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Analyzing the psychological variables linked to performance in beach volleyball: an integrative review and practical recommendations

Análisis de las variables psicológicas vinculadas al rendimiento en voleibol playa: una revisión integradora y recomendaciones prácticas

Análise das variáveis psicológicas ligadas ao desempenho no voleibol de praia: uma revisão integrativa e recomendações práticas

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ABSTRACT

Beach volleyball is an important team sport in which physical, technical, tactical, and psychological/social aspects are fundamental to sporting performance. However, this is the first review to analyse scientific production on psychological variables in beach volleyball. This is an integrative review in which a systematic search was carried out in five electronic databases (PubMed/MEDLINE, SPORTDiscus/EBSCO, SciELO, Scopus and BIREME) until September 2022. The terms used were "beach volleyball" OR "voleibol de praia" OR "vôlei de praia". In addition, the search included research with athletes, acute and chronic outcomes, and studies of various methods (e.g., experimental, observational) involving psychological variables. The initial search identified 652 articles, and after the manual search and application of the inclusion criteria, 18 studies were integrated into a final synthesis. Most of the studies were published between 2011 and 2022 (n = 14; 77.78%). Observational design was the main method used (n = 10; 55.56%). The studies were grouped into nine major topics for synthesis: stress situation, activation levels, concentration, goal orientation and motivation, mental fatigue and performance, anxiety, and performance, discouraging environments, relationships between team members, coping strategies. In general, social relationships and self-control appear significant for performance; thus, coaches must serve as role models for players and sports psychologists can aid in monitoring psychological variables, team dynamics, and develop psychological skills.

Keywords: performance; psychological preparation; team sports; net sports; athletes.

RESUMEN

El vóley playa es un importante deporte de equipo en el que los aspectos físicos, técnicos, tácticos y psicológicos/sociales son fundamentales para el rendimiento deportivo. Sin embargo, esta es la primera revisión que analiza la producción científica sobre variables psicológicas en vóley playa. Se trata de una revisión

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integradora en la que se realizó una búsqueda sistemática en cinco bases de datos electrónicas (PubMed/MEDLINE, SPORTDiscus/EBSCO, SciELO, Scopus y BIREME) hasta septiembre de 2022. Los términos utilizados fueron "beach volleyball" OR "voleibol de praia" OR "vôlei de praia". Además, la búsqueda incluyó investigaciones con atletas, intervenciones agudas y crónicas, estudios de diversos métodos (e.g., experimentales, observacionales) que implicaran variables psicológicas. La búsqueda inicial identificó 652 artículos y, después de la búsqueda manual y la aplicación de los criterios de inclusión, 18 estudios se integraron en una síntesis final. La mayoría de los estudios fueron publicados entre 2011 y 2022 (*n* = 14; 77.78%). El diseño observacional fue el principal método utilizado (*n* = 10; 55.56%). Los estudios se agruparon en nueve grandes temas para la síntesis: situación de estrés, niveles de activación, concentración, orientación a objetivos y motivación, fatiga mental y rendimiento, ansiedad y rendimiento, entornos desalentadores, relaciones entre los miembros del equipo, estrategias de afrontamiento. Las relaciones sociales y el autocontrol parecen ser importantes para el rendimiento, por lo que los entrenadores deben comportarse como modelos para los deportistas. Además, los psicólogos deportivos pueden ayudar a controlar las variables psicológicas, la dinámica del equipo y a desarrollar habilidades psicológicas.

Palabras clave: desempeño; preparación psicológica; deportes colectivos; deportes en red; Atletas.

RESUMO

O voleibol de praia é um importante esporte coletivo em que aspectos físicos, técnicos, táticos e psicológicos/sociais são fundamentais para o desempenho esportivo. No entanto, esta é a primeira revisão que teve como objetivo analisar a produção científica sobre variáveis psicológicas no voleibol de praia. Essa é uma revisão integrativa em que foi realizada uma busca em cinco bases de dados eletrônicas (PubMed/MEDLINE, SPORTDiscus/EBSCO, SciELO, Scopus e BIREME) até setembro de 2022, de forma sistemática. Os temos usados foram “beach volleyball” OU “voleibol de praia” OU “vôlei de praia”. Além disso, foram incluídos nessa busca pesquisas com atletas, intervenções agudas e crônicas, estudos de vários métodos (e.g., experimental, observacional) que envolviam variáveis psicológicas. A busca inicial identificou 652 artigos, após a busca manual e aplicação dos critérios de inclusão, 18 estudos foram integrados a uma síntese final. A maioria dos estudos foi publicada entre 2011 e 2022 (*n* = 14; 77.78%). O desenho observacional foi o principal método utilizado (*n* = 10; 55.56%). Os estudos foram agrupados em nove grandes tópicos para síntese: situação de estresse, níveis de ativação, concentração, orientação para metas e motivação, fadiga mental e desempenho, ansiedade e desempenho, ambientes desanimadores, relacionamento entre as partes da equipe, estratégias de enfrentamento. As relações sociais e o autocontrole parecem importantes para o desempenho, portanto treinadores devem se comporta como modelo para os atletas. Além disso, psicólogos do esporte podem ajudar a monitorizar as variáveis psicológicas, na dinâmica da equipa e desenvolver de competências psicológicas.

Palavras chave: desempenho; preparação psicológica; esportes coletivos; esportes de rede; atletas.

INTRODUCTION

Beach volleyball became an Olympic sport in 1996 (Lokegaonkar, 2022). Its level of competitiveness has significantly risen since then. Prior to the 2012 London Olympic Games, Brazilian or American teams were finalists in both genders (Lokegaonkar, 2022). However, in recent years, other countries such as Germany, Australia, and Norway have also excelled in the sport. In relation to physical aspects, this sport has intermittent characteristics, marked by game actions intercalated by rest periods (Costa et al., 2021; Magalhães et al., 2011; Medeiros et al., 2014a). Moreover, players employ vertical jumps in various game actions like serving, blocking, and attacking (Turpin et al., 2008). As a result, the physical attributes of performance are mainly linked to endurance and muscle power production. Thus, the physical attributes of performance are linked mainly with endurance performance and muscle power production.

