

Perception of Stressors and Psychological Tension in Game Situations: Differences Between Injured and Uninjured Pitchers

Jesús Ríos Garit^{1*}, Yanet Pérez Surita², Yasel Rodríguez Alfonso³, Yoanni Soris Moya³ and Roswel Borges Castellanos³



¹Provincial Sports Medicine Center of Villa Clara, Cuba

²Central University "Marta Abreu" of Las Villas, Cuba

³Provincial Sports Medicine Center of Villa Clara, Cuba

*Corresponding author: Jesús Ríos Garit, Provincial Sports Medicine Center of Villa Clara, Cuba

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ABSTRACT

Introduction: The aim of the research is to identify differences in stressors' perception and potentially stressful situations regarding the injury history of the 24 baseball pitchers who are members of Villa Clara's pre-selection team.

Material and Methods: A predominantly quantitative mixed study was carried out, also using descriptive statistics. The Sports Aspects and Injuries Questionnaire and the Brainstorming were used, and an ad hoc questionnaire was designed. The age of the pitchers ranged between 18 and 33 years, with a mean age of 22.38 (SD = 3.80), and a sporting experience between 6 and 21 years, with a mean of 12.63 (SD = 3.52).

Results: There was a marked presence of psychosocial stressors related to little social support from coaches, teammates, and referees, as well as stress-generating situations made up of elements related to the adverse result of their activity, the significance of the game, the talent of the opponent, and the moments of the game, being the beginning and the end those that cause a greater tension in these pitchers. The pitchers who have been injured experience a greater degree of stress in situations that compromise their performance.

Conclusions: The pitchers who have been injured experience high levels of psychic tension during various unfavorable game situations, which guides the need to implement direct and specific psychological preparation for competitions.

Introduction

The Sport Psychology has focused primarily on the analysis of the athlete's psychological factors with a marked focus on performance, however, several authors [1-8] have focused the psychological analysis of sport from a perspective that encompasses both well-being and the result, based on the principle that the sports psychologist must have a vision of health and performance as referred to by Palmi [9]. One of the most relevant psychological phenomena from a health perspective is undoubtedly stress, which can have negative consequences on the performance and health of the athlete. According to Zurita [10], the response to stress is

produced automatically by the body in the face of any external or internal change, by means of which it prepares to face the demands inherent in the new situation. The according to Williams and Andersen [11], if an athlete approaches competition as something exciting and fun, they may be more likely to take advantage of the benefits of stress that can help them stay focused on the task and in flow, thus avoiding negative consequences on health and sports performance.

In relation to the above, Gonzalez, et al. [12] expresses that in sports games, "the high psychic burden" caused by various factors

such as the number of players, the different emotional reactions, the accidental unforeseen events that translate into “psychological barriers for the athlete”; the influences of the refereeing, and of the spectators, generate a psychological load from which the teams in general and the players in particular do not escape. These elements can be considered as typical or common stressors of sports games, among which is baseball considered a national sport in Cuba. In this sport, the pitcher’s position is undoubtedly the one that receives the greatest psychological pressure during matches, since it is recognized that a high percentage of the result depends on the pitchers’ performance. Several authors [13-17] consider that the performance of a baseball pitcher is strongly conditioned by the level of psychological preparation to face the demands of his work. In this sense, Alvaredo [18] expresses that this sporting activity is strenuous due to the high probability of experiencing potentially stressful situations, some of which have been studied by González and Padilla [19], concluding that pitchers face situations of different levels of technical and tactical complexity, to which a certain degree or level of psychological pressure is inherent.

Taking the Stress and Injury Model [11] as a reference, it is evident that baseball pitchers have an inherent vulnerability to their activity, since the risk of injury is high as long as the psychological preparation is not sufficient to face the tensions derived from the multiple stressors and potentially stressful situations that frequently occur in each game during competitions [3]. In this sense, Diaz, et al. [20] found that life events and stressful sports circumstances influence the increase in vulnerability to injury, especially when both variables are measured in relation to the same time period, while a study carried out in tennis players other authors found relationships between the degree of experienced psychological stress and the negative evaluation of this stress with the type and severity of injuries [21]. Despite this, several studies have shown that in a general sense athlete have an inadequate perception of the psychological history of injuries [22-24] and specifically other authors [3,4] have obtained similar results in baseball pitchers. Olmedilla, et al. [24] refer that a perception adjusted to reality can be a form of injury prevention in terms of psychological factors antecedents of injuries, for which it is vitally important that athletes perceive situations that can trigger stress during games conditioning a maladaptive response leading to injury.

Based on the above, the following are proposed as objectives:

1. To describe the injury history of the athletes analyzed.
2. To identify perceived stressors and potentially stressful situations.
3. To determine the perception of the degree of mental tension that potentially stressful situations generate in the pitchers under study.
4. To compare the level of perceived tension in potentially stressful situations in relation to the history of injury.

Material and Methods

A predominantly quantitative cross-sectional mixed study was carried out where the benefits of the qualitative and quantitative research paradigms are used, but the study is developed under a dominant approach. All measurements were made at a single moment in time.

