

Volleyball Players Pre-Competitive Anxiety: Sex-Based Differences and Relationship with Sport Characteristics

Sintija Šadrincevaitė, Aušra Griciūtė

Lithuanian University of Health Sciences, Kaunas, Lithuania

ABSTRACT

Background. The issue of pre-competition anxiety is multidimensional and there is still a lack of complex studies in multiple sports as well as in volleyball analysing the relationships of pre-competitive anxiety with multiple correlates.

Methods. The research participants were male and female volleyball players from fore Lithuanian teams. The questionnaires were completed by 37 athletes (51.4% females) aged between 20 and 41 years (median age 23.0 years). Questions about Competitive State Anxiety (CSAI-2), socio-demographic and sport characteristics were answered 40 minutes before the pre-competition warm-up.

Results. The level of female and male pre-competition anxiety components was similar ($p > 0.05$). Direct associations were found between cognitive and somatic anxiety in both sex groups ($p < 0.001$). In the female group, cognitive anxiety was higher compared to somatic anxiety ($p < 0.05$). In the male subgroup cognitive anxiety was directly associated with age ($p < 0.05$). Relationships with sport characteristics ($N=37$): the level of cognitive anxiety was directly related to the number of years of playing volleyball ($p < 0.05$); volleyball players who reported having sufficient knowledge to manage competitive anxiety had lower levels of cognitive anxiety ($p < 0.05$), and lower self-confidence ($p < 0.05$).

Conclusions. The research data may help to better understand the manifestation of volleyball players' pre-competitive anxiety in sex groups and the relationship with sport characteristics. On the basis of this data, specialists will be able to formulate and test hypotheses of further research as well as select areas of preventive and educational work.

Keywords: volleyball, cognitive and somatic anxiety, self-confidence, gender groups, sport characteristics.

INTRODUCTION

COMPONENTS OF COMPETITIVE ANXIETY

In recent years, a growing number of studies have focused on athletes' anxiety (Correia & Rosado, 2019; Mercader-Rubio et al. 2022; Mercader-Rubio, Ángel, Esteban, & Ruiz, 2023;

Marín-González Portela-Pino, Fuentes-García, & Martínez-Patiño, 2022). Anxiety states encompass individual experiences of subjective feelings of apprehension and tension, which are consciously perceived – these feelings are accompanied by, or linked to, activation or arousal of the autonomic nervous system (Martens Vealey, & Burton, 1990).

The manifestation of competitive anxiety can be influenced by various factors, such as the athlete's perception of the situation, his/her level of experience, and the importance of the competition. Competitive anxiety can negatively affect the performance of athletes during the competition (Kjørmo & Halvari, 2002; Park, Lim & Lee, 2020; Datcu, Brîndescu & Petracovschi, 2021). Martens et al. (1990) examine competitive state anxiety as a multidimensional phenomenon consisting of cognitive anxiety, somatic anxiety and self-confidence.

The *cognitive component* of competitive anxiety, according to Mercader-Rubio et al. (2023, p.3), is "a state in which the subject has distressing and negative thoughts that significantly affect performance and attention". Meta-analyses data confirmed that cognitive anxiety is related to sportsmen's performance (Woodman & Hardy, 2003). Bebetos & Antoniou (2012) found out that cognitive anxiety levels are elevated in the days leading up to the competition and persist at a high level until the beginning of the event. According to the findings of Yoshie, Shigemasu, Kudo, & Ohtsuki (2009), enhancing self-confidence, minimising pre-performance cognitive anxiety, and interpreting cognitive anxiety symptoms as beneficial to subsequent performance can lead to an improvement in the quality of performance. *Somatic anxiety* is "a state in which the subject's thoughts and sensations are manifested at the body level" (Mercader-Rubio et al. 2023, p. 3) and manifests, for example, by increased heart rate, muscle tension, and sweating before competition etc. Somatic anxiety can have both positive and negative effects on an athlete's performance. It also can increase in the competitive environment (Avramidou, Avramidis, & Pollman, 2007). *Self-confidence* is an athlete's belief in his or her ability to successfully execute skills, achieve goals, and cope with challenging situations. Besharat & Pourboholol (2011) found out that self-confidence partially moderated the relationship between cognitive and somatic dimensions of competitive anxiety with sport performance. Self-confidence has a significant impact on an athletes' performance during competition – confident athletes tend to perform better compared to non-confident athletes (Draper, Dickson, Fryer & Blackwell, 2011; Hassmén, Raglin, & Lundqvist, 2004; Woodman & Hardy, 2003). However, Kais & Raudsepp, (2005) studies do not support positive associations between self-confidence and athletic performance and according to Lochbaum et al. (2022), the relationship between self-confidence is influenced by factors such as

sport type, performance objectivity, and athlete sex. This means that the effect of self-confidence on athletes' performance may be differentiated because of other factors.

Understanding the factors that influence competitive anxiety is important for designing treatment and intervention programs that foster the holistic development of athletes beyond just their technical and physical preparation. For instance, Rocha & Osório, (2018) found that more substantial associations were found between competitive anxiety levels and female sex, younger age, and less experience time. Scientists are analysing associations between anxiety and performance, but do not have yet an overall accepted theoretical model (Palazzolo, 2020). Further research is essential to delve into the development and variation of anxiety in athletes during sport activities.

