

The dependence of emotional burnout on ovarian-menstrual cycle phases

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Abstract

Emotional burnout in sports, particularly in handball, is a combination of physical, emotional and cognitive exhaustion or fatigue, but the main factor is the emotional exhaustion. Additional components of burnout are characterized by cupping of stress that can be led to depersonalization. As a result, depersonalization reflected in the reduction of personal achievements in sport and the team as well. There are minimal researches of this condition, especially in handball. The current study examines the determine the degree of burnout in female handball players, depending on phases of ovarian-menstrual cycle (OMC). Data were analyzed via descriptive statistics, method of averages and selective method and correlation analysis. Diagnosis of the psychological state of the qualified female handball players showed that increased levels of burnout were observed in the menstrual, ovulatory and premenstrual phases, which indicated a significant tension mechanisms of psychological adaptation. It proved the presence of the connection between the level of the dominant emotional burnout phase and OMC phases. Due to the fact in handball, as a team sport, there are requirements for individual and team work. There is an urgent need for a leveling effect of the specific characteristics of the female body on the effectiveness of the training process and competitive activities. Our analysis of the results of the psychological state of the female handball players gives us the opportunity to state the need to develop a program to improve the training process of the female players using auto-training in the menstrual, ovulatory and menstrual phases.

Key words: handball, female, ovarian-menstrual cycle, emotional burnout

Introduction

Studies on the psychological concept of burnout, initially has been focused on professions, such as teachers, social workers, etc. Several researches [Grin, 2009; Price & Weiss, 2000; Rainey, 1999] suggest that subsequently, on the basis of similarity in the nature of professional activity, they have spread to the sphere of sports in the form of studying mental burnout in athletes, coaches and referees. Currently, there is no single point of view on the definition of "burnout" in sports activities [Hill, 2013; Lonsdale & Hodge, 2011]. In 1986, Smith's study was expressed most widely determination. He believes that mental burnout – is a reaction to chronic stress including physical, behavioral and cognitive components.

In one study [Tyshchenko et al, 2018], physical fitness of the athlete repercussions a great influence on the emotional behavior that is a kind of final exposure of somatic on nervous system. At the same time, it is possible to have a feedback, which means, the pattern of behavior that is already established and significantly effects on the physical condition of the athlete [Evhen& Valeria, 2017]. Moreover, it must be understood that the emotional pattern of behavior affects the subjective perception of the physical condition of the body. Thus,

some scientists had determined that the sub-dimensions of athletic identity contributed a unique amount to the prediction of some aspects of burnout. In 2013, Martin and Horn analysis of these results indicate that both passion and athletic identity are important correlates or predictors of burnout levels, with harmonious passion offering the most protective effects. In addition, we measured symptoms of mental burnout on the basis of changes due to the influence of permanent mental overload caused by the intense participation of athletes during competitions [Berilova,2016].

As far as it has been discovered that in team sports, where the training takes place mainly in the composition of the teams, it takes into the account the individual capabilities of each athlete is difficult [Valeria et al, 2017]. Especially, it is not easy when it comes to the women's teams, which should take into the consideration, the physiological characteristics of the female body: these are phases of the menstrual cycle. Therefore, the coach of a female team must take into the account this important factor, the menstrual cycle, and it would play a significant role in the prevention of overtraining, offset pre-pathological processes and states of female athletes. Realizing that in the beginning of the game, emotions get emerged regardless the game situations and due to their appearance, athletes evaluate factors influencing on them. In our study, we determined the emotional burnout of female handball players [Boiko, 1996]. The use of this technique makes it possible to introduce the energy (due to emotions) spending of the athlete during the execution of certain actions in the game.

Despite considerable investigation into athlete burnout, there remain a number of unresolved questions and issues.

