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Psychological impact of sports injuries and psychological well-being in relation to sports performance in competition gymnasts

KEY WORDS:
Psychological impact. Sports performance. Sports injuries. Psychological well-being.

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ABSTRACT

Investigations with athletes who have suffered injuries have always been associated to the physical aspects of the injury, and there has not been enough investigation on its psychological aspects and how they affect athletes' lives. The present paper examines the relationship between the psychological impact of a sport injury, psychological well-being and sports performance, before and after the injury, in 14 female gymnasts aged between 12 and 18 years old. Before the sport season begun, an adapted version of the Rating of Perceived Effort assessed the perceived psychological impact and the Spanish version of the Scale of Psychological Well-Being was used to assess psychological well-being. At the end of the season, the performance of the athletes, was compared to the results of the last season before the injury. Results were analyzed using descriptive and inferential statistics and showed a significant improvement in the overall athletic performance in the aftermath of the injury with respect to the previous season. However, there were no significant correlations between sports performance and the psychological well-being or the perceived psychological impact of the injury. Conversely, the results showed a positive relationship between the perceived psychological impact and the personal growth dimension of psychological well-being.

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Impacto psicológico das lesões desportivas e bem-estar psicológico em relação ao desempenho desportivo de ginastas de competição

RESUMO

Investigações com atletas que sofreram lesões têm sido sempre associadas ao aspecto físico das lesões, não existindo suficiente investigação sobre os seus aspectos psicológicos e como isso afeta a vida dos atletas. O presente artigo analisa a relação entre o impacto psicológico de uma lesão desportiva, bem-estar psicológico e desempenho desportivo antes e depois da lesão em 14 ginastas, com idade entre os 12 e os 18 anos de idade. Antes do início da temporada desportiva, foi utilizada uma versão adaptada do *Rating of Perceived Effort* para avaliar o impacto psicológico percebido e a versão em espanhol da *Scale of Psychological Well-Being* para avaliar o bem-estar psicológico. No final da época, o desempenho desportivo dos atletas foi comparado com os resultados da última época antes da lesão. Os resultados foram analisados por meio de estatística descritiva e inferencial, revelando uma melhoria significativa no desempenho atlético em geral, depois da lesão em relação à temporada anterior. No entanto, não foram encontradas correlações significativas entre o desempenho desportivo e o bem-estar psicológico, ou o impacto psicológico percebido da lesão. Não obstante, foi identificada uma relação positiva entre o impacto psicológico e a dimensão do crescimento pessoal do bem-estar psicológico.

PALAVRAS-CHAVE:

Impacto psicológico. Desempenho desportivo. Lesões desportivas. Bem-estar psicológico.

INTRODUCTION

Competitive sport is one of the areas where most sports injuries originate. Sometimes they are considered as something usual in elite sports, regardless of their particularities. All who engage in professional practice in sport area should understand the injury from the athlete's stand point and evaluation, which is determined by various aspects, mainly subjective or personal in nature. Along this line, from the 70's on there has been a wide range of research on the most important theoretical and empirical psychological aspects of injuries. Accumulated empirical evidence has suggested that psychological factors play a significant role in injury occurrence and recovery [11].

The main contributions of the research on sports injuries and psychological factors are exposed in the work of the Global Psychological Model of the Sportive Injuries [11], which constitutes the theoretical framework of this research. This model embraces the main theories of previous models [1, 3, 5] as well as theories based on the process of stress and pain, namely the Integrated Model of Response to Sport Injury and Rehabilitation Process [16], which sustains that cognitive and emotional response is reflected in the recovery process.

The main contribution of the present study is to introduce a new concept that was not previously considered within the field of sport psychology: the psychological impact of sport injury as perceived by the athlete. From the examination of previous studies [7, 8], emerged the need of unifying the most researched psychological factors in the field of sports injuries. Moreover, it was considered that a new concept could properly represent the perception of the athlete about his injury. Specifically, the present investigation approaches the injury from a psychological perspective and looks at the possible relationships between the perceived impact of injuries sustained previously and the state of psychological well-being, with regards to subsequent athletic performance.