PRE-COMPETITIVE ANXIETY

Pre-competition anxiety (PCA) is a specific type of anxiety experienced by athletes before a competition or performance. In this research data, Lithuanian volleyball players' pre-competitive anxiety estimates are analysed. Volleyball is characterised as a fast-paced and dynamic team sport that calls for a wide array of skills (Cardoso Marques et al., 2006; Marques et al., 2009). Due to the nature of this sport, volleyball players tend to feel pre-competitive anxiety, which, as in most other team sports, can have a significant impact on athletes' performance.

For example, as Weber et al. (2018) point out, pre-competitive anxiety can lead to a decrease in athletes' concentration and focus, an increase in mistakes, and a decrease in self-confidence. Several researchers have investigated pre-competition anxiety in different sports contexts. For instance, Martínez-Gallego, Villafaina, Crespo, & Fuentes-García (2022) conducted a study to analyze the pre and post-competitive anxiety levels of young tennis players and explore the potential implications of gender and age on anxiety responses. Zienius, Skarbalius, Zuoza, & Pukėnas (2014) aimed to assess and evaluate the psychological factors before competition, sport performance indicators, and physiological demands in youth golf. Furthermore, García-Ceberino, Fuentes-García, & Villafaina (2022) focused on the impact of a basketball competition on the pre-competitive heart rate variability of young female basketball players. These studies offer valuable insights into the psychological and

physiological aspects of pre-competition anxiety, shedding light on how different factors, such as gender, age, and sport type, may influence athletes' anxiety responses before competitive events. There is still a notable lack of research dedicated to assessing pre-competitive anxiety, i.e., the emotional state before competition or performance and its relationship with different sociodemographic and sport characteristics. This research is intended to analyse the prevalence of pre-competition anxiety in Lithuanian volleyball players in female' and male' subgroups, as well as the associations with sociodemographics (sex, age, education) and sport characteristics (a detailed list is presented in the Methods section). Research data present more complex and valuable insights from the scientific and practical viewpoint to the indicators and associated mechanisms influencing pre-competition anxiety.

ANXIETY AND ATHLETE'S GENDER

Volleyball teams are usually divided not only by proficiency but also by sex, with male and female teams being created. Pre-competition anxiety may manifest itself differently in groups of athletes according to gender and other socio-demographic characteristics. Previous research suggests that male and female players may experience competitive anxiety differently (Verdaguer, Más, Ramón, & Conti 2016). Chalabaev, Sarrazin, Fontayne, Boiché, & Clément-Guillotin (2013) also note that sex differences in the impact on pre-competition anxiety may be due to societal stigmas. Studies have identified sex as a factor related to the emotional states of athletes. De Paola & Scoppa (2017) research showed that females who lost the first quarter were much more likely to play poorly in the following quarter than male teams. Studies also show that male athletes' self-confidence and cognitive anxiety do not change significantly before the match, but in female teams, somatic anxiety levels increase and self-confidence decreases before the match (Cerin, 2003; Correia & Rosado, 2019). However, Kumar (2016) found no significant difference in pre-competition anxiety (somatic and cognitive) between adult males and females. In order to better understand sex differences in pre-competition anxiety, this study will analyse the manifestation of pre-competition anxiety in sex subgroups. Given these varying findings and the potential impact of gender on athletes' pre-competitive anxiety, this study seeks to further investigate these differences and hypothesises that, in the context of volleyball,

estimates of pre-competition anxiety components will be higher in the male subgroup compared to the female subgroup, contributing valuable insights into this area of sports psychology.

ANXIETY AND SPORT CHARACTERISTICS

Cognitive anxiety manifests itself subjectively – it is situational and personality factors can contribute to the effecting of cognitive anxiety (Cerin, & Barnett, 2011), as well as to their experience, and the specifics of coping with anxiety (Palazzolo, 2020). As Mercader-Rubio, Ángel, Silva, & Brito-Costa (2023) suggest, symptoms of *somatic anxiety* can interfere with an athlete's motor skills and cause the athlete to become overly tense and/or stagnant. Researchers suggest that the competition state of somatic anxiety may be influenced by a variety of factors such as the athlete's experience, level of proficiency, gender, age, and personality traits (Granero-Gallegos et al., 2017; Marín-González et al., 2022; Casali, Ghisi, Jansen, Feraco, & Meneghetti 2022). *Self-confidence* may be affected by the mediation of negative self-directed affect, such as guilt and shame, which plays a role in the negative influence on performance (Barreto, Ellemers, & Banal 2006). Moreover, Stress exerts contrasting effects on self-confidence among high and low-anxious athletes (Goette, Bendahan, Thoresen, Hollis, & Sandi 2015). In this research relationships between pre-competitive anxiety components (cognitive anxiety, somatic anxiety and self-confidence) and sociodemographic and sport characteristics are analysed. Given these intricate relationships between pre-competitive anxiety components and sociodemographic, personality, and sport-related characteristics, this study hypothesises that pre-competitive anxiety components will differ within subgroups defined by sport characteristics, underscoring the need to investigate and better understand these relationships.