Materials and Methods

Participants

The study was conducted with the participation of Ukrainian Super League Handball teams, "Karpaty" (Uzhgorod) and "Galychanka" (Lviv) (32 female 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 was 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 degree of burnout in female handball players, depending on phases of the ovarian-menstrual cycle (OMC).

To solve this desirable purpose, we established the following tasks:

1. Define changes to the emotional reactions of female athletes in a different microcycle week of their menstrual cycle.
2. Analyze the impact on the performance of female athletes and the success of the regulation of their functional manifestations.
3. Carry out a comparative analysis of the emotional and energy spending in female handball players, depending on OMC phases.

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

To determine the effect of factors on the training of female handball players, diagnostic technique burnout have been used – burnout dominant phase (a phase at which the largest number of points have been scored) [Boiko, 1996].

Statistical Analysis

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 applied: the method of averages and selective method. Calculated arithmetic mean (X), the deviations from the arithmetic mean (m). The value of $p < 0.05$ was considered statistically significant.

Hence, the internal consistency of the questionnaire was evaluated by establishing of correlations between the number of points for the individual approval of technique with the final score of the index to the relation of this statement. The more powerful methods have been utilized for this reason- methods correlation analysis. Despite the fact that the independent variable – the phases of the OMC are measured in a scale of names or nominative scale (menstrual, post-menstrual, ovulation, post-ovulation, premenstrual). The diagnostics results were supposed to be transferred by the method of emotional burnout. The Pearson correlation coefficient was calculated for this purpose. 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]:

$$C = \sqrt{\frac{\varphi^2}{1+\varphi^2}}, \text{ where } \varphi^2 = \sum \left(\frac{\frac{n_{xy}^2}{n_x}}{n_y} \right)$$

Results

The data shown in the Table provides an opportunity to ensure the presence of significant differences in terms of qualified female handball players who were in different periods of OMC phases.

Table Indicators Of Emotional Burnout Among Female Handball Players

Symptoms and phases "burnout" (points)	OMC Phases				
	1($n_1=5$)	2($n_2=7$)	3($n_3=3$)	4($n_4=8$)	5($n_5=9$)
Emotional experience of psychotraumatic circumstances	***16.40±1.14	*10.14±0.28	**14.00±0.64	*08.00±0.42	**14.22±0.56
Self-dissatisfaction	**15.20±0.76	*10.86±0.43	**13.67±0.27	*08.38±0.28	**14.67±0.9
Trapped in the corner	***17.60±0.74	*08.43±0.62	***14.33±0.10	*08.75±0.60	***19.00±0.8
Anxiety and depression	19.20±0.68	07.43±0.43	**13.33±0.27	*07.88±0.42	***16.78±1.4
Intention component phase "tension"	+68.40±1.83	-36.86±0.81	±55.33±0.84	-33.00±1.20	+64.67±1.89
Inadequate emotional reaction	***15.60±0.24	*07.71±0.39	***15.00±0.61	*07.50±0.43	***16.44±0.5
Emotional and moral disorientation	***15.60±0.97	*10.57±0.29	***15.00±0.53	*08.13±0.41	***17.44±0.9
Expending spheres of holding emotions	***17.20±0.46	*09.00±0.43	***16.00±0.31	*08.25±0.43	***17.11±0.8
Reduction of professional duties	***15.20±1.07	*08.57±0.39	**14.00±0.35	*08.50±0.48	***16.44±0.5
Integral indicator of phase "resistance"	+63.60±2.31	-35.86±0.85	±60.00±0.18	-32.38±0.72	+67.44±2.1
Emotional deficit	***16.80±0.44	*09.14±0.61	**14.67±0.10	*07.88±0.43	***18.56±0.8
Emotional detachment	***15.20±0.34	**10.43±0.55	***14.67±0.20	*09.25±0.36	***16.00±0.8
Personal detachment (depersonalization)	***14.80±0.08	*07.86±0.43	***14.33±0.27	*08.00±0.57	***17.22±0.8
Psychosomatic and psycho-vegetative disorder	***20.00±1.00	*07.43±0.78	***14.00±0.18	*06.50±0.25	***22.67±0.8
Integral indicator of phase "exhaustion"	+66.80±1.49	-34.86±0.86	±57.67±0.10	-31.63±0.35	+74.44±1.5