About technical-tactical aspects that are relevant to beach volleyball, the role (i.e., blocker or defender), age category (e.g., U18, U21), and gender are variables that interfere in players' performance (Medeiros et al., 2014; Pérez-Turpin et al., 2019). For instance, these variables can interfere with the frequency of type serve and efficiency (Medeiros et al., 2014; Pérez-Turpin et al., 2019). Moreover, the attack performance appears to have a significant influence on determining the set's winner (Medeiros et al., 2017; Palao & Ortega, 2015). The relationship between physical, technical, and tactical aspects in sports science is a subject of extensive study. However, a holistic model proposed by Bangsbo (2015) also includes psychological/social aspects as determinants of sporting performance. This set (i.e., physical, technical, tactical, and psychological/social) are essential for optimal performance. Just as muscular power and skills necessary to perform game actions efficiently are required, psychological skills (e.g., stress management, self-control, motivation, etc.) are also required for training and competitive events.

Iso-Ahola (1995) proposes two primary areas linked to psychological performance in athletes. These areas involve intrapersonal factors such as motivation, anxiety, stress, and concentration, as well as interpersonal factors, including the relationship between the coach and the athlete. Generally, these skills are developed by sports psychologists or mental training consultants (Carr, 2006). Nevertheless, Coaches must also give heed to these factors, as they frequently spend extended periods with athletes and have a daily connection. Similar to how endurance and technical-tactical performance are learned and refined through training, psychological abilities can also be honed to comply with specific sporting demands (Birrer & Morgan, 2010). It is therefore crucial to identify the precise psychological demands of a sport to propose effective interventions (Stefanello, 2009).

Specifically in beach volleyball, systematic reviews analysed the literature on injuries and pathology (Jimenez-Olmedo & Penichet-Tomas, 2015) and tactical-technical performance (Alvarado-Ruano & López-Martínez, 2022; Medeiros et al., 2014b). In this regard, it seems that the physical, technical, and tactical aspects have been prioritised, while the psychological aspects have been neglected by researchers interested in beach volleyball. In contrast, psychological factors and performance have already been revised in soccer players (Pettersen et al., 2022). Therefore, the current integrative review aims to analyse scientific production regarding psychological variables in beach volleyball. This encompasses identifying significant profiles and behaviours for optimum beach volleyball performance. Additionally, we used an integrative model to encompass all potential methods used to date. Finally, practical recommendations were provided for coaches and sports psychologists to facilitate evidence-based psychological preparation.

MATERIALS AND METHODS

This study is an integrative review, following guidelines wherever possible (Toronto & Remington, 2020), and the PRISMA/PERSiST guidelines (Ardern et al., 2022) were used to design the research question and selection protocol. In addition, the review protocol was published on the Open Science Framework (OSF platform - https://osf.io/4s7gy).

Research Question

This review included research of diverse methods (e.g., observational, experimental) following rigorous systematic criteria. Thus, the PICOS strategy (Table 1) was utilized for the defined research question:

Table 1

PICOS Strategy

Population	Beach volleyball players (grassroots or senior players who aimed to compete in sport, recreational players were excluded).
Intervention	Acute or chronic interventions and observational studies.
Comparator	*Experimental studies:* psychological adaptation compared to control. Experimental studies that did not have a comparator were excluded. *Descriptive and observational studies:* this criterion was not applied to observational studies.
Outcomes	Psychological variables (e.g., anxiety, motivation, coping strategy, etc.).
Study design	All types were included (e.g., experimental, observational, etc.).

Eligibility Criteria

The selection studies were based on inclusion and exclusion criteria. The inclusion criteria were as follows: published in Portuguese or English language, beach volleyball players (grassroots/amateurs or senior players) as participants, studies addressing psychological observations and interventions in training or competition.

The exclusion criteria were as follows: a) review or opinion articles; b) injuries outcomes, c) studies that included other sports participants; and b) full text unavailable (in this case, the paper was requested from the main author and excluded if the request was not answered or denied).

Search Strategy

The searches were carried out in electronic databases until September 2022: PubMed/MEDLINE, SPORTDiscus/EBSCO, SciELO, Scopus, and BIREME. The terms utilized were “beach volleyball” OR “voleibol de praia” OR “vôlei de praia”. Only in the PubMed/MEDLINE database were the terms "injured" and "injuries" initially excluded from the search. This was because it was noted that these terms included many articles outside the objectives of the research, especially in this database. The BibTeX list was extracted from these databases and added to the Parsif Platform. First, duplicate studies were automatically deleted before applying inclusion/exclusion criteria using the tool of Parsif Platform. Then, two researchers (YPC and BSLS) independently selected the studies by title/abstract. In the end, the list of selections was compared. When only one researcher selected the study, the third (GRB) decided to include or exclude it. Moreover, if the title/abstract provides enough information about the criteria adopted, the authors consulted the full text. The reference list was searched for selected other articles that met the inclusion criteria.

Data extraction and result syntheses

Information about author, year of publication, study participant (age and sex), objectives, data collection(s)/method(s) and primary outcomes were extracted by two independent researchers. If there were disagreements, the paper was consulted again. In cases the authors cannot identify the main outcomes to extract, the corresponding author were contacted. The studies were grouped for the syntheses in stress situations; activation levels; concentration; goal orientation and motivation; mental fatigue and performance; anxiety and performance; discouraging environments, the relationship between team parts; and coping strategies.

Statistical analysis

The frequency distribution was calculated to verify publication trends, gender and age category of participants, and studies by topic. Previously, publication trends were classified into “before years 2010”, “years 2011 – 2019”, and “years 2020 – 2022”, gender into male or female, the category into grassroots (players U21 or less) or senior (players ≥ 21 years old), and studies into in accordance with synthesis group. Statistical calculations were performed using the software Microsoft Excel (Microsoft Corporation, Version 2016, Redmond, USA). The Cohen’s “d” effect size was calculated when possible. Moreover, if the paper reported “r” (correlation) and/or “r2” (determination) coefficient, this was transformed in Cohen’s “d” (Lenhard & Lenhard, 2022).