This study advances the literature by addressing a notable research gap that delves deeper into the nuanced interplay between sex-based differences and the specific sport characteristics of volleyball players. While prior research has explored anxiety in sports generally and across gender (Verdaguer, Más, Ramón, & Conti, 2016; Chalabaev, Sarrazin, Fontayne, Boiché, & Clément-Guillotin, 2013; De Paola & Scoppa, 2017) and different sports (Marques et al., 2009; Martínez-Gallego et al., 2022; De Paola & Scoppa, 2017; Ruiz-Juan et al.,

2016) lines, the examination of how characteristic factors uniquely interact especially in the context of volleyball has been largely overlooked. Understanding pre-competitive anxiety in volleyball players and its sex-based differences while exploring its connection with sport characteristics is important for several reasons. Firstly, it impacts athletes' performance and mental well-being, necessitating effective anxiety management strategies. Secondly, recognising gender-specific differences can lead to tailored support and interventions, promoting inclusivity in sports. Coaches can benefit from this knowledge and create a coaching environment that meets the real needs of athletes and therefore is more positive. Additionally, optimising anxiety levels can improve performance without hindering athletes. Scientifically, it contributes to sports psychology literature, expanding our understanding of psychological factors affecting athletes. Ultimately, it empowers players with insights into their anxiety and coping mechanisms, fostering personal growth and enhanced coping skills beyond sports. This research also provides important insights that can inform sport-specific interventions and support mechanisms, bridging a crucial gap in our knowledge and enhancing the practical application of sports psychology in the context of team sports like volleyball.

Aim of the study. To assess the manifestation features of volleyball players' pre-competitive anxiety in gender groups and its connections with sport characteristics.

Research object: Manifestation of volleyball players' pre-competitive anxiety components (cognitive anxiety, somatic anxiety and self-confidence) in gender and age, education subgroup and in sport characteristics subgroups. It was *hypothesised* that estimates of the components of volleyball players' pre-competition anxiety – cognitive anxiety, somatic anxiety and self-confidence - are: 1. higher in the males' subgroup compared to the females' subgroup; 2. differ in the subgroups of sport characteristics.

METHODS

Process of the study and participants. The survey was carried out between 3 and 10 of May 2023. Bioethics centre at the Lithuanian University of Health Sciences approval for the study BEC-SP(B)-119 (19.04.2023) was obtained. A public call for participation in the study was published on Facebook on 20 April. By convenient sampling, 5

volleyball teams responded. One team was unable to arrange a suitable time for the study before the competition and did not participate in the study. Study participants were athletes from two teams from the Lithuanian Volleyball Amateur League and from two professional teams. At the time of the research in Lithuania, 17 teams participated in the Lithuanian Volleyball Amateur League and 10 professional teams participated in the Lithuanian Volleyball Federations Championship. The number of teams participating in the study was due to the specific characteristics of the Lithuanian volleyball enthusiast population, the study's unique focus on the mandatory pre-competition meetings and the presence of several teams comprising minors who were not eligible to participate in this research. The teams were scheduled to meet with the researcher (the first author) 40 minutes before their pre-competition warm-up. The representatives of the teams, either the team captain or the coach, signed the trial team manager's briefing form. All consenting volleyball players were informed about the study, its purpose and how to complete the questionnaire. Each participant was given the questionnaire and completed it in the quietest part of the arena, in order to minimise any external distractions that might interfere with the participants' attention and data anonymity. The completed questionnaires were returned immediately to the researcher.

A total of 37 adult volleyball players participated in this study (18 men, 19 women). They all play volleyball recreationally or professionally and compete in volleyball competitions. The mean age of the subjects was 23.95 (SD = 4.03) (median age 23.0 years). Out of the 37 subjects who participated in the study, 16 individuals (43.3%) had a higher education, 15 (40.5%) had a secondary education, four participants (10.8%) had completed post-secondary (higher professional) education, and the remaining two (5.4%) had completed vocational education. The research data on education are grouped and further two groups are analysed: higher education vs. secondary, post-secondary, vocational.

Research instruments. An anonymous quantitative questionnaire was used in this research, which was developed to assess pre-competitive sport anxiety and socio-demographic and sport characteristics.

Pre-competitive anxiety was assessed with Competitive State Anxiety Inventory-2 (CSAI-2), the authors of which are R. Martens, D. Burton, R. S. Vealey, L. Bump, L., and D. E. Smith – which is

well-known and often used in sports research (e. g., Cerin, 2003; Zienius et al., 2014; Patsiaouras et al., 2022). CSAI-2 scale was used with permission from Human Kinetics, Inc., Champaign, IL. This scale consists of 27 items assessing the components of Competitive State Anxiety (nine items each): cognitive anxiety, somatic anxiety and self-confidence. Athletes were asked to rate each of the statements (for example “I feel nervous”, “My heart is racing”) on a four-point Likert scale (values: 1 – completely disagree; 2 – somewhat agree; 3 – moderately agree; 4 – completely agree). The subscale scores range from 9 to 36, with higher scores for cognitive and somatic anxiety indicating higher levels of anxiety and higher scores for self-confidence indicating higher levels of self-confidence. The internal consistency coefficients for each of the 3 subscales were reasonably high: 0.834 for the cognitive anxiety subscale; 0.881 for the somatic anxiety subscale; and 0.817 for the confidence subscale.