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

* – symptom that didn't succeed; ** – symptom that develops; *** – symptom that was formed; – phase is not formed; ± – phase in a stage of being form; + formed phase

A comparison was conducted of burnout symptoms of female handball players, which were grouped in accordance with OMC phases with a value average in the whole group. Each phase of burnout ("tension", "resistance" and "exhaustion") is estimated by the sum of points for the symptoms that it includes. In this connection, diagrams were constructed (Figures 1-3), which illustrate the forming of each phase in female handball players with different OMC phase.

We knowledges that the given us a comparative analysis of average values of the indicators may not be plausible argument to infer the importance of communication in psychological state of female athletes with OMC phases, and it only shows the tendency in the average of indicators.

The indisputable fact is that during the menstrual phase, concentration of erythrocytes and hemoglobin in the blood decreases lowered aerobic capacity of the organism, reduced muscle strength, speed and endurance, but flexibility improves. Our studies emphasized the highest integral indicator "tension" phase in comparison to the other phases (Figure 1).

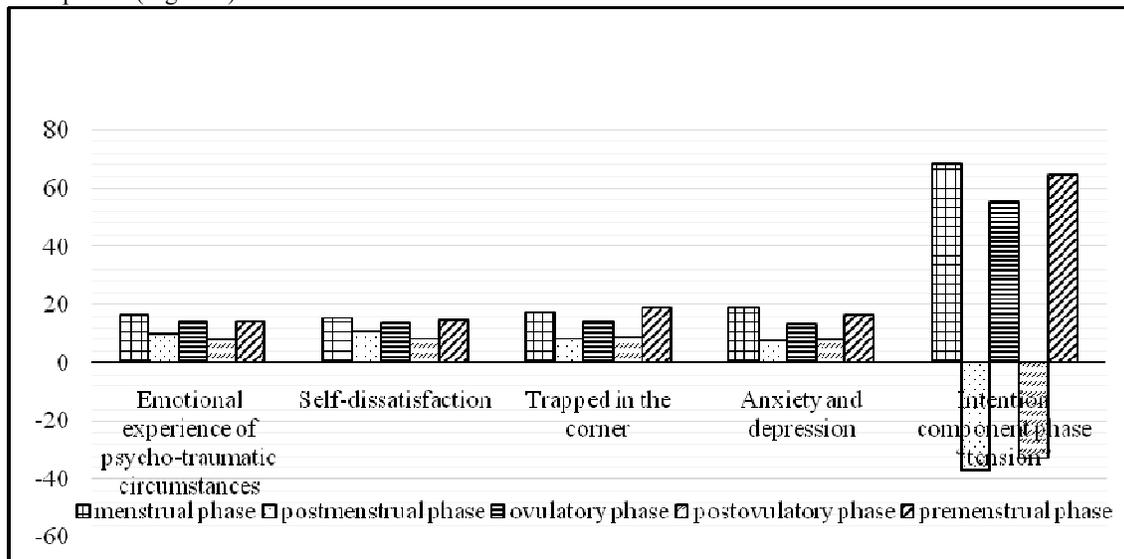


Figure 1. The histogram of average values of phase "tension" symptoms of female handball players with different OMC phases

During pre-menstrual phase concentration in blood of all the sex hormones decreases, but the number of tyrosine erythrocytes and hemoglobin increases. In addition, the excitability of the central nervous system and the level of metabolic processes in the body goes up as well. The glycogen content in the liver gets decreased but the concentration of glucose and calcium in the blood increases. The efficiency goes down with the maximum values of the integral phase indicator "resistance" (Figure 2).