Subjects

The population under study is made up of 24 high-performance baseball pitchers who are members of the Villa Clara team’s preselection for the national series 60 corresponding to the year 2020. The age of the pitchers ranged between 18 and 33 years, with a mean age of 22.38 (SD = 3.80), and a sports experience between 6 and 21 years old, with a mean of 12.63 (SD = 3.52).

Instruments

- a. The Sports Aspects and Injuries Questionnaire was applied to record the injuries and the sociodemographic and sports characteristics of the athletes [25].
- b. The Brainstorming technique was used in order to identify stressors and stress-generating situations in the group of pitchers studied [26].
- c. A specific ad hoc questionnaire was designed with the 23 stress-generating situations identified by the athletes through brainstorming, which was applied to determine which ones are considered potentially stressful and the degree of tension they generate. A liker scale was designed where 1 = nothing and 5 = a lot. Their evaluation method was based on the response to the item.

Analysis of Data

The information obtained of a qualitative nature was subjected to a general analysis process that consists of recording the expressions and situations as they appear in reality to later initiate a process of data reduction followed by the provision and transformation and then arrive at obtaining and verification of conclusions. For a better understanding of the results, a quantification of the qualitative data is carried out using the analysis of frequencies and percentages, as well as descriptive statistics such as the minimum, the maximum, the mean, the standard deviation and the t-test for independent samples considering a 95% confidence interval ($p \leq 0.05$). Measurable data are statistically processed using IBM SPSS software for Windows version 25.0.

Ethical Considerations

In order to carry out the study, the informed consent of the participants was requested and the approval of the Scientific Council of the Provincial Center of Sports Medicine of Villa Clara, Cuba, as well as the endorsement of the Research Ethics Committee was received. At all times, the ethical precepts of scientific research established by the world medical organization contained in the Declaration of Helsinki were complied with.

Results

(Table 1) shows that most pitchers have been injured during competitions, although the number of injuries sustained is predominantly low and most have suffered moderate serious injuries. (Table 2) shows the results obtained through brainstorming. Inadequate exercise of criticism by coaches, adverse and inadequate environmental conditions of the terrain, different moments of play, negative influences from teammates and unfavorable arbitral decisions are the most collectively significant stressors. (Table 3) shows the descriptive results of the degree of

psychic stress generated by different game situations and stressors. Through the application of the designed questionnaire, it was obtained that the high relevance of the game, the low confidence of the coaches in their skills in difficult times, the high quality of the batsmen faced consecutively, having men in scoring position and the low control of the pitches are the events that generate the most tension during the games. (Table 4) shows that pitchers who have been injured experience greater psychological tension when facing the best rival offensive run, having men in scoring position, pitching with full bases, making a mistake that compromises the result, and when they fail to succeed by having men in circulation.

Table 1: Description of injury history.

Variables		Frequency	Percentage
Antecedent of injury	No	9	34,6
	Yes	15	57,7
Context	Training	6	40
	Competing	9	60
Number	One injury	10	66,7
	Two injuries	4	26,7
	More than two injuries	1	6,7
Severity	Minor injuries	6	40
	Moderate injuries	7	46,7
	Serious injuries	2	13,3

Table 2: Distribution of stressors identified by pitchers.

Stressors	Frequency	Percentage	
Psychosocial	Negative influence of the coach	24	100
	Negative influence of teammates	10	41.66
	Negative influence of referees	10	41.66
	Negative influence of managers	8	33.3
Environmental	Adverse ambient temperature	24	100
	Negative influence of the sun	24	100
Sports	Inadequate terrain conditions	24	100
	Transit through different moments of the game	15	62.5
	Adverse result of activity	1	4.16

Table 3: Degree of tension generated by the situations identified by the pitchers.

Potentially stressful situations	Min	Max	Mean	SD
Play on the opposite ground.	1	4	2.50	.905
Face the first batter	3	5	4.08	.793
Start the game.	2	5	3.83	1.03
Transiting through half the game.	1	2	1.25	.452
Close the game	2	5	3.33	.985
Pitching in a game that defines the ranking.	3	5	4.50	.674
Pitching in play off.	3	5	4.58	.669
Pitching in a game that defines the championship.	4	5	4.67	.492
Pitching at the best batter on the opposing team.	2	5	3.58	.900
Face the best rival offensive battery.	3	5	4.17	.835
Play without the support of the offensive.	2	5	3.33	1.07
Playing in adverse weather conditions.	1	4	2.92	.900

When bad box conditions make me lose focus.	2	5	3.42	1.08
When coaches don't trust my skills in adverse situations.	3	5	4.42	.669
When teammates make mistakes for the defense.	2	5	3.50	1.08
When the referees play against me.	3	5	4	.853
When I'm up against a batter with a man in a scoring position.	3	5	4.33	.778
When I don't get effectiveness and I have men in circulation.	3	5	4.33	.778
When I have the bases full.	3	5	4.42	.793
When I make a mistake, the defense compromises the outcome.	3	5	4	.853
When I can't dominate the first hitter in the inning	2	5	3.67	1.15
When the runner takes another base.	4	5	4.75	.452
When coaches criticize me and yell at me from the bank.	3	5	4.08	.900

Note: Min= Minimum, Max= Maximum, SD= Standard deviation

Table 4: Differences in the degree of tension generated by game situations depending on the antecedent of injury.