In order to show features of distributions of the CSAI-2 anxiety components their scores have been divided into tertiles (three equal parts). The cognitive and somatic anxiety scores have been grouped in the following way: I tertile scores from 9 to 18 – low anxiety / low self-confidence; II tertile scores from 19 to 27 – moderate anxiety / moderate self-confidence; III tertile scores from 28 to 36 – high anxiety / high self-confidence.

The socio-demographic questions assessed research participants’ age, gender and education of athletes.

Sport characteristics were assessed by asking the subjects dichotomous questions (Yes/No answers): 1. Is there a coach in the team now? 2. Are you currently the captain of the volleyball team? 3. Have you ever suffered a physical injury during volleyball competitions/training? 4. What higher level of competition have you participated in (top level, amateur)? 5. Have you played any other sport? 6. Have you attended psychology lectures or seminars? 7. Do you have enough knowledge to manage anxiety during competitions (yes, maybe, no)? There were no differences according to anxiety components between subgroups (question 7) “maybe” (N = 16) and “no” (N = 6) ($p > 0.05$), therefore these groups were combined in further analysis. The questionnaire also included questions asking the subjects to record the answer (in numbers): 8. How long have you been playing sports? 9. How many years have you been playing volleyball? 10. How old were you when you started playing volleyball?

Statistical analysis. Statistical calculations

were performed using IBM SPSS Statistics 29.0. Cronbach alpha coefficients for internal consistency of subscales were calculated. The normality of the distributions was assessed with the Shapiro-Wilk criterion; as well as with the coefficients of symmetry and skewness - distribution of which in the range from (-1) to (+1), together with visual inspection of the histograms, were used as additional data to consider the application of statistical analysis criteria. The distributions of most studied indicators are close to the normal distribution, but according to the Shapiro-Wilk criterion did not correspond to a normal distribution, so for group comparison, non-parametric methods were used. For the comparison of two not related research participant groups, the Mann-Whitney U (for 2 independent samples) criterion was used; Wilcoxon Signed rank test (for 2 related samples) was used to compare indicators inside research participant groups; in all cases Exact Sig. p (2-tailed) were calculated. When statistically significant differences were found between the groups, the effect size estimates were calculated. One-Sample T-test was used for comparison of the pre-competition anxiety components scores (Cognitive anxiety, Somatic anxiety and Self-confidence) with the theoretical mean, i.e., the arithmetic mean of scale, with some violations (normality of some distributions is approximately satisfied), in order to be careful, the stability of parameter gained was tested performing the Bootstrap calculations (number of samples 2,000 with seed for Mersenne Twister). Spearman’s rho rank correlation coefficient was used to assess the association between the analysed variables. When the p-value fell within the range $0.050 < p < 0.100$, a statistical tendency was recorded. The level of statistical significance was chosen $p < 0.05$.

RESULTS

Characteristics of volleyball players’ pre-competition anxiety in gender subgroups.

In the total sample of volleyball players, the medians, mean scores (SD) and Min-Max (range) values for the components of pre-competition anxiety (N = 37) were accordingly 20.00, 20.73(5.88) and 11.00-34.00 for cognitive anxiety; 18.00, 19.27(6.07) and 11.00-36.00 for somatic anxiety; and 15.00, 14.62(2.79) and 9.00-18.00 for self-confidence (skewness ranged from -0.679 to 1.022; kurtosis ranged from -0.837 to 0.994). The medians, mean scores (SD) and Min-Max (range) values for pre-competitive anxiety components

(cognitive anxiety, somatic anxiety and self-confidence) in the sex-subgroups, and the distributions (numbers and percentages) of subjects according to the tertile groups are shown in Table 1. The average scores (medians) of pre-competitive cognitive anxiety in the subgroups of females 22.32 (22.00) and males 19.06 (20.00) were found to be higher than the theoretical arithmetic mean (13.5 points) of the scale (from 9 till 36) (One-Sample T-test: in both sex cases $p < 0.001$; Bootstrap calculations: in both sex cases $p < 0.001$). The distributions of volleyball players' pre-competitive cognitive anxiety according to the tertile subgroups identified that in female and male subgroups, the highest percentage of subjects fell into the tertile II (moderate anxiety) subgroups (42.1 and 61.1, respectively). The average estimates (medians) for pre-competitive somatic anxiety in the subgroups of females 20.47 (19.00) and males 18.00 (16.50) were higher than the average estimate (One-Sample T-test: female: $p < 0.001$ and male: $p < 0.01$; Bootstrap calculations: in both sex cases $p < 0.01$) of the scale (13.5).

The highest percentage of the females according to somatic anxiety data were assigned to the tertile I (42.1%) and tertile II (47.4%), and males – to the tertile I (low anxiety) (61.1). The average estimates (medians) for self-confidence in the subgroups of male 14.58 (15.00) and female 14.67 (15.00) players, were slightly higher than the arithmetic mean of the scale, but differences were not significant (One-Sample T-test: female: $p > 0.05$ and male: $p = 0.087$; Bootstrap calculations: in both sex cases $p > 0.01$) (Table 1). All volleyball players (male and female) were assigned to the tertile I (low self-confidence) subgroup (100%) on the basis of their self-confidence scores.