RESULTS

Study Selection and Characteristics

The initial search identified 652 articles in five databases, but only 16 were included. Moreover, two articles were found in a manual search and included (more details in the flow diagram, see Figure 1). Concerning the publication trend, 22.22% (n = 4) were published before 2010. Moreover, the same number of publications were observed between 2011-2019 (38.89%; n = 7) and 2020 – 2022 (38.89%; n = 7). A balance was found in the study participants. A small difference was observed in the frequency (Males = 517; 58.22% Vs. Females = 371; 41.78%; Youngies = 417; 54.87 Vs. Senior = 343; 45.13%). In addition, Knoblochova et al. (2021) were excluded from gender synthesis because it did not provide such information. The most frequent study design was analytical with an observational (n = 10; 55.56%) approach, following Ranganathan and Aggarwal, (2018)’s classification. On the other hand, only 11.11% (n = 2) of studies found used an experimental design. The others, 33.33% (n = 6), were descriptive studies. In addition, the highest Cohen’s “d” effect size was observed in “association between coping strategies and resilience” (“personal coping resources

score" - d = 1.960), and confidence in victory (*d* = 1.523). All studies included were listed in Table 2, along with the extracted data.

Figure 1

Flow chart of study-selection process (inclusion and exclusion of studies)

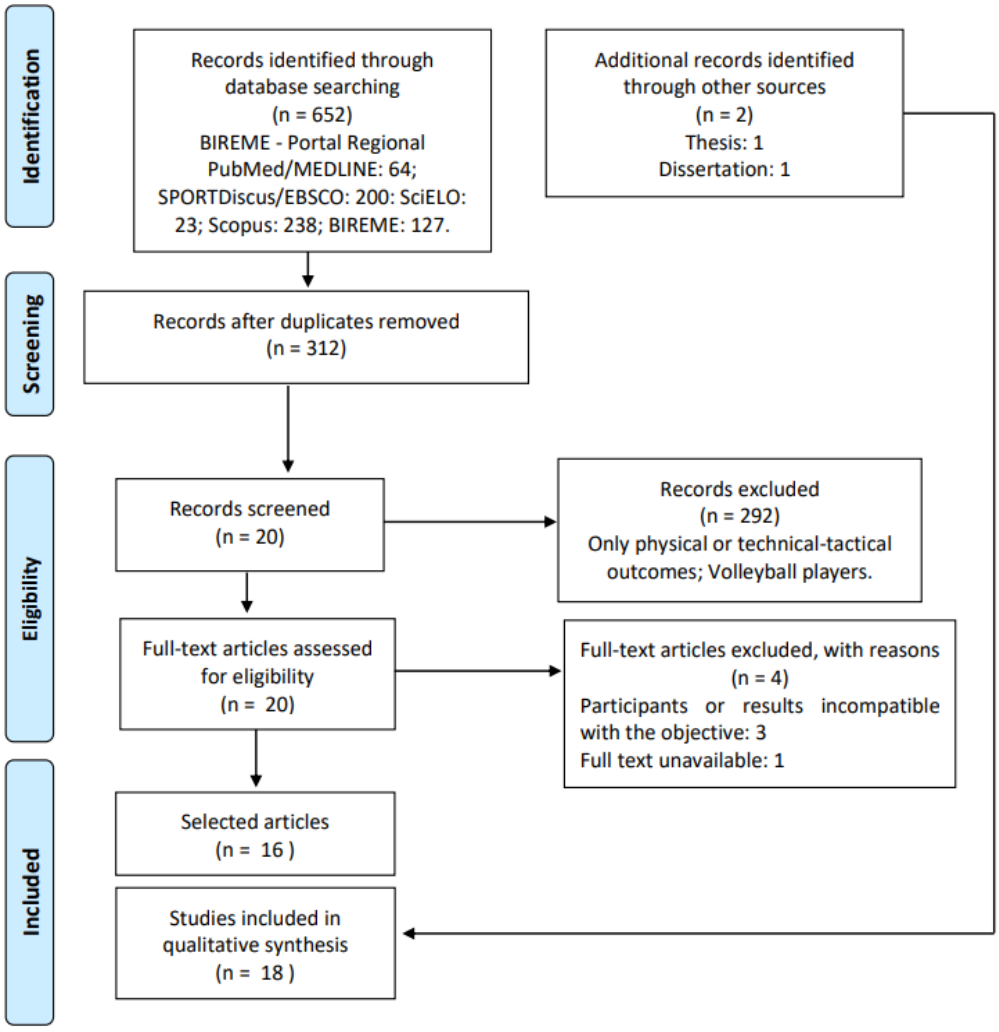

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Table 2

Summary of studies on the beach volleyball and sports psychology

Reference	Participants	Aim(s)	Study Design	Instruments	Main outcomes	Effect Size (d)
Belem et al. (2014)	Grassroots: U21: 24 M; 24 F (18 ± 1.3 years old)	Analyze the impact of coping strategies on the resilience of beach volleyball athletes.	Observational (cross-sectional)	Athletic Coping Skills Inventory-28; Connor-Davidson Resilience Scale.	More resilient athletes had higher scores on "Coping with adversity", "Confidence and achievement motivation", "Coachability", and "Personal coping resources score". The main coping strategies that had an impact on resilience were "personal coping resources", "confrontation with adversity", "confidence and motivation".	Association between coping strategies and resilience *Coping with adversity: 1.461 *Goal setting: 0.796 *Confidence and achievement motivation: 1.217 *Coachability: 0.699 *Personal coping resources score: 1.960
Caruzzo et al. (2013)	Grassroots: 33 M 34 F; Senior: 32 M; 26 F	Analyzed the sporting orientation (task/ego) of beach volleyball athletes of the state of Parana.	Observational (cross-sectional)	Task and ego orientation sports questionnaire.	The score relative to task orientation was similar between medalists and non-medalist athletes. But the ego orientation was higher in medalists. No difference was found in goal orientation (task and ego) according to age.	Not informed and it was not possible to calculate
Caruzzo et al. (2021)	Senior: 27 M; 38 F (28.16 ±4.85 years old)	Analyze the impact of the coach-athlete attachment style, mediated by the coach's leadership style, on the mental toughness of athletes in the world beach volleyball context.	Observational (cross-sectional)	The Coach-Athlete Attachment Scale; Mental Toughness Index; Leadership Scale for Sport.	In coach-athlete relationship, the "secure style" (i.e., relationship of trust with the coach) was positive associated to mental toughness, and leadership profiles isn't a mediator. For "anxious style", the "autocratic leadership style" (focused on coaching-instruction) was positive associated a mental toughness.	Not informed and it was not possible to calculate
Costa et al. (2020)	Grassroots: 16 M (17 ±2.44 years old)	Verify the effect competitive anxiety on the match's result.	Observational (cross-sectional)	Competitive State Anxiety Inventory (CSAI-2R). Visual analog scale for confidence in victory.	"Self-confidence" and "confidence in victory" showed moderate and large effect, respectively, in discriminating the winner of the match.	Winner Vs. Loser Cognitive anxiety: - 0.620 Somatic Anxiety: - 0.168 Self-confidence: 0.972 Confidence in victory: 1.523