Adverse situations	Antecedent of Injury	Mean	t Test	Sig.
Play on the opposite ground.	Not injured	1.11	-0.576	0.571
	Injured	1.2		
Face the first batter	Not injured	1.33	0	1
	Injured	1.33		
Start the game.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Transiting through half the game.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Close the game	Not injured	1.47	0.937	0.362
	Injured	1.67		
Pitching in a game that defines the ranking.	Not injured	1.22	-1.232	0.233
	Injured	1.47		
Pitching in play off.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Pitching in a game that defines the championship.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Pitching at the best batter on the opposing team.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Face the best rival offensive battery.	Not injured	1	-2.256	0.041
	Injured	1.27		
Play without the support of the offensive.	Not injured	1.89	1.323	0.2
	Injured	1.67		
Playing in adverse weather conditions.	Not injured	1.89	1.323	0.2
	Injured	1.67		
When bad box conditions make me lose focus.	Not injured	1.89	1.323	0.2
	Injured	1.67		
When coaches don't trust my skills in adverse situations.	Not injured	1.89	1.323	0.2
	Injured	1.67		
When teammates make mistakes for the defense.	Not injured	1.89	1.323	0.2
	Injured	1.67		
When the referees play against me.	Not injured	1.44	-0.101	0.921
	Injured	1.47		

When I'm up against a batter with a man in a scoring position.	Not injured	1.11	-4.468	0
	Injured	1.8		
When I don't get effectiveness and I have men in circulation.	Not injured	1	-2.256	0.041
	Injured	1.27		
When I have the bases full.	Not injured	1.22	-3.179	0.006
	Injured	1.8		
When I make a mistake, the defense compromises the outcome.	Not injured	1.33	-2.81	0.015
	Injured	1.87		
When I can't dominate the first hitter in the inning	Not injured	1.56	0.71	0.488
	Injured	1.4		
When the runner takes another base.	Not injured	1.67	0.937	0.362
	Injured	1.47		
When coaches criticize me and yell at me from the bank.	Not injured	1.89	1.682	0.107
	Injured	1.6		

Note: $p \leq 0.05$ = Statistically significant differences

Discussion

The negative influences of the pitching coach are the main psychosocial stressor. The little support and recognition of the work carried out, followed by destructive criticism during the games, and the transfer of negative expectations toward the result, are the aspects that generate higher levels of tension. Other relevant psychosocial stressors were the poor support of teammates and the unfavorable and unfair decisions of the referees. Adverse environmental conditions and poor ground conditions (box) are stress-generating elements, although of lesser significance. Other elements were identified in isolation such as inadequate nutrition, little institutional support for personal problems and the adverse outcome of the work carried out, the latter identified only by an athlete. On the other hand, 100% of athletes said that throwing the 1st batter in the game and in the inning generates a high psychic tension, followed by facing a good batter with men in the scoring position. In addition, other stress-generating situations are identified, such as working to preserve victory under unfavorable conditions or launching into a decisive game on the opposite ground.

In total, 23 stress-generating situations were included, consisting of elements related to the product of the pitcher's activity, the significance of the game, the talent of the opposite, the social support perceived by coaches and teammates, as well as the moments of the game, the beginning and the end are the ones that lead to greater tension. Inadequate playing field conditions are also aspects to be considered. Pitchers who have been injured experience a higher level of stress in situations where their work is not effective with negative consequences for the outcome of the game. The multiplicity of stressors and stressful situations that influence the activity of the baseball pitcher was observed coinciding with the results obtained by several authors [12,18,19]. In addition, the relevance of the psychological preparation of the

pitcher is confirmed coinciding with several studies [2-5,13-17]. The results obtained provide data of theoretical interest in the field of stress study in sport, and also provide valuable information for team managers and coaches, being able to make informed decisions during matches as well as generating a system of positive influences to minimize stress on athletes.

However, the results obtained are more useful for the pitchers themselves because an adjusted and realistic perception of potentially stressful situations can contribute to the development of metacognitive and emotional regulation strategies that allow you a greater degree of control and adaptive adjustment during games. The design of this study can be applied to other sports to determine the stressors and stressful situations most significant to athletes. This knowledge allows you to design intervention strategies to optimize sports performance and differentiate actions based on injury history. Despite the above, its exploratory and descriptive design does not allow to determine relationships between stressors, stressful situations, and sports injuries. This should be addressed in future studies using more powerful statistical methods and a longitudinal design.

Prior Presentation

The data reported in this paper have not been previously disclosed in other articles or poster presentation.

Contributor Ship

- MSc. Jesús Ríos Garit conceived and designed the research, analyzed, interpreted data and wrote the manuscript.
- PhD. Yanet Pérez Surita analyzed, interpreted data and wrote the manuscript.
- Yasel Rodríguez Alfonso, Yoanni Soris Moya, Roswel Borges Castellanos collected data and informed consents and interpreted data.

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Jesús Ríos Garit. Biomed J Sci & Tech Res



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