A comparison of somatic and cognitive anxiety scores (Table 1) showed that in the woman subgroup cognitive anxiety scores were higher compared to somatic anxiety scores (Wilcoxon signed rank test, $p < 0.05$; small effect size 0.336). In the male subgroup, there was no significant difference between somatic and cognitive anxiety estimates ($p > 0.05$) (Table 1).

Table 1. Descriptive data on the components of pre-competitive anxiety in volleyball players

Groups	Descriptive indicators and conditional groups		CSAI-2 scale components			Comparison of CA and SoA scores inside group (p)
			Cognitive anxiety (CA)	Somatic anxiety (SoA)	Self-confidence (SCo)	
Female (N=19)	Mdn		22.00	19.00	15.00	0.038
	M (SD)		22.32 (6.15)	20.47 (6.59)	14.58 (2.93)	
	Min-Max (range)		13-34 (21)	11-36 (25)	9-18 (9)	
	Skewness		0.342	1.132	-0.777	
	Kurtosis		-0.682	1.310	-0.883	
	*I tertile	N (%)	6 (31.6)	8 (42.1)	19 (100)	
	II tertile		8 (42.1)	9 (47.4)	0 (0.0)	
III tertile	5 (26.3)		2 (10.5)	0 (0.0)		
Male (N=18)	Mdn		20.00	16.50	15.00	0.247
	M (SD)		19.06 (5.23)	18.00 (5.37)	14.67 (2.72)	
	Min-Max (range)		11-27 (16)	12-29 (17)	10-18 (8)	
	Skewness		-0.052	0.698	-0.608	
	Kurtosis		-1.243	-0.641	-0.682	
	I tertile	N (%)	7 (38.9)	11 (61.1)	18 (100)	
	II tertile		11 (61.1)	6 (33.3)	0 (0.0)	
III tertile	0 (0.0)		1 (5.6)	0 (0.0)		
Comparison of gender groups (p)			0.139	0.235	0.969	

* I tertile (9-18 low level); II tertile (19-27 medium level); III tertile (28-36 high level).

Estimates of the components of pre-competitive anxiety were found to be similar in males and females, with no significant differences in cognitive

anxiety, somatic anxiety and self-confidence ($p > 0.05$ in all cases) (Table 1).

Table 2. Associations between pre-competitive anxiety components inside gender subgroups

Pre-competitive anxiety components	Somatic anxiety	Self-confidence
	Correlation indicators: r / p	
Female		
Cognitive anxiety	0.863 / 0.000	0.137 / 0.571
Somatic anxiety	-	0.026 / 0.916
Male		
Cognitive anxiety	0.734 / 0.001	0.187 / 0.457
Somatic anxiety	-	0.386 / 0.114

The assessment of the association between the components of pre-competition anxiety revealed that in both male and female subgroups, cognitive anxiety and somatic anxiety were significantly correlated (strong correlation, $p < 0.001$) (Table 2), meaning that volleyball players who reported more negative thoughts, representing possible negative experiences, before the competition also experienced more of the physical symptoms of pre-competition anxiety. No statistically significant relationships were found between self-confidence and the other two components of anxiety, i.e. cognitive and somatic anxiety ($p > 0.05$) in each sex subgroup.

Table 3. Pre-competitive anxiety evaluation of indicators by sex, education and age characteristics

Groups	Subgroups	N (%)	CSAI-2 scale components			
			Cognitive anxiety	Somatic anxiety	Self-confidence	
Education			Comparison between subgroups: <i>p</i>			
Female	A. Higher	8 (42.1)	0.505	1.000	0.963	
	B. Secondary, post-secondary, vocational	11 (57.9)				
Male	A. Higher	8 (44.4)	0.347	0.811	0.228	
	B. Secondary, post-secondary, vocational	10 (55.6)				
Age			Correlation indicators: r / p			
Female	Mdn	M (SD)	Range	0.186 / 0.447	0.094 / 0.703	0.167 / 0.493
Male	22.00	23.42 (3.64)	11	0.469 / 0.049	0.380 / 0.120	0.187 / 0.456

Significant associations between male athletes' precompetitive cognitive anxiety and age were established, this meant that the older the male volleyball players were, the more symptoms of pre-competitive cognitive anxiety they are likely to experience ($p < 0.05$) (Table 3). In both male and female subgroups, estimates of pre-competitive cognitive anxiety, somatic anxiety and self-confidence were similar when comparing educational subgroups (high vs. secondary, post-secondary, vocational) ($p > 0.05$) (Table 3).