Costa et al. (2022)	Grassroots: 16 M (16.9 ±2.7 years old)	Investigate differences in salivary testosterone and cortisol concentrations before, during, and after simulated beach volleyball match, depending on match outcome (winning vs. losing).	Observational (cross-sectional)	Salivary cortisol and testosterone - Enzyme-linked immunosorbent assay (ELISA).	Victory in the match appears increased testosterone levels in winners (i.e., winner effect); in losers, the cortisol level was higher. Furthermore, pre-match cortisol levels was negatively correlated with attack performance.	Testosterone: Pre-post (Winner): 0.693 Pre-post (Loser): 0.379 Cortisol: Pre-post (Winner): 0.567 Pre-Post (Loser): 0.866 *Correlation between attack efficiency and cortisol pre-match: - 1.286

[#] = Listed in alphabetical order; grassroots: age < 22 years old); Senior: Age ≥ 22 years old); M = male players; F = female players; MPUP: Maximum performance under pressure; CWA: Confrontation with adversity; CON = Concentration; CTS = Coping total score; * = r or r^2 transformed in Cohen's "d".

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Table 2 (continuation)

Summary of studies on the beach volleyball and sports psychology

Reference	Participants	Aim(s)	Study Design	Instruments	Main outcomes	Effect Size (d)
Domingos-Gomes (2019)	Grassroots: 10 M (16.1 ±0.9 years old)	Analyze the effects of mental fatigue on performance during a beach volleyball match.	Experimental (crossover)	Visual analog scale for mental fatigue; Match analysis.	Mental fatigue impaired attack performance.	Mental Fatigue Vs. Control PC – Attack: 2.5 Efficiency: 1.4
Kais & Raudsepp (2004)	Senior: 66 M (28.2 ±2.9 years old)	Examine the effects of intensity and direction of competitive state anxiety and self-confidence on athletic performance in beach volleyball.	Observational (cross-sectional)	Competitive State Anxiety; Inventory-2 with directional scale.	The beach volleyball performance as predict by self-confidence score, and directional perception of somatic and cognitive anxiety. These variables explained 43% technical-tactical performance variation.	*Association between anxiety dimension and beach volleyball performance Self-confidence Intensity: 1.090 Somatic Anxiety Direction: 1.387 Cognitive Anxiety Direction: 1.250
Klatt et al. (2021)	Senior: 46 M; 36 F (26.39 ±4.32 years old)	Assess the personality traits and emotion regulation styles of elite beach volleyball players.	Observational (cross-sectional)	Big Five Inventory; Personality Adjective Scale; Affective Style Questionnaire.	The main reported personality traits were agreeableness and openness to experience. Moreover, beach volleyball players were related to reasoning, warmth, emotional stability, and perfectionism personality adjectives, and showed a high emotion regulation. However, a relationship between personality traits, emotional regulation styles, performance, and overall satisfaction was not found. Finally, the teams were formed by players with similar personalities.	*Correlation between personality and performance Emotional stability: 0.429
Knoblochova et al. (2021)	Grassroots and Senior: 63 M; 65 F (26 ± 6.27 years old)	Assess the relationships among achievement goal orientations (task/ego), sport motivation, and athletes' competitive performance.	Observational (cross-sectional)	Sport Motivation Scale-6; Perception of Success Questionnaire.	Task oriented athletes were associated to intrinsic motivation (enjoyed the sport participation); Ego oriented athletes were associate to extrinsic motivation (sporting results and social status). Moreover, perhaps the ego orientation can represent an advantage for elite sport.	Association between goal orientation, sport motivation and competition outcomes *Intrinsic motivation and task orientation: 1.167 *External regulation and ego orientation: 0.779 *Competitive performance and ego orientation plus age: 0.744
Lau et al. (2020)	Senior: 7 F (22 ±2 years old)	Discover how Singapore national beach volleyball athletes voice about an ideal coach.	Descriptive	Semi-structured interviews.	Understanding female athletes (i.e., relating to the coach-athlete relationship and training structure), being a role model with responsibility (e.g., punctuality, fulfill commitments and agreements), and possessing rich experience as a coach and athlete (i.e., believe that the athlete experience can help to develop effective training, as well as achieve athlete development through the sharing of ideas and stories).	Not apply

Table 2 (continuation)

