

Stress Sources of Powerlifters Aged 14-23

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Abstract. Athletes are exposed to numerous stress factors, which can have a negative impact on their health, including psychological health. This is especially true for young athletes whose psyche is unstable. The article highlights the factors that prevent powerlifters' successful training and performance in powerlifting competitions for the age groups of 14-23. By assigning a rank by the respondents (n = 128), the highest #1 and lowest #11 values were selected. Data analysis showed that the priority of 3 factors coincided in training and competitive activities: 1) injuries (average score – 1.64 and 1.82), 2) emotional excitement (4.64 and 3.9), 3) physical fatigue (5.09 and 5.18). The following positions during training sessions are: human factor (6.34), unexpected circumstances (6.45), audio interference (6.50), problems with equipment and outfit (6.55), difficult relationships (6.82), the rank and type of competition and preparation for them (6.9), coach/referee assessment (7.09), changing conditions (8.0). At the competitions, subsequent stress factors are distributed as follows: unexpected circumstances (5.64), coach/referee assessment (5.7), rank and type of competition and preparation for them (6.36), human factor (6.82), problems with equipment and outfit (7.0), changing conditions (7.18), audio interference (7.23), difficult relationships (8.64). Taking into account the young powerlifters' sources of stress allows forming the athletes' psychologically healthy attitude to and perception of external changes and circumstances, which largely contributes to the optimization of sports performance and life.

1 Introduction

Sport is an independent subculture that creates conditions for the formation of health, including psychological one.

From a general point of view, scientific research provides a large amount of evidence that there is a strong and multifaceted relationship between mental health and physical performance [1].

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Mental health cannot be separated from physical health, as evidenced by mental health symptoms and disorders increasing the risk of physical injury and delaying subsequent recovery [2].

The relationship between the physical and psychological is close and rather complex; therefore, the topic does not lose its relevance, which is enhanced by scientific research. Within the framework of a sports career, this problem is of an increased interest, as the research result is of utmost importance.

The literature presents a wide variety of studies investigating the close relationship of mental health and sport performance [3].

Most of the research involves adult athletes. It is common knowledge that adolescence is the time of tremendous physical, social and emotional growth, and sports can bring significant mental health benefits to young athletes. [4]. According to Jewett et al [5], engagement in sports can protect adolescents and young people from mental health failures.

Athletic participation during adolescence can play an important role in psychosocial development and can have a significant impact on how individuals react to adversity and social pressures [6].

Findings show that regular exercise in high school is good for mental health [7].

It is possible that consistent involvement in sport during adolescence is important for longer-term mental health in adulthood [8].

Many studies have focused on young athletes' mental health. We should note that athletes experience the same mental health problems as their non-athlete peers. Besides, they experience unique stressors that put them at the risk of developing or exacerbating mental disorders. Sports creates special conditions with various specific problems. A group of researchers [9] provides a list of several factors that affect the mental health of students-athletes. These are such factors as physical injury, overtraining, concussion, sleep disturbances and social identity, etc.

Athletes engaged in competitive kinds of sports experience stress of various degrees. A number of factors may contribute to the development, severity, and persistence of sports-related anxiety [10]. The life of an athlete is not limited to sports activities; it is much more versatile, despite the maximum involvement in a sports career. Athletes may encounter traumatic experiences from inside or outside of sport, and such experiences may range from sport injuries to life events independent of a sport injury [11]. This circumstance is an important aspect to be taken into account when studying stressful situations in sports activities.

This article continues the study of stress factors influencing powerlifters, namely in the activities of young athletes – adolescents aged 14-18 and juniors aged 19-23.

The purpose of our study was to determine the value of stress factors in the training and competitive activities of 14-23-year-old athletes-powerlifters.

2 Materials and methods

2.1 Procedure

The study data were collected during the competitions, soon after the performance on the platform. This is quite important for the organizers of the study. Immediately after the competition, the athletes are no longer focused on the results and the questionnaire cannot bring down their sports mood. Besides, we see a significant advantage in the fact that the comparison of competitive and training conditions is more informative precisely within the framework of the competition than during the usual training sessions.

2.2 Participants

The questionnaire survey involved 152 athletes aged 14 to 23 involved in powerlifting. The questionnaires that were incorrectly completed were excluded from the data analysis. The sample included 128 questionnaires (60 female, 68 male). Experience in sports is from 1 year to 8 years. Sports qualification ranged from the 2nd sports category to the sports title “Master of Sports of Russia”.

