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STRESS AND ANXIETY IN UNIVERSITY ATHLETES AND HANDBALL PROFESSIONALS IN DIFFERENT SPORTS CONTEXTS

ESTRESSE E ANSIEDADE EM ATLETAS UNIVERSITÁRIOS E PROFISSIONAIS EM DIFERENTES CONTEXTOS ESPORTIVOS

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ABSTRACT

The study sought to identify and compare the level of anxiety (trait-state) and stressful situations in handball, in different sports contexts. The two variables were evaluated in a sample of 29 athletes, of whom 20 were professionals (Bauru team), and nine were university athletes (Unesp team). A questionnaire was used to characterize the sample. Data collection took place before important games for both teams. Results showed that there was no difference in the level of anxiety (trait-state) between the two teams, and that some stressful situations were similar for both. However, each team also mentioned specific stressful situations that were not previously found in the literature. Other results were related to the characteristics of the athletes in these contexts. Significant differences and correlations for some variables were found, such as how long the athletes had been on the teams, their ages, and time of practice. The relevance of this study lies in the facts that the characteristics of the athletes in the two contexts are different, but the stressful situations in handball are the same in general, and that each team considers some specific situations to be stressful.

Keywords: Anxiety; Handball; Psychological aspects; Stressful situation.

RESUMO

O estudo buscou identificar e comparar os níveis de ansiedade (traço-estado) e situações causadoras de estresse no handebol, em diferentes contextos esportivos. 29 atletas foram avaliados acerca dessas duas variáveis, sendo 20 atletas profissionais (Equipe de Bauru), e 9 eram atletas universitárias (Equipe da Unesp). Utilizou-se um questionário para caracterizar a amostra. A coleta de dados aconteceu antes de jogos importantes das duas equipes. Os resultados mostram que não houve diferença nos níveis de ansiedade (traço-estado) entre as equipes, e que algumas situações causadoras de estresse são similares para as duas equipes. No entanto, cada time mencionou situações estressoras específicas

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que não haviam sido mencionadas na literatura antes. Foram encontrados outros resultados significantes sobre as características dos atletas nesses contextos, como o tempo de permanência na equipe, idade e tempo de prática. A relevância deste estudo está no fato de que as características dos atletas nos dois diferentes contextos esportivos, e na descoberta de que as situações causadoras de estresse, em geral, são as mesmas em diferentes contextos, e que ao mesmo tempo existem particularidades das equipes sobre algumas situações estressoras.

Palavras-Chave: Ansiedade; Handebol; Aspectos psicológicos; Situações estressoras.

1 INTRODUCTION

Competitiveness as a social and cultural phenomenon affects society, being present in the family, at work, at school and in friendships. However, competitiveness in sports is always in focus due to the attention from the media. Competition is a representation of struggle and challenge, which eventually requires a number of attitudes from those involved. Athletes are immersed in the competitive process and experience situations of confrontation, demonstration, comparison and assessment. This process provides the experience and the manifestation of physical and emotional reactions, which can lead to stressful situations (De Rose Junior, 2002).

Stress is understood as a process that occurs in stages, which are characterized by environmental requirements, perception of demand, response to the situation and consequences of the response. The latter stage restarts the stress process with another requirement from the environment. Therefore, the instability generated by environmental demands (physical and/or psychological) and the effectiveness of responses is what defines stress. Physical activity is one of the ways to reduce and control stress, but in high-performance sports and professional sports, there are many other stressor factors that can increase a stressful sense (Lacerda Júnior et al., 2022; Weinberg; Gould, 2016).

In addition to such intrinsic and extrinsic causes, the stress process also includes emotional reactions by the individual undergoing a stressful situation. Among these reactions, anxiety can be considered, which is a momentary state characterized by feelings of anguish, restlessness, nervousness, and a high level of activation of the autonomic nervous system. Anxiety in athletes can be observed by self-report, biological markers, and specific behaviors such as agitation and body reactions. The consequences of high levels of anxiety in sports are loss of confidence and self-control, negative feelings, and struggling with decision-making (Castro-Sánchez et al., 2019; Lacerda Júnior et al., 2022).