Relationships between pre-competitive anxiety and sport characteristics. The pre-competitive anxiety components were compared across subgroups of sport characteristics (items 1-7) (Table 3). A significant difference was found for cognitive anxiety and self-confidence when comparing groups of volleyball players in terms of the sufficiency of knowledge in managing competitive anxiety (question 7; subgroups (enough knowledge to

manage competitive anxiety): "yes" vs. "maybe/no") (Table 4). So, athletes who responded that they had sufficient knowledge to manage competition anxiety ("Yes") were found to have a lower level of pre-competition cognitive anxiety (Mdn: 17.00 vs. 22.50, respectively) ($p < 0.05$, small effect size 0.359), but they had lower self-confidence (16.00 and 19.50), respectively) ($p < 0.05$, small effect size 0.421), compared to study participants who responded "maybe/no". Due to the small number of subjects in the subgroup of females, it was not possible to fully analyse the differences in cognitive anxiety and self-confidence in subgroups according to the answers "yes" vs. "maybe/no" to item 7. Nonetheless, descriptive data analysis of both sex subgroups and comparisons among male subgroups can be a base for some hypothetical assumptions. Thus, a lower level of cognitive anxiety in the group stating to have enough knowledge to manage competitive anxiety is likely determined due to analogue

tendency in male subgroup (Mean Ranks (N = 9) “yes” 6.44 vs. (N = 9) “maybe/no” 12.56; $p < 0.05$, medium effect size 0.575), compared to the data of the female subgroup ((N = 6) “yes” 9.08 vs. (N = 13) “maybe/no” 10.42; $p > 0.05$). The lower level of self-confidence likely occurred due to female subgroup data ((N = 6) “yes” 28.00 vs. (N = 13) “maybe/no” 162.00; $p < 0.01$, medium effect size 0.662), compared to the male subgroup data ((N = 9) “yes” 79.00 vs. (N = 9) “maybe/no” 92.00; $p > 0.05$).

There was a tendency towards higher self-confidence in the subgroup of athletes who do not currently have a coach (question 1) compared to those

with a coach (Mdn: 16.00 vs. 14.50 ($p = 0.065$). There were tendencies towards lower cognitive (19.00 and 22.50) ($p = 0.078$) and somatic (17.00 and 20.50) ($p = 0.060$) anxiety in the subgroup of the volleyball players who reported having experience in another sport (besides volleyball) (question 5), compared to the participants who only played volleyball. There was also a tendency towards higher somatic anxiety scores in the subgroup in which participants reported attending psychological lectures and/or seminars (question 6) compared to the players who did not attend such lectures/seminars (22.50 vs. 18.00) ($p = 0.051$) (Table 4).

Table 4. Assessment of pre-competitive anxiety scores by sport characteristics

Sport characteristics	Subgroups		CSAI-2 scale components		
	Answers	N (%)	Cognitive anxiety	Somatic anxiety	Self-confidence
			Comparison between subgroups: p		
1. Have a coach	A. Yes	18 (48.6)	0.148	0.322	0.065 ^t A ≤ B
	B. No	19 (51.4)			
2. Is the team captain	A. Yes	5 (13.5)	0.508	0.611	0.566
	B. No	32 (86.5)			
3. Ever had sports injuries	A. Yes	32 (86.5)	0.889	0.992	0.319
	B. No	5 (13.5)			
4. Highest level of the competition	A. Top level	12 (32.4)	0.417	0.558	0.377
	B. Amateur	25 (67.6)			
5. Participating in another sport	A. Yes	25 (67.6)	0.078 ^t A ≤ B	0.060 ^t A ≤ B	0.889
	B. No	12 (32.4)			
6. Ever attended psychological lectures/seminars	A. Yes	12 (32.4)	0.347	0.051 ^t A ≥ B	0.352
	B. No	25 (67.6)			
7. Enough knowledge to manage anxiety during competitions	A. Yes	15 (40.5)	0.028 A ≤ C	0.167	0.011 A ≤ C
	B. Maybe/No	22 (59.5)			

Sport characteristics	Subgroups			CSAI-2 scale components		
	Answers		N (%)	Cognitive anxiety	Somatic anxiety	Self-confidence
	Mdn	M (SD)	Range	Correlation indicators: r / p		
8. Duration of participation in sport (in years)	10.00	11.27 (5.54)	30	0.255 / 0.127	0.024 / 0.889	0.014 / 0.934
9. Duration of participation in volleyball	9.00	8.49 (4.27)	24	0.386 / 0.018	0.290 / 0.081 [†]	0.002 / 0.993
10. Age of starting sports	15.00	14.78 (3.14)	18	-0.302 / 0.069 [†]	-0.201 / 0.233	0.193 / 0.253

[†] statistical tendency (0.050 < p < 0.100).

The associations between the components of pre-competitive anxiety and sport characteristics were assessed (questions 8-10). It was found that the more research participants had volleyball-playing experience in years (question 9), the higher their pre-competition cognitive anxiety scores (weak correlation, $p < 0.05$) (Table 4). There was established a statistical tendency ($p = 0.081$) of associations between volleyball players general duration (in years) of the participation in sport (question 9) and pre-competitive somatic anxiety, as well as a statistical tendency of an inverse relationship between the participants' age of starting sports (question 10) and pre-competitive cognitive anxiety ($p = 0.069$) (Table 4).