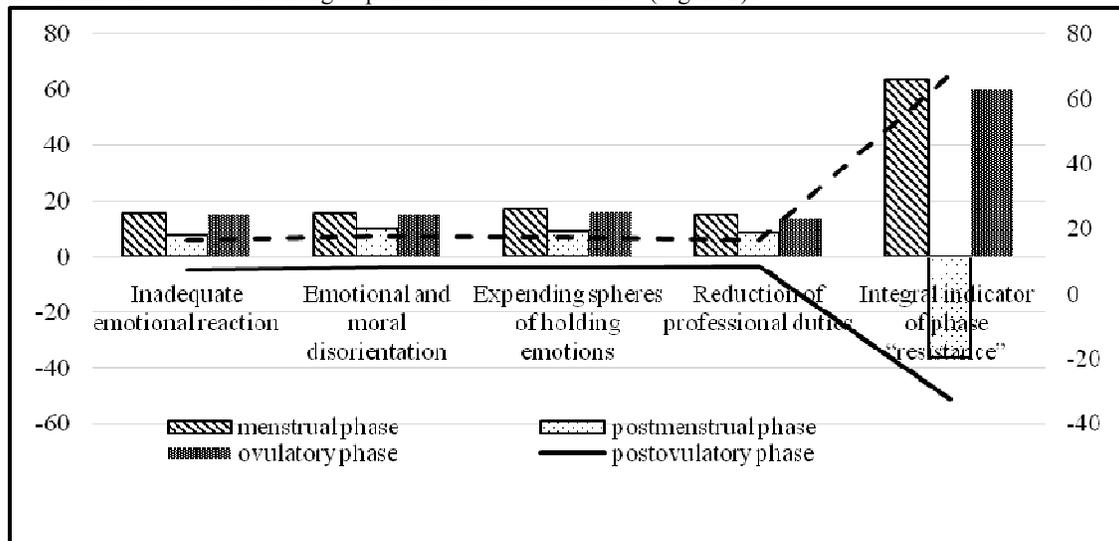


Figure 2. The histogram of average values of phase "resistance" symptoms of female handball players with different OMC phases

The same can be asserted by a integrated indicator and the "exhaustion" phase that was reached the maximum value during pre-menstrual phase and the minimum in the postovulatory phase, where the background of elevated progesterone concentrations occurs the improving of metabolic processes and performance (Figure 3).