The authors of the study obtained verbal consent from the athletes’ parents to complete the questionnaire. This does not violate the rights of young athletes under 18 years old.

Data collection took place during the competitions at the Russian Championships in powerlifting among youths and juniors for three years: from February 27 to March 3, 2019 in Moscow, from March 15 to March 19, 2020 in Arkhangelsk and from May 15 to May 18, 2021 in Suzdal. Such a selection is justified, since it makes it possible to consider stress factors from different perspectives in subsequent studies: gender, athlete qualifications; to conduct a comparative analysis of the significance of stress factors with other age groups (adults, veterans), etc.

2.3 Research methods

To identify the influence of stress factors, we modernized the questionnaire, which was presented by the authors (G. Ldokova, K. Volkova, O. Razzhivin) in their studies of powerlifters’ stress factors earlier (2014-2016) [12-14]. The questionnaire contains 11 sources of stress, taking into account training and competitive activities. In the course of the survey, the respondents ranked the factors according to the degree of significance of their influence on the athlete. The factor that is most significant for the athlete was assigned the highest rank #1, and the factor with the least influence was ranked #11.

The novelty of this questionnaire is that it modernizes the indicators (criteria) of stress factors, taking into account the age group of the respondents and regularly changing requirements in powerlifters’ training. The proposed factors combine material and spiritual orientation, thereby having a significant impact on the athletes’ psychological health. The peculiarities of the questionnaire include the fact that it offers situations, circumstances that are not related to a sports career (for example, personal relationships), but create conditions for stress.

This questionnaire allows identifying the general trend of stress, which is very informative for the coach’s work. The proposed stress factors reflect the conditions for performing activities that disrupt the training process or behavior at the competitions.

The questionnaire that the respondents were to fill out presented interferences with some examples so that they could understand the meaning of the stress factor. Thus, “emotional excitement” means anxiety, restlessness, inner tension; “physical fatigue” means fatigue, tight training schedule, frequent trips to competitions; “assessment of the coach/referee” is subjective, biased towards the athlete’s actions; “unexpected circumstances” imply an emergency situation, a change in the training or competition schedule; “changing conditions” are moving to or competing in a different city, country, climate or time zone; “rank and type of competitions and preparation for them” means that the higher the status of the competition is, the greater is the significance and responsibility during training at the competition; “problems with equipment and outfit” relate to the quality; “audio interference” includes calls, unpleasant or loud music during training or competitions, people talking, noise in the hall; “injuries” mean injuries that limit performance and disrupt the functioning of the body; “difficult relationships” are those in the family, with a partner, in education or at work; “human factor” refers to the presence of

strangers who are not related to sports, a large number of trainees, advice from strangers and other athletes.

The analysis identified priority positions among the factors that impede young powerlifters in their sports activities.

The study was based on the analysis of scientific literature on the research problem, observation, conversation, and questioning.

The identification of the stress factors significance proposed to athletes for assessment was carried out based on calculating the arithmetic mean, after which the list of sources of factors causing stress was ranked.

3 Results

The results of calculating and ranking the data of the entire sample are presented taking into account training and competitive conditions (Table 1).

Table 1. Young powerlifters' stress factors hierarchy

Stress factors	at the training session		during competitions	
	rank	mean value	rank	mean value
Emotional excitement	II	4.64	II	3.9
Physical fatigue	III	5.09	III	5.18
The coach/ referee assessment	X	7.09	V	5.7
Unexpected circumstances	V	6.45	IV	5.64
Changing conditions	XI	8.0	IX	7.18
Rank and type of competitions and preparation for them	IX	6.9	VI	6.36
Problems with equipment and outfit	VII	6.55	VIII	7.0
Audio interference	VI	6.50	X	7.23
Injuries	I	1.64	I	1.82
Difficult relationships	VIII	6.82	XI	8.64
Human factor	IV	6.34	VII	6.82

The most significant factors (three indicators) during training and at competitions from the point of view of young powerlifters have been considered and analyzed in detail. Surprising is the fact that the first three ranks are occupied by the same indicators, both in the training process and in competition conditions. All these indicators, in our opinion, are interconnected.

According to the previous studies [15], the choice of stress factors made a significant difference between training and competitive activities. In this work, we can attribute this circumstance to the features of the study, and it is advisable to consider it when providing psychological support to young athletes involved in powerlifting.