Summary of studies on the beach volleyball and sports psychology

Reference	Participants	Aim(s)	Study Design	Instruments	Main outcomes	Effect Size (d)
Poczwardowski et al. (2020)	Senior: 3 M; 2 F (42 ±9.54 years old)	Explore Olympic-level athlete-athlete partnerships through the lenses of interdependence theory. and Jowett and colleagues' 3+1C's model of the coach-athlete relationship.	Descriptive	Phenomenological approach (giving voice) by semi-structured interview.	Five constructs were found: compatibility (i.e., match between the players), associate interpersonal components (partnership chemistry, philosophy, and mindset); commitment (i.e., emphasized to team success above individual success), included personal sacrifice, goal achievement awareness, and preparation (physical and mental); complementarity is a distribution of responsibilities among partnership for decision-making, role definition and dyadic coping; co-orientation refers to the sharing of perspective between players, reducing the chances of interpersonal conflict, thus increasing satisfaction; closeness is related to trust among athletes, therefore trust, dependence, affective investment and respect are subclasses of this construct.	Not apply
Rikberg et al. (2011)	Grassroots: 38 M (16.7 ±1.4-year-old)	Examine the accuracy of retrospective recall of affect and competitive anxiety in young male beach volleyball players.	Experimental (parallel groups)	Affect grid; Competitive State Anxiety Inventory-2.	The video feedback improves accuracy of retrospective recall of affect and competitive anxiety.	Video Vs. No-video. Somatic Anxiety: -0.250 Cognitive Anxiety: -0.164
Sonnabend (2020)	Grassroots: 89 M; 88 F (8.63 ±3.94; 27.43 ±3.55, respectively)	Investigates the adverse effects of unbalanced competition and negative feedback in team contests in the field.	Observational (cross-sectional)	Performance indicators provided by specialized companies and official tournament website.	Discouraging environments (heterogeneity in skills or negative feedback) was related an effort reduction. Age-diverse team seems better react to discouraging environments. There is a tendency for the second set score to be lower if the first set is lost.	Association between unbalanced abilities and performance (non-linear and convex): 1.033 (Male) 1.500 (Female) SET2 score associated SET1 outcome: 0.651
Stefanello, (2007a)	Senior: 2 M (29 and 31 years old)	Analyze internal and external factors that can influence the state of concentration of high-performance athletes.	Descriptive (case report)	Adapted feedback instrument.	Personal competence, opponents' conduct, and opponents' performance (i.e., situational factors) are the main factors that disturb concentration. The main effect of this is perceived in the emotional state and/or mood. Self-talk was the main approach to maintain or regain concentration.	Not apply
Stefanello (2007b)	Senior: 2 M (29 and 31 years old)	Analyze the psychological techniques or strategies used by athletes to regulate their activation levels.	Descriptive (case report)	Adapted feedback instrument.	Finally, optimal activation levels were present in most matches (~60 - 80%). When the activation level was "optimal," athletes primarily used self-talk and focusing attention to maintain this state. When the activation level was "low", athletes primarily used self-talk and goal setting to achieve the optimal level of activation. When the activation level was "high", self-talk and attentional focus were the most frequently used cognitive techniques, in addition, athletes used somatic techniques, for example, breathing and screaming (overflow) to adjust activation.	Not apply

Table 2 (continuation)

Summary of studies on the beach volleyball and sports psychology

Reference	Participants	Aim(s)	Study Design	Instruments	Main outcomes	Effect Size (d)
Stefanello, (2007c)	Senior: M= 2 (29 and 31 years old)	Analyze situations that generate stress, how athletes experience competitive stress and what are the most efficient techniques for stress control.	Descriptive (case report)	Adapted feedback instrument.	Situational factors were the main source of stress. Moreover, stress was experienced primarily through thoughts and emotions/ corporal sensations. Athletes used self-talk, concentration, and imagery (i.e., cognitive techniques) to manage stress.	Not apply
Vieira et al. (2013)	Senior: U21: 24 M, 21 F; Senior: 24 M, 24 F.	Analyze burnout syndrome and coping strategies.	Observational (cross-sectional)	Burnout questionnaire for athletes; Athletic coping skills inventory.	Burnout syndrome was negative associated to coping strategies. More experienced and male players seem use more often coping strategies.	Correlation between coping strategy and burnout dimension MPUP and total burnout: - 0.516 MPUP and Reduced sense of accomplishment: -0.629 MPUP and sports devaluation: - 0.796 CWA and total burnout: - 0.796 CWA and Physical and emotional exhaustion: - 0.583 CWA and Reduced sense of accomplishment: -0.494 CWA and sports devaluation: - 0.899 CON and Physical and emotional exhaustion: - 0.429 CON and sports devaluation: - 0.723 CTS and total burnout: - 0.583 CTS and Reduced sense of accomplishment: - 0.429 CTS and sports devaluation: - 0.747
Zakrzewski (2015)	Senior: 6 F	Examining the phenomenological experience of competitive state anxiety for female beach volleyball players at the 2012 London Olympics	Descriptive	Phenomenological interview method.	The ability to recognize, manage and positively interpreting anxiety is more important to performance than intensity. The negative impacts of anxiety were potentiated by self-confidence.	Not apply

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Quantitative synthesis

The studies were grouped into nine topics, as demonstrated in Table 3. The "Relationship between team parts" and "Coping strategies" were the topics with most studies included, five each (n = 5; 21.74%). Some studies were included in two topics, as Sonnabend (2020) in "Discouraging environments" and "Relationship between team parts"; Costa et al., (2022) in "Stress situation" and "Discouraging environments"; and Stefanello's studies "Stress situation" (Stefanello, 2007c), "Activation levels" (Stefanello, 2007b) "Concentration" (Stefanello, 2007a) were also included in "Coping strategies".