DISCUSSION

In this study, we investigated the relationship between volleyball players' pre-competitive anxiety and socio-demographic, sport characteristics among volleyball players. The focus is on analysing and comparing pre-competitive anxiety levels in sex groups, and evaluating the relationship between pre-competitive anxiety and various sport-related factors that may influence athletes' psychological state before competition. The pre-competitive anxiety is explored in three dimensions: cognitive anxiety, somatic anxiety, and self-confidence.

Pre-competitive anxiety and sex-based differences. This study showed that male and female volleyball players rated their pre-competitive cognitive and somatic anxiety and self-confidence similarly, with nonsignificant differences. Some previous studies also obtained no significant gender differences in the state of pre-competition anxiety (Ruiz-Juan, Zarauz Sancho, & Flores-Allende

2016; Martínez-Gallego et al., 2022) and competitive anxiety (Marín-González et al. 2022;). Nevertheless, research data are controversial when evaluating sex differences, e. g., it was found that male athletes experienced higher level of anxiety during competition than females (Amjad, Irshad, & Gul, 2018; Patsiaouras, Boziou, & Kontonasiou, 2022); and opposite data – females pre-competitive cognitive anxiety level was higher (Abdoshahi, Kondric, & Huang, 2023) and they had lower self-confidence than males (Marín-González et al., 2022). Cultural differences may be important in explaining gender differences in anxiety – the pre-competitive anxiety data in this Lithuanian volleyball study might have been similar for men and women due to the participants' homogeneous backgrounds and cultural influences. Like in other research analysing pre-competitive anxiety (Mercader-Rubio et al., 2023) and competitive anxiety (Marín-González et al. 2022), in this research in both sex groups, strong associations between athletes' pre-competitive cognitive and somatic anxiety estimates were established; this means that volleyball players having more negative pre-competitive thoughts and fear about competition, reported more somatic anxiety symptoms – like tightness in the body, clammy hands, jittery, racing heart and other. Fluharty, Attwood, & Munafò (2016) findings indicate that greater subjective and physiological responses can be associated with anxiety proneness. Contrary to some other studies analysing competitive anxiety (e.g., Marín-González et al. 2022), in this research cognitive and somatic pre-competitive anxiety estimates were not associated with athletes' (females and males) self-confidence.

It should be noted that the estimates of pre-competition cognitive and somatic anxiety among female volleyball players were quite high,

while the self-confidence of all athletes (male and female) who participated in the study was low (all research participants were assigned to I tertile - low level), in comparison with some other investigations, e. g., data of female and male judo athletes in Agaoğlu (2016) research; female volleyball team athletes (Şekeroğlu, 2019) and female and male volleyball players (Patsiaouras et al., 2022) evaluations.

The results of this study show that in the subgroup of *female* athletes (N = 19) cognitive anxiety estimates were higher than somatic anxiety estimates. While Milavić, Jurko, & Grgantov (2013) also reported higher cognitive anxiety than somatic anxiety among female volleyball players. However, unlike this study, Milavić et al. (2013) also observed the same difference in a sample of male players as well. In the *male* subgroup (N = 18), higher age was associated with elevated cognitive anxiety level. Martínez-Gallego et al. (2022) report similar findings, suggesting that younger players are less anxious before competition. This data points to a very important area of practical implications for coaches working with older male athletes – who may experience according the age heightened cognitive anxiety, and that they can accumulate more negative thoughts about competitive experiences and performance expectations, and to motivate to prepare appropriate intervention programs.

Pre-competitive anxiety and sport characteristics. In this study, we investigated characteristics, that have been previously examined in other research, in relation to competition anxiety, such as the presence and influence of the coach (Galić, Protić, Žvan, & Kondrič, 2014) or duration of participation in sport (Draper et al., 2011), as well as characteristics that are rarely explored, like the role of being the captain of the team and athletes' previous injuries. By exploring both more frequently and less studied factors, we aimed to provide a comprehensive analysis of their impact on pre-competitive anxiety among volleyball players. In this study volleyball players (N=37) with a longer history of playing volleyball exhibited more pre-competitive cognitive anxiety symptoms. Palazzolo (2020), notes that both cognitive and somatic anxiety depend on the athlete's personality, experience, and the specifics of coping with anxiety. Thus, a more experienced volleyball player may become more engaged and committed, which can increase performance expectations and pressure – which in turn can increase pre-competition anxiety. However, Morales et al. (2012) state that athletes performing

at an international level of competition have lower pre-competitive anxiety compared to those competing at the national level. Consequently, they are more susceptible to experiencing worry and self-doubt during competitive situations. Given these findings, it inspires to organise further research projects to investigate the management of cognitive anxiety in volleyball players of all skill levels. Coaches, sports psychologists, and professionals working with athletes should apply sports practices focused not only on achievements but primarily on the process (Mercader-Rubio et al., 2023) and emphasise the development of effective coping strategies tailored to individual needs, which, as evidenced by this research data, can be caused by some sociodemographic and sport characteristics. Implementing techniques like cognitive restructuring, mindfulness, and goal-setting can empower athletes to regulate their thoughts, reduce cognitive anxiety, and enhance mental resilience. By providing comprehensive support and resources, athletes can better navigate pre-competition anxiety, leading to improved performance and overall well-being.