4 Discussion

4.1 "Injuries" as junior powerlifter's dominant stress factor

The analysis of the results shows that the most significant stress factors for young powerlifters are injuries (during training, the average score is 1.64, during the competition – 1.82). We must note that any professional sport is eventually accompanied by injuries of varying degrees of complexity. Elite sports always require significant physical and

psychological load, and traumatic situations are almost inevitable. Injuries are unfortunately common in sports and pose a threat to the athletes' short-term and long-term health [16].

A sports injury has both physical and psychological consequences for an athlete. A common post-traumatic psychological reaction is an increased fear of re-injury [17].

In powerlifting, an athlete deals with large and even prohibitive weights, which, if certain principles are not observed, including those related to the desire to get the best result faster, can harm the body and endanger life. This is most typical of the studied age group, when youthful maximalism and a desire to prove leadership often lead to irreparable mistakes. Immediately following the diagnosis of a serious sports-related knee injury, female athletes age 13 to 23 years old report decreased QOL up to 6 months following the injury [18].

The athletes' functional training and the anatomical features of the body structure play an important role in this matter. For the developing organism, this issue is the most significant, since the anatomical and physiological contradictions of the organism formation during this period require the strict fulfillment of all the requirements and instructions of the coach, who organizes the training process taking into account all the age characteristics of this period. Injuries during the training process can also be caused by: an incorrectly and irrationally drawn up daily routine (combination of athlete's training sessions and rest), inconsistency of physical activity with the body's capabilities, improperly prepared sports equipment, failure to follow the recommendations of the coach and healthcare staff, lack of self-control and self-regulation skills when the young athlete is injured. Young age does not allow estimating the consequences of the injury fully: the young athlete is afraid of missing an important competition, a whole season, and as a result, it may lead to psychological demoralization.

During the competition, the injury in most cases leads to the termination of participation in the competition or to the demonstration of poor performance. Powerlifting is one of those sports in which an injury (stretching of the ligaments and muscles, damage to the tendons) does not allow achieving the desired result. Experienced triathletes, overcoming pain and mastering the skills of self-control, can go on to the platform, which is not typical of young men and juniors. Physical injury at competitions can lead to psychological trauma, especially during the period of unstable emotional and volitional sphere of adolescence and juvenility in the form of a decrease in motivation for victory. All this is very important for young athletes, because as a result of the injury, the affective and cognitive systems are deformed at all levels, from physiological to the general picture of the world and the image of one's "I". The athletic identity of athletes increases from late childhood to adolescence and remains elevated into young adulthood unless the individuals terminate competitive sport involvement, in which case athletic identity decreases [19].

An injured athlete usually has to deal with the emotions and stresses that come with worrying that the injury will prevent them from playing, or worse, prevent them from competing in the biggest event of their sporting career – the one they have been preparing for years [20].

In this regard, sports injury research raises the question of the need to take into account the expectations, the athlete's ideas about what it means to "be injured", and understanding the scope of pain in each specific sport. The kind of sport (team or individual) significantly affects the reaction of the player to an injury and its consequences for both the player and the team. Support from other players, the creation of conditions under which an injured player can be in demand, the right team contribute to his speedy recovery and rehabilitation [21].

4.2 Analysis of the “emotional excitement” stress factor

The next position in the hierarchy of stress factors is occupied by emotional excitement (during training – 4.64, at competitions – 3.9). Adolescence and juvenility are a period when individual variability of emotional behaviour is clearly expressed. In the emotional sphere, as well as in the cognitive one, there is still considerable uncertainty about the choice of forms of behaviour. New feelings have already arisen, though have not yet found adequate ways of expression and self-control. The motivational situation is characterized, on the one hand, by the desire for independence and self-respect, and on the other hand, by a collision with regulation and the expectations of others [22]. This contradiction draws young people into an internal conflict with themselves, when something does not work out or the success of those who train next to them is more significant, or even into a conflict with the coach. Nevertheless, playing sports allows the athlete to concentrate and develop subjective feelings that aim at completing the task, the exact implementation of the coach's instructions, and success contributes to the formation of generalized feelings and self-control skills.

During the competition, the feeling of excitement is typical of all age groups, but it is super significant for the juniors. Today's young athletes are getting stronger and more resilient as compared to the previous generations. An evidence to it is given in an interview with O. Razzhivin, the head coach of the youth team of the Russian Federation in powerlifting, Honored Coach of the Republic of Tatarstan. This is due to the changing training methods, innovative technologies that coaches use, the athletes' personal qualities aimed at winning. As a result, best juniors get into the adult team. However, any level of competition involves great responsibility, which leads to internal tension and anxiety. Sports-related performance anxiety is common, especially in young female athletes, and the severity and persistence of its signs and symptoms is influenced by multiple factors [23].