The psychological impact refers to the emotional impression left by an event. In sports, an athlete's perception of his injury, both objectively and subjectively, can affect his or her general state of well-being. The existence of an injury may influence the perception of general and emotional health [10], but among the psychological well-being factors investigated, the 'environmental mastery' was the most negatively related to the perceived psychological impact [8]. This is reflected in the area of sports performance, where investigations about the performance psychological profile of athletes suggests that they mentally prepare themselves for the competition [9], while others studies propose that the athlete's perception of autonomy in decision-making is closely related to their psychological well-being [12].

In this line, Ryff [13] highlighted the importance of the relationship between athletes' expectations of psychological well-being and their achievements, developing a multidimensional model of psychological well-being called Integrated Model of Personal Development, composed of six dimensions: self-acceptance, positive relations, autonomy, environmental mastery, purpose in life and personal growth. This model derives from the positive psychology framework [14] and was recently introduced in the field of the sport psychology. It is a different approach from the clinical approach, which is, currently, the most investigated framework.

According to Ryff's model, it would be logical to think that the impact of having suffered a sports injury would subsequently affect well-being and athletic performance. Accordingly, in a recent case study [7], some psychological factors undergone relevant changes during the period of rehabilitation after the recovery of a football injury, influencing performance. On the other hand, it is possible that the state of psychological well-being could act as modulator and help improve athletic performance. At the same time, one could possibly conceive and improvement or decline in performance as an indicator of psychological well-being. In this manner, the emotional process that the injury has triggered can be considered a relevant aspect. The valuation of this process will determinate the psychological impact of the injury, how it influences the athlete's state of well-being, and how it could affect future sports performance.

Accordingly, the purposes of this paper were: (a) Keep a record of the time frame in which the athlete had remained at rest or in rehabilitation due to the injury, (b) to assess the degree of psychological impact and the psychological well-being of the participants in the season after having recovered from a sports injury, (c) to examine the results of sports performance at the end of the competitive season as compared to performance during the season prior to the injury; and (d) to analyze the relationship between the perceived psychological impact of the injury and psychological well-being, with regards to the differences in sports performance.

MATERIALS AND METHODS

PARTICIPANTS

The participants were 14 female gymnasts, aged between 12 and 18 years old. They belonged to the category of 6 to 10 of the Olympic track. Table 1 presents some data regarding the participants.

TABLE 1 – Data summary of the participants.

N=14	AGE	COMPETITIVE EXPERIENCE	CATEGORY*
1	15	4	8
2	15	6	10
3	13	6	9
4	18	10	10
5	14	5	9
6	15	8	8
7	13	5	9
8	18	4	10
9	14	5	7
10	15	8	10
11	13	7	7
12	14	6	9
13	15	5	8
14	12	7	6

* Category from 6 to 10

INSTRUMENTS

Figure 1 displays an adapted version of the Rating of Perceived Effort [2] designed to assess, like a subjective perception score, the perceived psychological impact of an injury. The participants reported the degree to which their injuries had affected their lives using an 11-item scale ranging from 0 (*No impact*) to 10 (*The worse impact*).

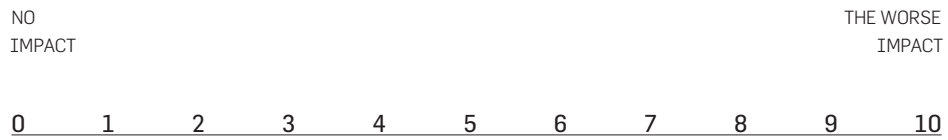

FIGURE 1 – Analog scale elaborated to assess the psychological impact.

The duration of the injury in weeks was also measured.