The assessment of sport characteristics among participants (N = 37) revealed that athletes with sufficient knowledge (subjective evaluation) to manage pre-competition anxiety had lower cognitive anxiety levels, but their self-confidence was also lower compared to those who perceived their knowledge as insufficient. We can interpret that athletes with sufficient knowledge to manage pre-competition anxiety may have lower cognitive anxiety levels because they possess effective coping strategies and techniques to regulate their anxiety. For instance, Permadi & Nurwianti (2019) states that mindfulness and coping skills can decrease competitive anxiety in athletes. However, despite an athlete's ability to manage anxiety, their self-confidence may be lower because they are more aware of the potential challenges and uncertainties associated with competition. A deeper analysis of the data from this study allows to hypothesise that data from the males' subgroup may have led to lower cognitive anxiety level being established, while data from the females' subgroup may have led to lower level of self-confidence being found in the group of sufficient knowledges about anxiety management.

In our study, no strong effect sizes were observed between the subscales of pre-competition anxiety and the participants' sporting characteristics. Small effect sizes may be significant – their practical significance and real-world implications within the specific context of the study are crucial. Other studies (Agaoğlu, 2016; Marín-González

et al., 2022) also demonstrated a tendency towards very small effect sizes when comparing CSAI-2 subscales; it might be due to various factors such as the specific sample populations, the measurement instruments used, or the context in which the studies were conducted. These factors can influence the magnitude of the observed effects and highlight the need for further investigation to better understand the underlying reasons for the consistent small effect sizes in this context.

According to the research data, the first hypothesis was not supported: the female volleyball players' estimates of the components of pre-competition anxiety were similar to those of the male group, but it was found that there are some differences in the manifestation of pre-competition anxiety between female and male. The second hypothesis was partially supported: pre-competitive cognitive anxiety was directly related to the volleyball athletes' years of experience in volleyball; also, volleyball athletes with sufficient knowledge to manage competitive anxiety (based on subjective evaluations) had lower levels of cognitive anxiety and lower self-confidence when compared with those who were doubtful or lacked such knowledge.

ADVANTAGES, LIMITATIONS

One of the strengths of the study is that pre-competition anxiety was assessed by meeting athletes just before the competition and collecting relevant data at the time when they were actually experiencing this condition. This data collection strategy allows the results of the study to be obtained without the potential biases of difficulty in recalling the specifics of the pre-competition anxiety states and symptoms which can appear if the study is conducted by interviewing the athletes retrospectively. Another strength of the study is the complex assessment of a wide range of socio-demographic and sport-specific characteristics relevant to pre-competitive anxiety of the same athletes' group. Such a research strategy allows one to get a broader picture of the reality of the area under analysis and at the same time to avoid data biases which are possible when relationships of the separate indicators of different groups are generalised.

Cross-sectional research does not allow the assessment of causal relationships. The sample size was relatively small, which may limit the generalisability of the results to a larger population of volleyball players. In addition, the study only focused

on pre-competition anxiety and did not investigate other psychological factors, such as personality characteristics, self-efficacy, motivation or resilience, which may influence athletes' performance and well-being. Furthermore, it is important to acknowledge that the self-assessment measures utilised in the study may not entirely capture the objective reality of pre-competition anxiety.

Perspective research. Future studies should assess the associations of pre-competitive anxiety levels with sport characteristics across gender groups. Incorporation of a broader range of psychological variables could provide a more comprehensive understanding of the psychological factors associated with volleyball players' precompetitive anxiety. Qualitative research could also provide valuable insights into female and male athletes' subjective experiences, leading to targeted interventions for optimising their mental well-being and performance. Also, as the self-assessment measures may not fully reflect the objective reality of pre-competition anxiety, future research could consider using a combination of self-assessment tools and objective physiological assessments (e.g. heart rate variability, cortisol levels) to provide a more comprehensive understanding of volleyball players' anxiety reactions.

CONCLUSIONS

Research data gained can help researchers understand gender- and sport-specific characteristics of volleyball players' pre-competitive anxiety in a more complex way and can assist coaches and professionals in providing targeted support in a more personalised way and, therefore, to manage pre-competitive anxiety more effectively, enhancing athletes' preparation, performance, and mental health.

1. Male and female volleyball players rated their pre-competitive cognitive and somatic anxiety and self-confidence similarly ($p > 0.05$). In the subgroup of females, estimates of cognitive anxiety were higher ($p < 0.05$) compared to estimates of somatic anxiety. The higher age of the male volleyball players was associated with higher levels of cognitive anxiety ($p < 0.05$). Volleyball players (female and male) experiencing higher levels of pre-competitive cognitive anxiety reported experiencing more pre-competitive symptoms indicating higher level of somatic anxiety ($p < 0.001$).

2. An assessment of the volleyball players' sport characteristics revealed ($N = 37$) that athletes who reported sufficient knowledge to manage competition anxiety had lower level of cognitive anxiety ($p > 0.05$), but also lower self-confidence ($p < 0.05$) when compared to participants who thought that they "might/may not" have sufficient knowledge. Participants with a longer duration of participation in volleyball reported more symptoms of pre-competitive cognitive anxiety ($p < 0.05$).

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