

Dependence of athletic performance on mental health in female students

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Published online: December 30, 2021

(Accepted for publication December 15, 2021)

DOI:10.7752/jpes.2021.06465

Abstract

There are risk factors that become relevant under extreme conditions and, therefore, significantly affect sports performance. This paper aims to describe the correlation between certain parameters of mental health and their manifestation in female students with different sports performance levels. The components of mental health were assessed with a 10-point self-assessment test. The correlation structure was analyzed with respect to the level of statistical significance and correlation sign and depending on the parameters of mental health that affected athletic performance in female students. The data obtained were divided into five groups of factors. The first group of factors includes the ability to create a positive emotional field in the group, self-confidence, everyday well-being and adaptation to different irritants. The second group contains the factors associated with dysfunction such as the presence of mental disorders/illness, symptoms of chronic fatigue, increased heart rate when doing important tasks, disorders of the autonomic nervous system, use of sedative drugs, and wasting too much energy in ordinary tasks. The third group includes female students with a high level of athletic performance, who demonstrated significant correlations for the following parameters of mental health: mental health level, knowledge of stress resistance techniques, mental health awareness, psychological climate in a group, academic, sports, and work-related activities. The fourth group includes female students with a high level of athletic performance, who demonstrated negative correlations with certain mental health parameters. It was revealed that the higher the level of athletic performance, the less its dependence on external environment and other people. The fifth group includes parameters that do not have significant correlations with mental health and athletic performance in both groups of female students. These parameters include the need for psychological support from other people and releasing stress through smoking and alcohol consumption. The inverse correlation between athletic performance and mental health is significant in the group of female students with low athletic performance, which characterizes the activity of the autonomic nervous system.

Keywords: mental health, sport, performance, self-confidence, adaptation, risk factors, anxiety, stress, recovery means, pedagogical influence.

Introduction

Mental health is an important tool in improving athletic performance. Athletes' willingness to enhance their skills requires participation in socially significant competitions, which is accompanied by physical and mental stress. Sports activities and extreme exercise can be both beneficial and harmful for health. Recent statistics indicate that extreme conditions provoke mental disorders and pathological conditions in elite athletes (Samoilov M., Aloshecheva A., 2012; Eganov A.V., Bykov V.S., Romanova L.A., Nikiforova S.A., Kokin V.Y., 2016; Uphill M., Sly D., Swain J., 2016). There are risk factors associated with the features of certain sports events that negatively affect athletic performance. Changes in mental health can lead to trauma (Nippert A.H., Smith A.M., 2008, Clérico, J.-B. et al., 2019) and decrease in physical qualities or psychological well-being (Ramzia S., Besharatb M.A., 2010). Moreover, mental health and cognitive processes are also affected by the symptoms of anxiety and depression (Rumball F., Antal K., Happé F., Gray N., 2021).

At the same time, sports activities strengthen physical health and improve the mental state of a person (Aivazova E., 2019; Popa et al. 2020). This is evidenced by the studies of Rajappan et al. (2015), who described the level of physical activity among university students. The authors concluded that sedentary lifestyle was an important public health issue and one of the risk factors for mental disorders.

Recent statistics indicate that extreme conditions provoke mental disorders and pre-pathological/pathological states in elite athletes (Samoilov M., Aloshecheva A., 2012; Eganov A.V., Bykov V.S., Romanova L.A., Nikiforova S.A., Kokin V.Y., 2016; Uphill M., Sly D., Swain J., 2016).

Strive for excellence, intensive physical activity and other risk factors can jeopardize mental health. These factors include exposure to physical and mental stress, high social and personal responsibility, overtraining, mental burnout, depression, frustration, etc. (Eganov A., Cherepov E., Romanova L., Bykov V., 2020). Overeating, doping, gastrointestinal symptoms can lead to subclinical symptoms (Hughes, L., Leavey, G.,

2012). Mental health in adults and teenagers can be also affected by the quality of nutrition (Dimov S., Mundy L.K., Bayer J.K., Jacka J. K., Canterford L., Patton G.C., 2021).