Handball athletes are immersed in a sports context, which poses many stressful situations, such as exposure, confrontation, challenge assessment and overcoming. When submitted to competitiveness, athletes are exposed to these situations and must deal with such demands, which leads to stress and anxiety processes (De Rose Junior, 2011; Knijnik; Simões, 2000).

In sports contexts, stress can be understood as demands from the game, specifically in competitions that cause certain situations: confrontation, assessment, demonstration and comparison. Confrontation with other teams and individuals; assessment based on each athlete's performance; demonstration of athletes' skills, techniques and conditions; comparison of teams, athletes and strategy to assess performance. The people involved in such scenarios can be affected by those moments. Depending on how athletes and coaches deal with these moments, they may find them threatening (stressful), which could impair athletes' performance or the coach's perception of the game (De Rose Junior, 2002).

When these demands are considered to be stressful, they can trigger other emotions, such as fear, negative thoughts, nervousness, haste, apprehension, and many others. These feelings and emotions can cause high levels of anxiety, which will be mediated, through the interaction of cognitive, mental, and physiological aspects, by the level of activation of the autonomic nervous system, negative feelings, and each individual's subjectivity, and this can cause symptoms such as agitation, intense sweating, and difficulty concentrating, among others (Samulski, 2002).

Therefore, stress is a multifactorial dynamic and response to demands that are perceived as challenging or threatening, involving environmental, personal, and organizational aspects that are related to competitive pressures such as physical performance and conditions, sportive experiences, media attention, and personal values. When these demands overcame tools to deal with all factors involved within a sports context, the individual could start responding to this in a negative way. Examples of these moments and situations are injuries, hostile fans and opposing fans, referee mistakes, a sequence of losses, and criticism from the coach and the media (Tossici; Zurloni; Nitri, 2024).

The literature shows studies associating handball performance with psychological aspects (Wang et al., 2024), mental skills (Jakšić et al., 2022), motivation climate and anxiety (Nur'aini et al., 2025), psychophysiological variables associated with stress (Drole et al., 2025), and stress and anxiety in male college athletes (Venditti Júnior et al., 2019). With that in mind, literature has shown that in the female case, there are a lot of unique elements and psychological stressors, such as sport inequities, body image concerns, hormonal

challenges, violence, and abuse. These are outside of the field of game and court, but they are in the sportive context, representing specific treats for females (van Niekerk; Matzkin; Christino, 2023).

Mental health and psychological aspects represent an important topic of research over the female population, and the sportive context is a useful environment to look at it. At the same time, physical activity is a good tool to control stress, anxiety, depression, and other factors affecting mental health. The sports field has stressors and anxiogenic elements that are related to physical activity, performance, competition, and sportive experience. (Castro-Sánchez et al., 2019; Lacerda Júnior et al., 2022; van Niekerk; Matzkin; Christino, 2023). This contradiction contributes to scientific research to analyze psychological aspects from different perspectives and related issues.

In handball, studies have investigated psychological skills, emotional resistance and competitive anxiety (Kristjánsdóttir et al., 2018). The other studies refer to trait-state anxiety and stress, such as those by Venditti Júnior, Prado, Santos, Zagatto and Silva (2013), who investigated stressful situations in handball with 69 female athletes. Similarly to this study, Pandolfo, Azambula, Machado and Santos (2014) investigated the level of state anxiety in young male athletes in the final phase of the South Brazilian handball championship. Considering literature, studies have combined several psychological aspects, performance, and other sportive elements. It is relevant to compare different sportive contexts.

This study investigated stressful situations and anxiety levels in professional and university handball athletes and aimed to compare the data found in athletes from different sports contexts. It was expected that professional athletes would present a lower level of anxiety than college athletes. For the stress variable, both teams should signal the same situations found in the literature. However, each team may present peculiarities in the stress variable.

2 METHODS

2.1 Participants

Twenty-nine female handball players participated in the study: 20 professional athletes who represented the city of Bauru in the 2018 competitions (Bauru team) and nine other university athletes who represented São Paulo State University's team (Unesp team) on Bauru Campus. The participants' mean age was 24 (± 4.7) years, and the mean number

of years in practice was 11 (± 5.7). Athletes' length of performance on each team was 21 months for the Bauru team and 51 months for the Unesp team.