Table 3
Studies distribution by psychology topics

General Topics	n	%	Studies
Stress situation	2	8.70	(Costa et al., 2022; Stefanello, 2007c)
Activation levels	1	4.35	(Stefanello, 2007b)
Concentration	1	4.35	(Stefanello, 2007a)
Goal orientation and motivation	2	8.70	(Caruzzo et al., 2013; Knoblochova et al., 2021)
Mental fatigue and performance	1	4.35	(Domingos-Gomes, 2019)
Anxiety and performance	4	17.39	(Costa et al., 2019; Kais & Raudsepp, 2004; Rikberg et al., 2011; Zakrzewski, 2015)
Discouraging environments	2	8.70	(Costa et al., 2022; Sonnabend, 2020)
Relationship between team parts	5	21.74	(Caruzzo et al., 2021; Klatt et al., 2021; Lau et al., 2020; Poczwardowski et al., 2020; Sonnabend, 2020)
Coping strategies	5	21.74	(Belem et al., 2014; Stefanello, 2007b, 2007c, 2007a; Vieira et al., 2013)

DISCUSIÓN

This present integrative review aimed to analyse scientific production regarding psychological variables in beach volleyball. Therefore, according to the identified scientific production, we discuss topic-by-topic showing what has already been found, limitations, and recommendations for future research. Finally, we provide a model that helps in the integrated work between coaches and sports psychologists.

Stress situation

Stress is characterized to any situation that individual capacity (physical and/or mental) as surpassed by environmental demand, leading to unsatisfactory responses that can result in significant consequences (Weinberg & Gould, 2017). The stressors can be categorized into two primary groups: situational stressors (e.g., the significance of the championship, the possibility of winning for the team) and personal stressors (e.g., anxiety). Stefanello (2007c) is the only study that investigated stress situations in real beach volleyball. The result of this study suggests that situational factors, such as aspects related to the match (e.g., opponent level), were the main stress factor. Moreover, "thoughts" and "emotions / corporal sensations" were the main ways athletes reported experiencing stress. Although interesting, these data require updating as they were studied over a decade ago. Furthermore, the researcher analysed only two players, which may lead to research bias (i.e., confirmation bias). The identified factors could facilitate the development of tools to assess a greater number of athletes in an impartial manner for an objective way. Moreover, in stressful situations as facing sport competition, the hypothalamic-pituitary-adrenal (HPA) axis is activated, leading to elevated cortisol levels (Russell & Lightman, 2019). In this way, the preliminary evidence with beach volleyball players suggests that match stress induced higher cortisol levels in losers, and pre-match cortisol was negatively correlated with attacking performance (Costa et al., 2022). Therefore, stress management seems to be important for victory, although the evidence is limited.

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Activation Levels

Activation is defined as a variable level of excitement between the sleep state and maximum excitement (frenzy), which is manifested both psychologically and physically (Weinberg & Gould, 2017). Additionally, the level of activation is not determined by the event alone; pleasant and unpleasant events can generate similar activations. The Individual Zones of Optimal Functioning (IZOF) were the first model to suggest that performance relates to an individually optimal zone (Ruiz et al., 2017). In this sense, Stefanello (2007b) examined how often Olympic champions played at various activation levels. The players indicated an optimal activation level in over 60% of matches. However, the activation level and link with match outcomes was not tested. Moreover, the data was collected from a team. Additionally, analyses were based on athlete feedback. Further research could implement heart rate variability monitoring of the sympathetic and parasympathetic activity to provide stronger evidence.

Concentration

Beach volleyball matches are disputed with spectators near the courts. Additionally, training facilities are often located in open areas like beaches and parks. Therefore, concentration - defined as the skill to focus on pertinent stimuli (Weinberg & Gould, 2017) - is crucial for athletic excellence, helping players maintain their attention on key elements. Stefanello (2007a) investigated the factors that can disrupt concentration during beach volleyball matches. The players reported situational factors, such as the opponent's behaviour and performance, own performance, and adverse weather conditions, as the primary causes of concentration lapses. This condition led to irritation and impatience that affected the actions of the game, reducing aggression and increasing errors. This information can be utilized to coach players to destabilize the opponent team. Besides, the weather also seems to break the athletes' concentration, which sports psychologists can work on since there is no athlete's control over this variable. The author also reported that the consequences of losing concentration were an alteration in mood status (i.e., irritation), losing attention, and errors in in-game actions. These data were derived from only two elite professional athletes. Therefore, future investigations need to investigate on a larger scale. In addition, investigating grassroots athletes, who probably have lower psychological skills, seems interesting.

Goal orientation and motivation

Athletes generally set short/long-term goals for the season. This seems essential to direct and motivate the athlete (Weinberg & Gould, 2017). Goal orientation relates to success perception (Copetti et al., 2005). It can be directed to ego (i.e., overcoming the opponent, winning the competitions) or task (i.e., overcoming personal limits, development in sport). In beach volleyball, this topic was investigated with young and seniors of different competition levels (Caruzzo et al., 2013; Knoblochova et al., 2021).

The goal orientation seems similar between grassroots and senior players (Caruzzo et al., 2013). Moreover, task orientation was associated with intrinsic motivation (Knoblochova et al., 2021). Players with this characteristic participated in beach volleyball activities because they loved the sport. On the other hand, ego orientation was associated with extrinsic motivation, players can like sports, but winning is the primary way to motivation. In this context, it is important to note that the enjoyment of playing can last a lifetime. However, competition outcomes depend on several other factors (i.e., biology, gene, opponent, etc.). It is therefore important to investigate the effect of goal-orientation on dropout in the future.

Regarding goal orientation and performance, ego orientation was higher in medalists compared with non-medallists (Caruzzo et al., 2013). Moreover, the point averages were associated with ego orientation (Knoblochova et al., 2021). These studies confirm that performance is the benefit of ego orientation. Sports psychologists and coaches can direct athletes' goals in this direction. However, we suggest caution with young athletes, as we have hypothesised that too much focus on the ego may favour dropout from sport. Future research could analyse these issues using longitudinal methods and use more robust technical-tactical indicators than point averages to explain the relationship between goal orientation and performance.