At the same time, athletes experience additional psycho-traumatic stress compared to non-athletes (functional, psychological and emotional stress, tough competitive conditions and a stressful lifestyle in general). All these factors lead to emotional dysregulation and autonomic dysfunctions (Schinkea R., Stambulovab N., Sicand G., Moore Z., 2017; Hughes, L., Leavey, G., 2012; Bostania M., Saiiarib A., 2011; Erlikh V.V., Korableva Yu.B., Epishev V.V., Polyakova O., 2018).

Uphill M., Sly D., Swain J., (2016) consider it necessary to study the variables of mental health that positively or negatively affect athletic performance.

The majority of research studies concerns athletic activities, career and personal growth in connection with mental health problems, as well as measures aimed at monitoring and maintaining mental health and preventing mental disorders (Schinkea R., Stambulovab N., Sicand G., Moore Z., 2017; Hughes, L., Leavey, G., 2012; Bostania M., Saiiarib A., 2011). Research on mental health in extreme conditions was carried out in the works of Aleshicheva A.V., (2015), Samoilov M., Aloschycheva A. (2012).

A.V. Aleshicheva, 2015 studied the dependence of mental health on the level of athletic performance. Athletes of the average skill level have fewer mental disorders and better indicators of mental health. With the enhancement of athletic performance from beginners to international class athletes a decrease in the level of mental health was noted, especially in combat athletes. Elite athletes with long-lasting career experience negative changes and mental states such as anxiety, depression, fatigue, etc. The authors revealed a high level of aggressiveness and irritability in athletes that negatively affected their mental health and turned into pre-pathological states.

In the work of I.R. Fazletdinova, R.Z. Fazletdinov, (2008), the influence of sports on the mental health of athletes is noted compared with non-athletes. Athletes are more balanced in a conflict situation, more disciplined and group dependent and less tended to demonstrate outbursts of irritation.

Bostania M., Saiiarib A. (2011) made static comparisons of emotional intelligence and mental health between two groups of students (athletes and non-athletes). It was found that athletes had better indicators of mental and somatic health and lower values of personal anxiety and depression.

A.V. Eganov et al (2016) studied the impact of sports on the mental health of male athletes and non-athletes. It was found that male athletes had significantly better indicators of mental health, namely everyday well-being, adaptability to social conditions, self-confidence, balance of mental health, communicative abilities, success in educational and social activities, and mental health awareness.

N. Kuldeep (2017) investigated the mental health of two groups of athletes who participated in district competitions and national championships. It turned out that athletes who participated in national championships had better mental health than athletes who participated in district competitions.

Schinke R., Stambulovab N., Sicand G., Moore Z., (2017) emphasize the importance of alarming statistics on the mental health of athletes and urge experts to take further action together with sports psychologists, athletes and individuals interested in sports psychology. The authors presented a model of the mental health continuum, identified markers between mental illness, on the one hand, and good health with peak athletic performance, on the other.

There is also a need for studies of mental disorders in elite athletes provoked by external factors and extreme conditions.

The above mentioned reasons emphasize the role of physical education and sports and their influence on mental health, which is currently underestimated. The complexity of research is explained by a multicomponent nature of mental health in terms of structure and content, which requires describing physical, social, moral, professional and psychoemotional components. Moreover, the boundary between these components is hardly to be drawn (Cherepov E.A., 2013; Eganov A.V., Romanova V.S. et al. 2020).

This paper aims to describe the correlation between certain parameters of mental health and their manifestation in female students with different sports performance levels.

Materials and methods.

Experimental data were obtained in the period from 2015 to 2021 in Chelyabinsk on the premises of 2 educational institutions, namely South Ural State University and Ural State University of Physical Education. Mental health assessment was carried out using a self-assessment test with a ten-point scale (Eganov A.V., Erlikh V.V., Bykov V.S., 2013). This test was used in two groups of female students aged from 17 to 24 with a high ($n = 185$) and low ($n = 65$) level of sports performance.

The first group consisted of female students involved in various sports (athletics, aerobics, shaping, step aerobics, dancing, cross-country skiing, sambo, judo, swimming, volleyball, table tennis) with experience of 3 to 12 years.