The Bauru team trained five weekly shifts on a court with the official size for handball (40 meters x 20 meters); the training sessions lasted from two hours to two and a half hours on average. The athletes also performed resistance training during the week. The Unesp team had three training sessions a week, lasting from one and a half to two hours each; the sessions were held in two locations. Only one gymnasium was the official size, the court of the Department of Physical Education at Unesp on Bauru Campus.

Data collection occurred before the beginning of the games for both teams. The Bauru team had a valid game for the São Paulo Handball Cup, and the Unesp team had a play-off game for the São Paulo State University Championship by the Campinas Conference.

2.2 Data collection instruments

Participants responded to an anamnesis form prepared by the researchers to characterize the sample. The form included questions about where the players had first come into contact with the sport, how long they had been playing that modality, how long they had been on the current team, and the number of training sessions per week.

The questionnaire "Stress Situations in Handball" proposed by De Rose Junior., Simões and Vasconcellos (1994), designed in Portuguese and considering the Brazilian reality, was used to evaluate stressful situations. The questionnaire consists of 16 situations in handball, which must be checked with "yes" or "no" for each of the stressful events (Venditti Júnior et al., 2013). For any situation to be considered stressful, it must be identified by at least 75% of the sample on each team.

The instrument used for assessing the athletes' levels of anxiety was the State/Trait Anxiety Inventory (STAI), proposed by Spielberger, Gorsuch and Lushene (1970) and validated in Portuguese by Biaggio, Natalicio and Spielberger (1977), in which language it is referred to as "*Inventário de Ansiedade Traço-Estado*" (IDATE). The instrument consists of a trait-anxiety scale and a state-anxiety scale, each having 20 statements to be checked on a Likert scale from 1 to 4.

Finally, it is noteworthy that the study participants and the study were approved by the Research Ethics Committee of the School of Sciences on the Bauru campus of São Paulo State (Unesp), according to report no. 1.460.896.

2.3 Data analysis

Almost all of the variables in the study met the normality-test requirements (Shapiro-Wilk), except for variable length of time on the team. The anxiety variables (trait and state) and stressful handball situations were satisfactory for the homogeneity of the variance test (Levine's test). Basic descriptive statistics (mean and standard deviation) were calculated for anxiety data (trait-state) and number of stressful situations in handball per team. The method by Pandolfo et al. (2014) was used to classify the anxiety data, classifying the levels of anxiety between 20 and 34 points as low anxiety; 35-49 as moderate; 50 - 64 as high, and 65 - 80 as very high anxiety.

Parametric data were analyzed using Pearson's correlation and Student's t test in the independent sample. The Mann-Whitney test was used for non-parametric data (length of time on the team). The level of significance for all analyses was $p \leq 0.05$. All statistical analyses were performed using SPSS, version 20.

3 RESULTS

The teams showed similarities for trait anxiety and state anxiety. The Bauru team showed 40 (± 6.8) points for trait anxiety and 41 (± 7.6) points for state anxiety. The Unesp team showed 47 (± 7) points for trait anxiety and 48 (± 10.8) for state anxiety. According to Pandolfo et al. (2014), the teams were classified, on both scales as "moderate". The mean number of stressful situations pointed out by each athlete was between 9.4 (± 2.7) as the mean for the Bauru team, and 8.8 (± 2.4) for the Unesp team.

As regards which situations each team pointed out as stressful, similarities can be observed. Both teams pointed out these situations: (3) "Playing in poor physical conditions"; (5) "Losing to a technically inferior team"; (12) "missing a completely free throw" and (14) "Refereeing is affecting my team". Such situations were checked in 75% or more by each team's sample. However, the Bauru team also pointed out the following situations: (1) "I missed 7-m shots at decisive moments in the game"; (2) "Being removed for two minutes at the very beginning of the game"; (4) "The opponent passes by my stronger side"; (15) "Being removes at the decisive moments of the game" and (16) "Conceding a goal due to a defensive failure". The Unesp team signaled these situations, which were checked by the Bauru team with a lower percentage.

Pearson's correlation found a relationship between some variables, namely, trait anxiety with state anxiety (Table 1) and Age with length of practice (Table 2).