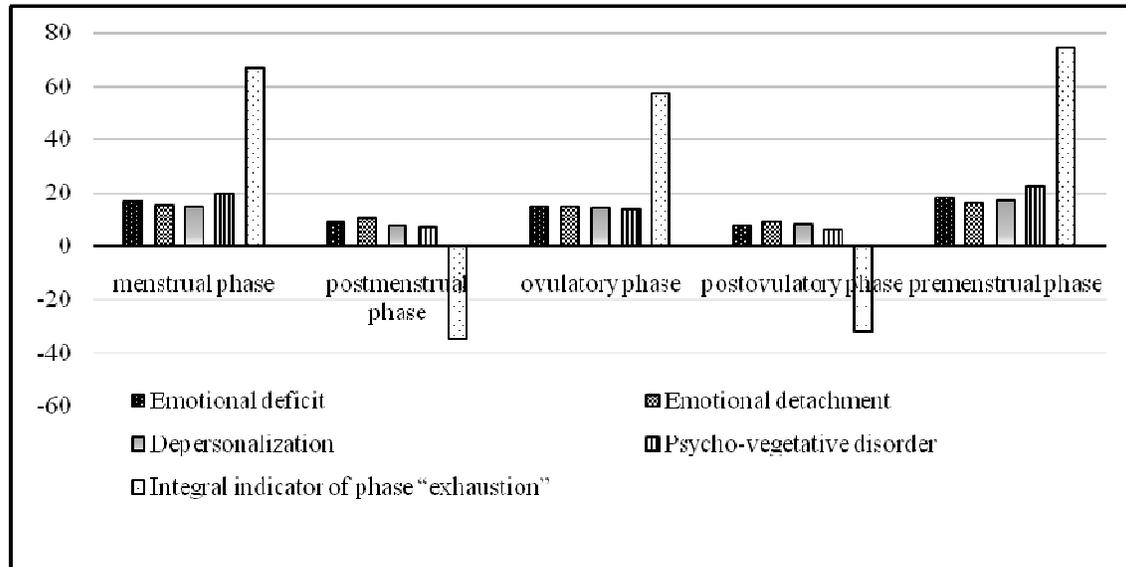


Figure 3. The histogram of average values of phase "exhaustion" symptoms of female handball players with different OMC phases

Conclusively, we recorded changes in indicators of the psychological status of qualified female handball players, depending on OMC phases. According to studies, it was proved that the presence of a dense-phase relationship between the dominant and burnout OMC phases. Based on calculation results obtained by the connected Pearson coefficient $C=0.742$, the reliability of this connection also confirms the significance level $P=0.01$.

Discussion

Emotional burnout has been described as exhaustion due to sharply inflated claims to their own resources and strengths. According to Shirom (1989), emotional burnout is a combination of physical, emotional and cognitive exhaustion or fatigue, nevertheless the main factor of emotional burnout would be exhaustion. The scientists noted that male athletes characterized by a higher degree of depersonalization and dehumanization, however, female athletes – more pronounced emotional exhaustion, which was confirmed by our team [Maslach et al, 1986].

Our research is based on the use of the developed concept, the model of development of professional burnout in sports activities, Raedeke, 2001 and the model of the study, Boiko, 1996. Therefore, Raedeke considers professional burnout in sports activities as a 3-component construct: emotional/physical exhaustion, reduced sense of achievement and the depreciation of the achievements [Raedeke& Smith, 2001]. Emotional burnout, in accordance to the concept of Boiko, 1996 is generated psychological defensive mechanism in the form of total or partial exclusion of emotions in response to a selective traumatic impact.

Hence, 3 stages are emphasized: "Anxiety tension", "Resistance" and "Exhaustion" phases. Burnout – functional stereotype because it allows an athlete economically to spend and use energy resources. At the same time, there may be consequences of his dysfunctional when burnout creates a negative impact on the performance during sports activities and relationships between the players off and on the court. In the study by Grin (2009), these phases of professional burnout, in our view, most fully reflect the specific manifestations of this syndrome in different subjects of sporting activities.

Emotional burnout is constructive, but dysfunction – consequences, when the emotional burnout harmfully may influence the productivity of qualified athletes not only during the performance in sports activities but also in their social lives, especially during pre-menstrual phase. Our research has shown, firstly, the possibility of optimal implementation of the functionality of the athletes, and secondly, the necessity for a differentiated approach to the planning of training loads, taking into the consideration these characteristics of the female athlete body. Due to the fact that handball is a team sport, there is a requirement for individual and team work on the team [Valeria & Olexander, 2015; Tishchenko, 2016], there is an urgent need for the leveling of the influence of specific features in the female athlete body (OMC phase), process on the effectiveness of training and competitive activities.

Conclusions

The conducted analysis of the results of psychological state diagnostics for qualified female handball players produced that increased level of burnout observed in the menstrual, ovulatory and premenstrual phase of OMC phases, which indicate significant tension mechanisms in psychological adaptation of female athletes.

In our research, the results showed a significant dependence of the level of psychological readiness of female athletes from OMC phases, indicating the necessity to develop an experimental program to construct the training process of the qualified female handball players with differentiated training loads, psychological support in the menstrual, ovulatory and menstrual phases of OMC.

We hope that this research can assist to stimulate future works of scientists, to help female handball players of any levels to avoid burnout and other severe forms of training maladaptation, based on OMC phases.

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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