intensity of depletion complaints in the whole group equal to 11.41; stomach complaints – 8.56; rheumatoid factor – 13.13; heart complaints – 8.84; complaints of pain in the reproductive organs – 10.94 (out of a possible 24 points) (Table 1.). That is due to the fact that the comparison of the different phases of the menstrual cycle of women athletes in a number of scientific research allowed the scholars to identify their presence and the dependence of the depth of functional and metabolic changes in tissues and organs of the phase of ovarian-menstrual cycle [Wojtyś et al, 1998].

We made an attempt to broaden our understanding of the impact of OMC phase on the body of highly qualified female handball players, in particular on their psychological state. Therefore, diagnosis was conducted, and further, the analysis of its results. Thus, the average value of the total score of intensity somatic complaints was equal to 52.88 (out of 100). The total score indicates the intensity of somatic complaints and correlated with depression, alexithymia, and personal anxiety as well.

Standards for the individual scales haven't been provided. The total score is evaluated based on the fact that the maximum possible amount of 100 points among healthy people is 50% less than 14 points, 75% – less than 20, 100% – less than 40 points. Thus, based on the obtained data, we were able to ascertain the high level (exacerbation perception) subjective perception of symptoms of various diseases. That can elaborate on these points to the tense of mechanisms' psychological adaptation for qualified female handball players (Table. 1).

Table 1. Indicators of subjective perception level for female handball players' malaise depending on the OMC phase (n=32)

Measurable state	OMC Phase				
	1 (n ₁ =5)	2 (n ₂ =7)	3 (n ₃ =3)	4 (n ₄ =8)	5 (n ₅ =9)
Depletion	14.20±0.51	09.29±0.32	12.33±0.57	07.88±0.35	15.00±0.58
Gastric complaints	08.60±0.27	08.71±0.35	11.00±1.16	08.50±0.43	07.22±0.43
Rheumatic factor	12.60±0.61	12.43±0.47	13.00±0.18	13.13±0.52	14.11±0.40
Cardiac complaints	10.40±0.78	08.29±0.52	10.00±0.88	06.63±0.50	08.56±0.37
Pain in the reproductive organs	11.20±0.69	09.14±0.52	10.33±0.37	09.00±0.61	15.11±0.53
Subjective disease level (intensity complaints)	57.00±1.36	47.86±0.60	56.66±0.87	45.14±0.79	60.00±0.94

Note: 1 – menstrual; 2 – postmenstrual; 3 – ovulatory; 4 – postovulatory; 5 – premenstrual

Analysis showed synergistic functional dependence of the depth of metabolic changes in organs and tissues, and the performance level of subjective perception malaise for the players depending on the OMC phase.

Despite the fact that the subjective level of the disease is the total of the intensity of the complaints for each scale, we consider it necessary to clearly present them in the form of bar graphs (Fig. 1). Complaints of depletion has been most expressed for premenstrual (15.00), menstrual (14.20) and ovulatory (12.33) OMC phases.

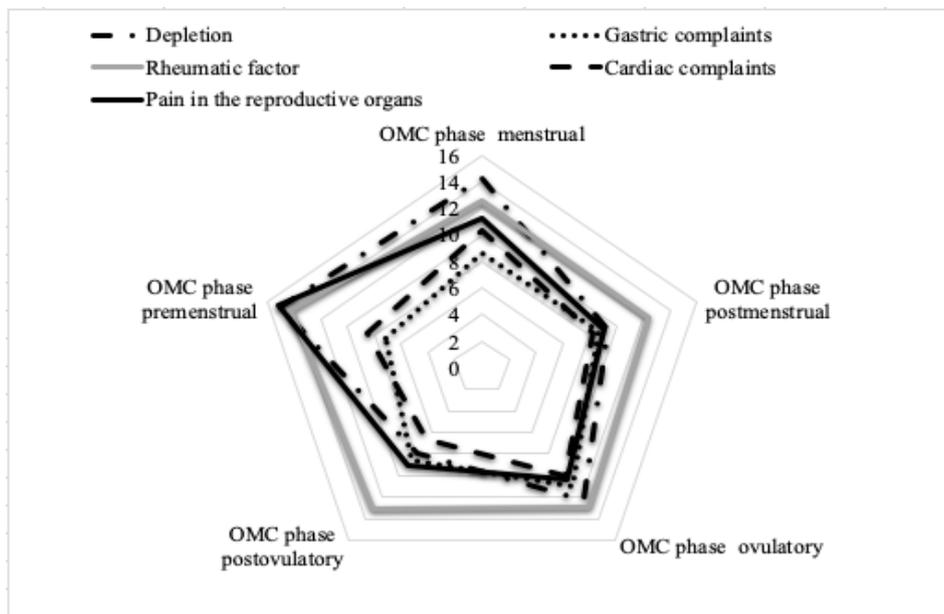


Fig. 1 Histogram average values

The physical condition of an athlete always affects the emotional pattern of his/her behavior. That is the result of somatic effects on mentality. At the same time, the feedback is possible. Nevertheless, a stereotype of behavior, which has already developed, provides a quite significant impact on the physical condition of the athlete. Moreover, it should be comprehended that the emotional pattern of the same behavior affects the subjective perception of the physical condition of the body. Hence, for the better evaluation, female players have been diagnosed by the method of emotion, mood and physical activity (EMPA), the results of which are presented in the Table. 2.