A Spanish version [4] of the Ryff's Scale of Psychological Well-Being [15] was used to assess the psychological well-being. This scale is composed of 29 items divided by six dimensions: self-acceptance, autonomy, environmental mastery, personal growth, purpose in life and positive relations. An example of an item is: "I have clear direction and the goal

of my life". (see Annex). Respondents rate their level of agreement with each item using a six-point Likert-type scale ranging from 1(Completely disagree) to six (Completely agree). Sports performance was registered at the end of the competitive season. These results were compared to the results of the season before the injury, and the mean difference between the two scores was used as an indicator to assess the improvement in performance.

PROCEDURES

This study was approved by the Bioethical Committee of a Spanish university. We selected gymnasts who had suffered sports injuries throughout previous season. Participation was voluntary and the researches obtained consent from the parents of each child.

Before the sports season began, the psychological impact of the injury and the psychological well-being of the athlete were assessed. The duration of the injury was taken into consideration. At the end of the season, the performance of the athlete was compared to her performance results on the last season before the injury. Performance results pertained to the most important competitions of the season, namely the Spain Cup and Artistic Gymnastics Individual Spain Championships.

RESULTS

Table 2 shows the level of psychological impact perceived by the participants, and the frequency with which different athletes assessed the same degree of psychological impact with regards to the duration of their injuries (measured in weeks). Results showed that athletes with different injury durations could perceived similar levels of psychological impact, and, inversely, that different levels of perceived psychological impact were reported by athletes with the same injury duration.

TABLE 2 – Level of the psychological impact, rated frequency and duration of injury (weeks).

LEVEL PSYC. IMP	FR. PSYC. IMP	DURATION (WEEKS)
2	1	96
3	1	4
5	2	4; 12
6	1	20
7	4	4; 12; 16; 48
8	3	8; 24; 32
9	2	8; 20

Table 3 presents the mean levels of psychological well-being. The highest levels of psychological well-being were related to 'positive relations' and 'autonomy'.

TABLE 3 – Mean levels of psychological well-being (SPW).

N = 14	Mean	SD
Psychol. well-being		
Self-acceptad	16.21	4.34
Autonomy	21.86	5.96
Control of environment	21.29	3.87
Purpose of life	20.71	5.77
Personal growth	18.50	1.83
Positive relationships	26.07	3.73

Table 4 presents the mean levels of performance (comparison of sports performance before and after the injury). The results indicated an overall better performance after the injury in all apparatus, but the student's t test (degrees of freedom and probability associated with the null hypothesis) only showed significant differences with regard to the total performance, the vault and the floor apparatus.

TABLE 4 – Mean levels of performance and significant differences between performance before and after the injury.

APPARATUS	PERFORMANCE BEFORE	PERFORMANCE AFTER	MEAN	SD	T	GL	P
Vault-post-ant	10.3	12.9	2.6	3.99	2.43	13	.030*
Uneven-post-ant	9.5	11.1	1.6	3.43	1.85	13	.088
Beam-post-ant	9.9	11.5	1.6	3.20	1.94	13	.074
Floor-post-ant	8.7	11.6	2.9	4.52	2.37	13	.034*
Total perf-post-ant	38.4	47.1	8.7	24.22	4.50	13	.001*

Table 5 shows the relationship between the mean difference in performance, psychological impact and the duration of the injury. There was no significant relationship between these variables.

TABLE 5 – Pearson correlations between mean difference in sport performance, the psychological impact (PI) by the athlete and the duration of injury (DI).

N = 14	MEAN DIFFERENCE IN PERFORMANCE	PI	DI_(WEEKS)
Mean Performance	1	-.02	-.13
PI		1	-.41
DI_(Weeks)			1

Table 6 shows the relationship between the difference in performance, psychological well-being and psychological impact. There was no significant relationship between sport performance and psychological well-being; however, the results showed that psychological impact was positively correlated with the personal growth dimension of psychological well-being.