Table 1 - Anxiety correlations (STAI), N - number of subjects, Pearson – Pearson's correlation, Sig - statistical significance ($p < 0.05$)

Variables		Correlations	
Anxiety		Anxiety trait	Anxiety state
	N		27
Trait	Pearson		0.761
	Sig. (Two-tailed)		0.000
	N	27	
State	Pearson	0.761	
	Sig. (Two-tailed)	0.000	

Source: Research data prepared by the authors, 2025

Student's t-test did not find significant values when all the parametric data in the study were associated. Regarding the sample characteristics, both teams played for the same period of time, a mean of 11 years (s.d. +/- 1.8 years), but the length of stay on the team was different, being 21 months (s.d. +/- 7 months) for the Bauru team and 51 months (s.d. +/- 2 months) for the Unesp team.

Table 2 - Length of practice-time correlations, N - number of subjects, Pearson – Pearson's correlation, Sig - statistical significance ($p < 0.05$)

Variables		Correlations	
Time		Age	Length of practice time
	N		29
Age	Pearson		0.726
	Sig. (Two-tailed)		0.000
	N	29	
Length of practice time	Pearson	0.726	
	Sig. (Two-tailed)	0.000	

Source: Research data prepared by the authors, 2025

The Mann-Whitney test showed significance for the length of time on the team (in months) when compared between the teams ($p = 0.012$). The null hypothesis predicted that distribution of the length of time on the team in months was the same between the two groups (Bauru team and Unesp team). Thus, this null hypothesis was rejected, since the distribution was not the same between the teams.

4 DISCUSSION

This study analyzed trait-state anxiety, stressful situations in handball and athletes' profiles in different sports scenarios: university athletes and professionals. Data analysis showed that different sports contexts may have similar characteristics and differences.

The results of the study confirm the outcomes of other studies found in the literature and contribute to the literature on sports contexts with new data. The results concerning the trait-state of anxiety showed that anxiety generally remains at moderate levels, regardless of the sports context. The data obtained in this study are similar to the conclusions reported by Pandolfo et al. (2014), who found moderate levels of competitive anxiety in adolescent

athletes. Another study in Iceland investigated handball athletes from the grassroots categories of the national team. Their findings showed no difference in relation to anxiety and age, and the sample in that study comprised athletes aged between 14 and 21 years old (Kristjánsdóttir et al., 2018).

Another study on handball, futsal and volleyball athletes analyzed pre-competition anxiety in university athletes, associating performance, age and gender. The results showed that athletes of all modalities showed pre-competition anxiety at moderate levels. Although anxiety causes psychophysiological responses that can affect performance, that study found no significant data associations with such a statement (Salles et al., 2015).

When anxiety is linked to motivation, it is possible to note that motivational climate is relevant to controlling anxiety effects over cognitive, somatic, and self-confidence. In the competitive context, these factors are related to the perception of the athletes over their own skills and the way they face and notice the competitive situations. These situations could be perceived as stressful depending on the relationship between motivational climate and anxiety (Nur'aini et al., 2025).

Additionally, the control of anxiety has been related to the orientation of motivation; when the sportive context is oriented to ego instead of task, it's noted an increase of competitive anxiety. When the focus of the sportive context is oriented to task and positively on the self-confidence of the athletes, there is noticed a decrease in the levels of competitive anxiety. Controlled this aspect through the action of the coaches, the behavior of athletes, predicting factors that could start the rise of anxiety, and psychological training which is essentially to control which competitive situations will be perceived as stressful (Jakšić et al., 2022; Nur'aini et al., 2025; Wang et al., 2024).

The entire sample in this study showed the same mean value for age and length of time in handball practice, and it is noteworthy that a positive correlation between age and length of practice was identified. Thus, the study sample showed that the older the athletes, the longer their length of time in playing the sport. In addition, there was no correlation between age and anxiety. Further studies may be needed to identify which demands in sports contexts cause the highest levels of anxiety in order to identify what makes each sports environment different.