When emotions are interpreted as pleasant, they can contribute to performance, but when perceived as unpleasant, they can get in the way [24]. Negative emotional states are manifested in the fact that the athlete loses confidence in his abilities, the sharpness of tactical thinking decreases, excessive excitement occurs, or, conversely, inhibition, apathy, and it is difficult for athletes to manifest volitional qualities: courage, determination, initiative, independence [25]. All this implies the need for young athletes' serious psychological preparation for competitions, the formation of self-control skills, the consolidation of protective psychological mechanisms in a situation of significance and uncertainty.

4.3 Analysis of the “physical fatigue” stress factor

Next in importance is physical fatigue (fatigue, tight training schedule, frequent trips to competitions). During training, the average score is 5.09, in competition it is 5.18. Fatigue as a mental state involves a temporary decrease in performance. The causes of fatigue can be both external and internal. The results that powerlifters show today are much higher than those that were previously considered to be records. This is a natural process of the sports dynamic development. However, the fatigue that occurs during adolescence can be unsafe for a developing organism. During training, a number of age-related circumstances can lead to fatigue: a decrease in energy resources in working muscles as a result of a sharp increase in the volume of muscle work, a violation of homeostasis, a change in nervous and hormonal regulation, individual characteristics, etc.

Continuing to perform muscle exercises against the background of chronic overwork causes overstrain. In this condition, as a rule, athletes often refuse to perform exercises, complain of pain or tense sensations in the region of the heart and liver. The general state of

health worsens: athletes may experience shortness of breath, pallor, cold sweat. In most cases, their performance drops dramatically [26]. The training process in powerlifting should be under strict control by specialists: a trainer and a doctor. The daily routine, training schedule, load dynamics, competition schedule should work to preserve the young athlete's mental and physical health and help to achieve the maximum training effect.

It should be borne in mind that in powerlifting and during competitions, athletes perform exercises with heavy weights, therefore, the recovery of the body, both physiological and psychological, is slower. Various reasons can also lead to fatigue during the competition period: lack of or insufficient time to adapt to a new gym, climatic conditions, a different time zone, restoring resources after training; maximum setting for victory without taking into account the young athlete's physical and moral capabilities; management style of the coaching corps, etc.

This is accompanied by a tension in compensatory mechanisms, difficulty in recovery processes, slow development of fitness, less successful performance in competitions, a disappointing outlook for prospects, and, finally, a halt in the growth of sportsmanship due to the exhaustion of the body's genetic reserve [27]. Of great importance for a young athlete is the maximum psychological, technical and tactical preparation for competitions, mastering the skills of restoring the body and the skills of self-control and self-regulation. The role of the coach in this process is undeniable, as the coach takes into account the functional capabilities of the body, changes in the athlete's physiological state; determines not only training loads, methods and means of training, but also the technical execution of exercises in competitions. The joint efforts of the coach and the athlete will help to overcome both fatigue and excitement, restore strength in the shortest possible time and mobilize efforts to achieve a high result.

4.4 Non-priority stressors

The next positions during training sessions were human factor (6.34), unexpected circumstances (6.45), audio interference (6.50), problems with equipment and outfit (6.55), difficult relationships (6.82), rank and type of competition and preparation for them (6.9), coach/referee assessment (7.09), change of conditions (8.0). At competitions, subsequent stress factors ranked as follows: unexpected circumstances (5.64), coach/referee assessment (5.7), rank and type of competition and preparation for them (6.36), human factor (6.82), problems with equipment and outfit (7.0), changing conditions (7.18), audio interference (7.23), complex relationships (8.64).

5 Conclusion

The practice of sports has shown that high performance in powerlifting is mainly achieved by those athletes who started training with a barbell as teenagers. In this regard, an indispensable condition for training young triathletes is the full use of means that ensure comprehensive physical development and consideration of individual typological characteristics and capabilities of the body, the creation of conditions leading to adaptation to stress factors and mastering self-regulation skills.

Taking into account young powerlifters' stress factors allows forming young athletes' psychologically healthy attitude to and perception of external changes and circumstances, which largely contributes to the optimization of sports performance and life.

Our empirical study made it possible to analyze young powerlifters' stress factors at the stage of their sports development, to outline ways for further consideration of the problems concerned with young athletes' professional improvement.

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