The second group consisted of first- to third-year female students engaged in physical activities according to the standard PE program (two hours per week); 15% of them did not practice sports on a regular

basis for up to 1.5 years. At the same time, there were no statistically significant differences between the groups in terms of body length, body weight and age ($P \geq 0.19-0.55$).

The results obtained were processed with Pearson correlation analysis, which allowed to identify both the strength of correlation and its orientation. The use of correlation analysis allows identifying cause-and-effect relationships of the studied variables. Calculations of primary data were carried out using the Microsoft Excel analysis package.

Results.

The results were subjected to statistical processing with the Pearson correlation coefficient, which determines the relationship between the variables. Calculations were carried out using the Microsoft Excel software.

Mental health is a holistic phenomenon that has a complex, multi-component and multi-level structure. Mental health starts with mental comfort in general characterized by the absence of mental abnormalities, optimal regulation of the mental sphere, resistance to adverse external factors (Eganov A.V., Bykov V.S., Cherepov E.A., et al., 2015).

Athletic performance is an integral indicator of athletic fitness, including sports achievements expressed in seconds, meters, points, the place taken in the competition, records, etc., which depends on the level of technical, tactical, physical and psychological readiness, personality traits, and mental health.

Athletic performance, which determines the success of sports activity, is a complex integrative feature that depends on various aspects of fitness and achievements in a particular sport (Yusupova, O.V., Voronin A.D., 2018).

In this work, athletic performance was expressed using an absolute 100-point scale from beginner to Olympic champion (Eganov A.V., 2021).

Table 1 shows the correlation between the indicators of mental health in female students with different levels of athletic performance. Five groups were established in terms of orientation and the level of statistical significance between the indicators of mental health in everyday life and sports-related events.

1. Indicators of mental health, which contributed to athletic performance of female students, were revealed in both groups. These indicators include the ability to create a positive emotional field in a group, self-confidence, everyday well-being, adaptation to various stimuli and the integral indicator of mental health (at $P \leq 0.05-0.001$). The dependencies obtained confirm the positive influence of these parameters on the sports performance of female students, regardless of the group. Consequently, the pedagogical influence should be aimed at enhancing these indicators of mental health.

Table 1 – The correlation between the indicators of mental health in female students with different levels of athletic performance

Indicators of mental health, points	Athletic performance	
	high, (n=185), r	low, (n=65), r
1. Ability to create a positive emotional field in a group	0,46	0,27
2. Self-confidence	0,41	0,45
3. Everyday well-being	0,33	0,33
4. Adaptation to different irritants	0,24	0,27
5. Integral level of mental health	0,34	0,22
6. Presence of mental disorders/illness	-0,42	-0,37
7. Symptoms of chronic fatigue	-0,27	-0,32
8. Increased heart rate when doing important tasks	-0,18	-0,27
9. Use of sedative drugs	-0,16	-0,30
10. Wasting too much energy in ordinary tasks	-10,4	-0,30
11. Knowledge of stress-resistance techniques	0,41	0,06
12. Mental health awareness	0,41	-0,10
13. Psychological climate in a group	0,33	0,20
14. Academic, sports- and work-related activities	0,22	0,12
15. Dependence on other people in everyday life	-0,22	-0,08
16. Overestimating one's own potential	-0,19	-0,11
17. Unpleasant sensations in the abdomen, tremor, sweating palms	-0,01	-0,24
18. Releasing stress through smoking and alcohol consumption	-0,08	-0,03
19. Athletic performance	0,12	0,24

2. The indicators of mental health, that negatively affect athletic performance in female students, were revealed in both groups with high and low levels of athletic performance. These indicators include the presence of mental disorders, symptoms of chronic fatigue, increased heart rate when doing important tasks, the use of sedative drugs, and wasting too much energy in ordinary tasks (at $r = -0.14 -0.42$, $P \leq 0.05-0.001$). The data

obtained imply that, regardless of the level of athletic performance, these indicators of mental health negatively affect athletic performance. These indicators can be considered as the limiting factors that determine the level of athletic performance. Pedagogical influence should be aimed at coping with these problems to preserve mental health of students.