The data referring to stressful situations in handball corroborate the data from other studies in literature. The situations found in this study for both teams which are reported in the literature are the following situations (12) "missing a completely free throw" and (14) "Refereeing is affecting my team" However, the Bauru team pointed out more situations that

are found in the literature, which are mostly moments occurring during the handball game and are described in the questionnaire statements; (1) "Missing 7-m shots at decisive moments in the game"; (15) "Being removed at the decisive moments of the game"; (16) "Conceding a goal due to defensive failure"(Pires et al., 2008;Venditti Júnior et al., 2013; Venditti Júnior et al., 2019).

Situations (3) "Playing in poor physical conditions" and (5) "Losing to a technically inferior team" were identified as stressful in this study for both teams. Situation (5) was also pointed out as stressful for a team in the study by Pires, Flores and Brandão (2008). Situation (2) "Being removed for two minutes too early in the game" was checked as stressful by the Bauru team, but in the study by Prado, Venditti Júnior, Silva and Santos (2013) and Venditti Júnior et al. (2019), situation (2) was referred to as non-stressful. It can be observed that studies tend to converge with each other by pointing out the same stressful situations in handball, which are usually encountered by researchers. However, the same studies indicate some situations that are not usually found, and although the data may converge at some point, this does not occur in all cases.

Athletes from each sports context may show individualities, identifying specific situations to be classified as stressful. In the specific case, female athletes have to deal with particular and individual stressor situations, as the literature shows: gender inequality, objectification of their bodies, and the risk and insecurity regarding harassment (van Niekerk; Matzkin; Christino, 2023). These stressors need to be considered in female teams to manage how female athletes perceive the competition situations and how individual stressors impact the anxiety levels. Motivational climate and task-orientation climate can promote a better sportive environment for the athletes (Castro-Sánchez et al., 2019; Nur'aini et al., 2025).

The types of situations pointed out by athletes are similar to those found in another study, in which the notion of stress is associated with performance, individual errors and teammates' performance. Such notions could be interpreted as a threat or a challenge, but this becomes the most stressful when athletes identify stress as a threat. That moment occurs during competition, and athletes showed higher levels of stress, when compared to the training period (Kerdijk; van der Kamp; Polman, 2016).

When comparing the present study with that of Kerdijk et al. (2016), it is noted that this study evaluated stress and anxiety in a competition period and found stressful situations in handball that are mentioned in the literature. Therefore, it can be assumed that similar stress situations can be identified in other sports modalities. Such situations reflect the same

notions identified in the present study and others found in the literature. Studies have reported that sports contexts are different, showing their own characteristics, and this must also be taken into account in team preparation, as specific situations of stress, anxiety and competitive experience must be controlled to seek the best possible performance (Alves et al., 2019; Venditti Júnior et al., 2019).

Regarding the variable length of time on the team, a significant difference was observed, as in the university context, athletes' permanence tends to extend throughout their undergraduate years (three or five years), sometimes longer. In the professional context, athletes remain on the teams for a season or until the end of the employment contract. Contract terms are shorter than the duration of undergraduate programs. However, further studies could find another reason for this finding, such as, for instance, issues such as team financing, among other reasons.

A limitation to this study was the number of participants, since few teams agreed to participate. In addition, the STAI instrument is not specific to sports contexts.

However, the instrument was purposely selected to enable the use of both trait and state concepts within the same questionnaire. Another possible limitation was the way stress was measured. The study used situations that can be stressful, but utilizing another model to investigate this variable may be interesting.

The results in this study are important because these two sports contexts are rather different, and few studies have compared them both. Thus, this investigation has accomplished the proposed objective of identifying the level of trait-state anxiety and stressful situations in handball and comparing them. The result in the present study makes it possible to outline strategies to deal with stressful situations in that sports modality during training and in preparation for season games. The other results in this study are also relevant, as they show athletes' characteristics in different sports contexts.

5 CONCLUSIONS

The conclusion in this study is that there is no difference between professional and university athletes when evaluated for stressful situations in handball and anxiety (trait-state). However, when looking into trait anxiety and state anxiety, it was observed that trait anxiety has an influence on the state-anxiety level, and both variables are strongly correlated. Some stressful situations found in this study are the same as those found in the literature, and when comparing with results in other studies on stressful situations, they

converge. However, all samples also showed specific situations in each context, which leads us to believe that some situations are common for sports contexts and each sample or team sees specific situations as stressful.

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