TABLE 6 – Pearson correlations between mean differences (MD) in performance, perceived psychological impact (PI) and the dimensions of psychological well-being.

N = 14	PERFOR	SELF-ACC	AUTONOMY	CONT. ENV	PERS. GROW	POSIT. REL	PURP. LIFE	PSYC. IMP
Perform	1	-.43	.08	.09	-.26	.30	-.34	-.02
Psyc. Imp	-.02	-.11	-.25	.39	.010**	-.37	-.02	1

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed.

DISCUSSION

The present study investigated the perceived psychological impact of sport injuries, the level of psychological well-being, and the performance at the end of the season in comparison to the performance in the season prior to the injury. Its specific purpose was to analyse the relationship between these variables, framed under a model that allows a greater understanding of this field of study [11].

Results showed a significant improvement in post-injury performance, high levels of perceived psychological impact and low levels of psychological well-being, but no relationship between these variables. These results suggest the possibility that there are other performance-related factors associated with injuries. For example, motivation was found, in another study [7] as one of the psychological factors that undergone relevant changes during the period of rehabilitation after the recovery of an injury.With regards to the perceived psychological impact, one might think that the degree of psychological impact should be proportional to the severity of the injury, (considering time as an objective aspect). However, the results of the present study showed different levels of perceived impact in injuries with a similar duration, as well as athletes who experienced the same level of psychological impact in injuries with different durations. These results suggest that the perceived psychological impact can be valued on the basis of personal or subjective criteria rather than on the objective aspects of the injury.

From this perspective, these results hinder the establishment of a clear line between what can be considered medical or not [8]. Accordingly, this may explain the different points of view frequently held by athletes, coaches and other influential persons in this domain who are affected by several aspects of the relationship between the psychological and physical aspects of the injury, making it difficult to make decisions about the active participation of the athlete. The psychological assessment of the athlete, which sometimes is opposed to the classical medical approach, is especially relevant in this matter. This is because the injury is not something the athlete suffers within a particular time span, but as a whole process in which personal and situational factors are involved and influence the overall response of the athlete [16].

Along these lines, researchers should consider retrospectively assessing the athletes' injuries process, capturing the experiences as a whole. This implies considering not only the downsides, such as pain or disability, but also the positive aspects of learning and control, as athletes overcome their injuries. In comparison with the isolated assessment at the time of the injury, this type of assessment provides athletes with a broader perspective. In addition, it could favour the perception of the athletes about their skills to cope with an injury later on, which could be particularly relevant to their psychological well-being and, possibly, to their future performance. In this way, and taking into account some considerations [13], the perceived impact of an injury could also point to the assessment that the athletes make about their ability to deal with that injury [8]. In this way, high levels of perceived psychological impact could become a challenge for the athlete when developing the capacity to face the injury. This approach could support the results of the present study, namely regarding the improvement that occurred in performance regardless of the athletes' level of perceived impact, as well as, with regard to psychological well-being, one of the highest score in 'autonomy', a proven dimension in another study as a present feature among high levels athletes [12].

In sum, injured athletes can move towards wellness trying to relieve the negative physical effects of the injury, but also by developing their personal skills. Thus, the injury could be considered as an element in the quest for personal development, the subjective or personal assessment can reflect the meaning of the injury for the athlete. This approach

would support the positive relationship found between perceived impact and the personal growth dimension of psychological well-being, as well as the improvement occurring in the performance regardless of the level of general psychological well-being.

As a conclusion, the present study indicates a significant improvement in the overall athletic performance in the aftermath of the injury with regards to the previous season. On the other hand, there were no significant correlations between sports performance and psychological well-being or the psychological impact of the injury. However, the results showed a positive relationship between the perceived psychological impact and the personal growth dimension of psychological well-being.

Finally, this study presents limitations with regard to the sample. Further studies should analyse of other sports and broader samples. Future research should also investigate other psychological variables associated with performance-related and sports injuries.

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