Improving mental health and athletic performance requires physical education and sports activities (Kenioua M., Boumasjed Abd Elkader, 2016; Conley CS, Shapiro JB, Kirsch AC, Joseph Durlak JA, 2017), as well as the use of special physical exercises (Winzer R., Lindberg L., Guldbrandsson K., Sidorchuk A., 2018), running, walking (Cherepov E.A., 2013; Eganov AV, Bykov VS, Cherepov EA, Romanova LA, Nikiforova SA, Kokin V.Yu., 2015) and attracting students to various training and competitive events (Dyukov N.V., Skurikhina V.M., 2010; Varambally S., Gangadhar BN, 2016).

3. The indicators of mental health that have a positive effect on athletic performance in female students with a high level of athletic performance and have no significant correlations when it comes to female students with low athletic performance. Female students with a high level of athletic performance compared with the second group demonstrated significant correlations for the following indicators of mental health: mental health level, knowledge of stress-resistance techniques, mental health awareness, psychological climate in the group, academic, sports- and work-related activities. This means that in the group of female students with low athletic performance it is necessary to improve these indicators of mental health.

4. The indicators of mental health that influence athletic performance in female students with a high level of athletic performance and have no significant correlations when it comes to female students with low athletic performance. The following indicators demonstrated significant negative correlations: dependence on other people in everyday life, as well as overestimating one's own potential. These dependencies imply that the higher the level of athletic performance in female students, the less their dependence on people around them in everyday life. At the same time, such female students adequately estimate their capabilities.

5. The indicator of mental health, which does not have significant correlations with athletic performance in both groups, which includes releasing stress through smoking or alcohol consumption. This indicator has little to do with athletic performance.

At the same time, it should be noted the presence of a significant inverse relationship ($r = -0.24$, $P \leq 0.05$) between athletic performance and unpleasant sensations in the abdomen, tremor and sweating palms in the group of female students with low athletic performance. This indicator describes the activity of the autonomic nervous system. This usually signals about dysfunction of the autonomic regulation manifested in such symptoms as numbness and coldness of the extremities, tremor, increased sweating, increased heart rate, etc. In the group of female students with high athletic performance, there was no significant change in the autonomic nervous system.

Thus, the correlation analysis between the groups of female students revealed both similarities and differences associated with mental health. Our results are consistent with the data obtained by Kenioua M. et al. (2016), who described the differences in the level of mental health among athletes and non-athletes. The authors concluded that the group of athletes differed significantly in terms of mental health from the group of non-athletes. This means that sports activities have a positive effect on the level of mental health and, therefore, can be recommended as a means of improving the mental health of university students.

Conclusion.

The correlation structure was analyzed in terms of statistical significance and correlation sign of mental health indicators that influenced athletic performance in female students in the following ways: 1) positively; 2) negatively; 3) positively but only in the group of female students with a high level of athletic performance; 4) negatively but only in the group of female students with a high level of athletic performance; 5) do not have significant correlations with athletic performance in both groups.

The parameters that affect positively athletic performance include: the ability to create a positive emotional field in a group, self-confidence, everyday well-being, adaptation to different irritants, the integral level of mental health, knowledge of stress resistance techniques, mental health awareness, psychological climate in a group, as well as academic, sports and work-related activities. It was found that the higher the level of athletic performance among female students, the less their dependence on people around them.

The parameters that have no effect on athletic performance should include the need for psychological support and releasing stress through smoking and alcohol consumption.

The parameters that negatively affect athletic performance include: the presence of mental disorders, symptoms of chronic fatigue, increased heart rate when doing important tasks, unstable performance of the autonomic system, the use of sedative drugs and wasting too much energy in ordinary tasks. Pedagogical influence should be aimed at eliminating these factors in everyday life.

Therefore, it can be recommended to use preventive measures aimed at conducting special trainings, mastering stress-resistance techniques, building self-confidence and the ability to maintain a psychological climate in a group, to prevent chronic fatigue, to create a positive emotional field and to diagnose the presence of mental disorders.

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