Mental Fatigue and performance

Mental fatigue is a sensation of fatigue or lack of energy after performing cognitive activities (Boksem & Tops, 2008; Marcora et al., 2009). This condition has been associated with a reduction in performance (Costa et al., 2022; Grgic et al., 2022). In the context of beach volleyball, research has shown that young players experienced subpar attack performance in a simulated match after 30 minutes of performing the Stroop task (Domingos-Gomes, 2019). Thus, it is recommended that players refrain from engaging in cognitive tasks before official matches and training sessions. In brief, the mechanisms that account for the decline in sporting performance are linked to executive function impairment resulting from mental fatigue (Smith et al., 2018). In the future, research could examine the link between mental fatigue and the executive functions of beach volleyball players. Additionally, Domingos-Gomes (2019) did not study senior players or ecological tasks, which involve cognitive activities conducted in real-life situations. Previously, the use of social media and video games before simulated soccer matches was found to impair decision-making (Fortes et al., 2019; 2020). Therefore, it appears crucial to investigate ecological tasks in the beach volleyball environment, with both senior and grassroots athletes.

Anxiety and performance

The Martens' "Multidimensional Anxiety Theory" has been a frequently adopted approach in sports psychology to comprehend the association between anxiety and performance. Essentially, this theory divides anxiety into three dimensions (Craft et al., 2003):

Cognitive: the athlete suffers from negative thoughts and has trouble concentrating and imagining unfavorable results regarding their sports performance.

Somatic: the perception of physiological symptoms by players, such as an elevated heart rate, in a sports setting.

Self-confidence: work in opposition to cognitive anxiety, leading the player to trust in their skills to carry out the subsequent performance

In this sense, three of the four studies in this topic used to the "Competitive State Anxiety Inventory - CSAI" (Costa et al., 2020; Kais & Raudsepp, 2004; Rikberg et al., 2011), a psychometric tool for investigated competitive anxiety. Alternatively, the phenomenological interview method was utilized in only study (Zakrzewski, 2015).

Kais and Raudsepp (2004) investigated the prediction power of anxiety dimensions in beach volleyball performance with 66 professional players that competed at the Estonian Championships, World Tour, or European Championship. These authors reported an association between self-confidence score and directional perception of somatic and cognitive anxiety. It is important to note that anxiety scores were not determinants, but how athletes perceived anxiety in a competitive context. On the other hand, a self-confidence score is essential to performance. Therefore, the more confidently and positively players perceive anxiety symptoms, the better they perform game actions. These results corroborate with, found in young players, self-confidence had a moderated effect on discriminated winners and losers (Costa et al., 2019). Finally, the interview's interpretation seems to follow the conclusion's observational studies concerning performance and intensity anxiety (Zakrzewski, 2015), but self-confidence, described as a potentiation of anxiety, seems a confusion in interpretation because cognitive anxiety is opposite to self-confidence. Therefore, they could not be correlated in the same direction.

The only study on this topic used an experimental design with parallel groups (Rikberg et al., 2011). The results suggest that watching 15 min of videotape of a warm-up routine can elicit anxiety and affect emotions (Rikberg et al., 2011). The findings of this study can assist researchers in constructing research procedures akin to competition in the laboratory and explore queries that are unfeasible to examine in real competition scenarios. Moreover, the effect of competition location (i.e., home Vs. away), competition level (i.e., national, international), and categories (i.e., U-19, U-21) in anxiety are still unknown. In addition, although one review suggests that athletes perform best within an ideal zone (Jokela & Hanin, 1999), as suggested by the IZOF model, the data for beach volleyball seem to confirm

that self-confidence has a significant relationship with performance (Craft et al., 2003). Thus, more evidence is needed to connect the other anxiety components with performance, as suggested by Multidimensional Anxiety Theory (Craft et al., 2003).

Discouraging environments

In the preceding topic (i.e., 'anxiety and performance'), we presented research indicating self-confidence as a crucial performance factor. In other hand, according to Sonnabend (2020), effort diminished during unbalanced matches (i.e., when the opposition was significantly stronger - ranking disparity) or when experiencing negative feedback during a match (e.g., losing the first set or a substantial point gap). As a result, this discouraging environment leads players to underperform. However, it is possible that self-confidence can mitigate the impact of a negative environment and this needs to be investigated, especially given the characteristics of volleyball. Furthermore, sports psychologists ought to seek strategies to encourage athletes to persist under challenging circumstances. In contrast, the triumph appears to foster positive surroundings. Costa et al. (2022) illustrated that testosterone levels are higher after a victory compared to a loss, supporting the Biosocial Model of Status (Mazur, 1985).

Relationship between team parts

Interpersonal relationships are an attractive topic in sport psychology due to the crucial role of social support in performance, and its potential to aid in emotional stress regulation, and its utility as a coping mechanism (Iso-Ahola, 1995). Accordingly, the coach-athlete relationship (Caruzzo et al., 2021; Lau et al., 2020) and athlete-athlete relationship (Klatt et al., 2021; Poczwardowski et al., 2020) have been explored in beach volleyball.

Lau and colleagues (2020) conducted a study on female athletes' perceptions of an ideal coach. The research findings suggest that players consider aspects associated with the influence of the coach on the athlete, which has been demonstrated by commitment and responsibility to the team, as well as the coach's past as a player. Furthermore, female athletes value receiving personalized attention, chiefly due to inherent female traits such as the menstrual cycle. An important limitation of this study is the small sample size (only 7 participants were interviewed). Therefore, caution must be exercised when generalising the findings to athletes from different social contexts (such as South American players), as national customs may influence athletes' expectations of a coach. Future research could address these questions by considering the gender and skill level of the athletes. About a coach-athlete attachment style and a coach's leadership style, Caruzzo et al. (2021) investigated how this variable can influence mental toughness. The findings demonstrate that establishing a secure coach-athlete attachment style may enhance the athlete's mental toughness. In essence, the greater the athlete's perception of confidence in their coach, the stronger their mental resilience. On the other hand, anxious athletes, who are often suspicious of their coach's commitment, seem to benefit mentally from autocratic coaches. This research reformulates the notion that sports psychologists ought to concentrate not only on individual players but everyone integral to the team. Furthermore, if the coach fails to adjust to the athlete's requirements, it may be worthwhile to contemplate a change in coaching personnel. Further research could explore the correlation between mental toughness and athletic technical-tactical performance in young and senior players. It would be valuable to examine also whether mental toughness can serve as a performance indicator in this population.