According to the logic of diagnostic techniques, we created an important opinion regarding the need to check the statistical bound between the independent variables: health scale (method EMPA) and an indicator of the intensity of the complaints female handball players (Giessenskiy questionnaire). For this purpose, the plan of a manageable correlation research has been used, and an indicator of rank coefficient has been chosen in this case Pearson's correlation coefficient [Sedgwick, 2012].

Since these calculations bear only supportive character, we just present the result of the figuring. The meaning rank coefficient of correlation Spearman $R_{xy} = -0.72$ indicates the presence of feedback between the evaluation of female handball players health condition and the intensity of their somatic complaints (more points – the better their condition, and simultaneously, the higher the intensity of the state of health complaints – subjective level of disease is worse) at high level of significance ($p < 0.05$). Additionally, these results, in oral forms, were confirmed sincerity by the players in their answers.

Table 2. Indicators of emotion, mood and physical activity (EMPA) of female handball players (in points) (n=32)

Measurable state	OMC Phase				
	1 (n ₁ =5)	2 (n ₂ =7)	3 (n ₃ =3)	4 (n ₄ =8)	5 (n ₅ =9)
Emotion	4.36±0.08	5.61±0.24	3.93±0.19	5.99±0.09	4.01±0.11
Physical Activity	3.70±0.15	5.99±0.24	3.90±0.15	5.39±0.05	3.81±0.10
Mood	4.24±0.10	5.31±0.12	4.17±0.14	5.31±0.16	4.11±0.16

Note: 1 – menstrual; 2 – postmenstrual; 3 – ovulatory; 4 – postovulatory; 5 – premenstrual

Therefore, analysis of the obtained emotion feeling, mood and physical activity data for qualified female handball players revealed that menstrual, ovulatory, and premenstrual OMC phases, diagnostic indicators EMPA are at a low level (below normal). The authors' method's indicators of emotional feeling were below 5.4 points, mood – below 5.1 points and physical activity – less than 5.0 points, have been evaluated as low (below normal).

Discussion

As far as it has been discovered that in team sports, practices take place mainly in the composition of the teams, to take into consideration the individual capabilities of each athlete is very difficult. Especially, it is simple when it comes to the women's team sports. It should take into an account the physiological characteristics of the female body: such as, primarily, menstrual cycle phase [Lebrun et al, 1995; De Jonge, 2003; Moran et al, 2000]. Some studies have observed features of OMC phase at female handball players and the necessity to analyze changes occurring in them throughout the menstrual period. For example, V. Ignatieva emphasizes that different lengths of the menstrual cycle can be isolated from three to six microcycle, physical load at the practice should to be differentiated [Ignatieva, Gibadullin & Minabutdinov, 2011]. Besides, as in the first microcycle of training as in the third – the female athletes could fulfill large and limit physical activity.

The above-mentioned and some other recommendations are based on the analysis of the kinetics-physiological parameters of female athletes throughout the menstrual cycle [Beidleman et al, 1999; De Jonge et al, 2001]. A psychological criteria and indicators in these studies barely considered. At the same time, we know that both hormone and nervous control functions largely depends on psychological factors and are determined by their influence, especially, emotional [Harlow & Matanoski, 1991; Reilly, 2000; Valeria et al, 2017].

The authors have conducted a comparative analysis of the mean values, obtained for the two diagnostic methods, may not be plausible argument to infer the conclusion of important bound in psychological state of female handball players based on OMC phases, but the analysis just shows the tendency of changes in average indicators. Therefore, we additionally used a more powerful method – the method of correlation analysis. Despite the fact that the independent variable – the phase of OMC is measured by a scale of measurement or nominative scale (menstrual, post-menstrual, ovulation, post-ovulation, premenstrual), it was necessary to transfer the diagnostics results of the two methods in scale's items, as follows: Giessen questionnaire – view of the prevailing type of complaints (the highest score); EMPA method – based on the results of the study in publications on this diagnostics instruments, we came to the conclusion that the overall assessment of a state of emotional feeling, physical activity and mood can be represented by the following satisfactory levels, optimal, dissatisfaction, and depression.

Nevertheless, we recorded changes in indicators of the psychological status of qualified female handball players, depending on the phases of the OMC. According to studies by the method of subjective perception level malaise (Giessen questionnaire) proved the presence of the tight relationship between the degree of manifestation of the predominant complaint and the phase of OMC for female players (Pearson coefficient relatedness $C=0.657$ ($p>0.5$)). Regarding the reliability of this connection, also it has been uttered that the level of significance of ($p\leq 0.05$). According to the calculations connected Pearson coefficient was calculated $C=0.742$ ($p>0.7$), indicating the relationship between the density level of EMPA and the phase of OMC. Regarding the reliability of this connection, also it has been uttered the level of significance ($p\leq 0.001$).

Conclusions and prospects for the further research

The conducted analysis results of diagnostics for psychological state of qualified female players showed that a high level of subjective perception of symptoms of various diseases (acute perception), negative emotion, mood and physical activity (EMPA) is observed in the menstrual, ovulatory and premenstrual OMC phases, which indicates a significant tense in psychological adaptation mechanisms for female athletes. In addition, it was determined that due to OMC phases values of practically all EMPA indicators correspond to a low level or are evaluated below the norms.

The analyzed data in our research allows to indicate the need to develop a program to improve the training process of qualified female handball players using means of psychological preparation in the menstrual, ovulatory and premenstrual OMC phases to the leveling effect of the specific characteristics of the woman's organism.

Conflicts of interest

The authors declared no potential conflicts of interest with respect to the research, authorship and publication of this article.

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