Beach volleyball teams possess a distinctive characteristic that sets them apart from other team sports. Two players exclusively share their living space during training, travels, and contests. Consequently, the frequent alteration of teammates does not foster the formation of stable relationships. Poczwardowski et al. (2020) proposed five interpersonal components in elite beach volleyball athlete-athlete partnerships based on interviews with Olympic players. These components include compatibility, commitment, complementarity, co-orientation, and closeness, which suggest desired behaviour both on and off the court, that may develop over time. However, while the participating athletes demonstrated success, it is possible that the relationship dynamics among the less successful could have been comparable. Specifically, it is

necessary to determine if these relationships have an impact on performance and how they are constructed. About personality, the teams were made up of athletes with similar personalities (Klatt et al., 2021), going against the belief that the teams would be made up of athletes with different personalities who would complement each other. This valuable information can be utilised by coaches to improve their team selection approaches, although further research ought to be conducted in other cultural settings. Furthermore, it appears that teams consisting of players of varying ages may exhibit a more effective response to negative environments (Sonnabend, 2020).

Coping strategies

In sports, the players are usually exposed to stressful situations (more details in the "stress situation" section). In this sense, it seems essential to develop ways that help athletes to manage stress and performance with positive psychological status (Smith et al., 2016). In the psychological literature, these strategies are referred to as coping strategies and are linked to athletic performance (Nicholls et al., 2016). In the beach volleyball context, coping strategies were investigated combined with burnout syndrome [i.e., impairment in performance and pleasure by chronic stress (Vieira et al., 2013)], and/ resilience [i.e., behaviour and adaptation skill in the face of adversity (Belem et al., 2014)]. Moreover, a series of case studies with Olympic champion athletes described the techniques used by the team with stress management (Stefanello, 2007c), concentration (Stefanello, 2007a), and activation (Stefanello, 2007b).

To investigate burnout syndrome and coping strategies, Vieira et al. (2013) conducted a study on grassroots and senior players prior to a national competition. The findings indicate a negative correlation between burnout syndrome and coping strategies. Specifically, athletes who do not utilize coping strategies tend to exhibit higher burnout scores. Moreover, it appears that male and more experienced athletes employ coping strategies more frequently. Moreover, same coping strategies ("coping with adversity", "goal setting", "confidence and achievement motivation", "coachability", and "personal coping resources score") were positively associated with resilience (Belem et al., 2014). This means that the greater the coping capacity, the greater the athlete's resilience. Therefore, it is probable that players with these characteristics have an advantage in the beach volleyball championship because the time between matches is short; it needs to recover quickly from possible defeats. Unfortunately, these studies are transversal, and there is no data about a season. Questions about how coping strategies are applied in training processes are unclear. In addition, it is surprising that types of coping strategies have not been investigated in the context of anxiety. In any case, developing coping strategies seems important and should be part of the work of sports psychologists.

The works presented by Stefanello (Stefanello, 2007a; 2007b; 2007c) released an insight into the main strategies used by Olympic champion athletes. Cognitive strategies were the primary way used by players. In this sense, self-talk and imagery were utilized in a stress situation (Stefanello, 2007c), re-establishment of concentration (Stefanello, 2007a), and regulation of activation (Stefanello, 2007b). Moreover, attention focusing was utilized to regulate activation (Stefanello, 2007b) and concentration (Stefanello, 2007a). Concerning self-talk, this technique involves the player talking internally or in a low voice to control anxiety and enhance self-confidence, moreover, the effectiveness of this practice is more significant after prolonged training (Walter et al., 2019). Furthermore, positive self-talk can be more beneficial than negative self-talk (Horcajo et al., 2019). Nevertheless, the potential impact on performance of this strategic and the optimal timing for its use in beach volleyball matches remain to be unknown.

In terms of imagery strategy, this approach is used to retrieve positive experiences and/or visualise ideal game actions. A recent study suggests that images help regulate the direction of attention during visual search tasks (Moriya, 2018). However, such results were verified in video-based stimuli, which may not clearly reflect the reality of the real matches. In addition, although players report using this technique during games (Stefanello, 2007a; 2007b; 2017b;), this strategy can be useful before games. For instance, Munroe-Chandler et al. (2008) reported that incorporating general-mastery imagery in soccer players led to an augmentation in their self-

confidence and self-efficacy levels. Therefore, further research could examine the optimal application of this strategic and its impact on athletic performance.

The attentional focus is employed to direct the athlete's thoughts for subsequent actions. The key contrast in imagery is that the athlete imagines what they will do without necessarily visualising it. The player can opt for either an internal focus, concentrating on bodily movements, or an external focus, concentrating on movement effects (Li et al., 2022). The athletes adopt an internal focus by considering their actions and attitudes, as well as an external focus by setting goals and contemplating the upcoming point (Stefanello, 2007a). As per a recent meta-analysis, external focus was found to enhance sprint performance, and this finding can guide coaching practices (Li et al., 2022). Further research ought to examine whether the same outcome holds for intricate movements undertaken in a team sport. It is pertinent to note that beach volleyball is an intermittent sport, and therefore, rest pauses may present opportunities for implementing all these strategies. For instance, the players have ~21 seconds of rest between rallies (Medeiros et al., 2014). In the future, this specific situation can be investigated, and, how to better introduce the technique used. In the future, this scenario can be explored to determine the most effective approach to implement each strategy for enhancing performance.

Limitations

This integrative review reveals certain limitations that need to be addressed. The discourse focused on nine topics, but the study only includes 18 research. The research encompasses athletes of different competitive levels and diverse upbringings (i.e., cultures), which may significantly affect the outcomes. Furthermore, there is also a lack of experimental research on psychological factors. The implication is that this area has been an area of neglect. However, this presents opportunities for researchers who wish to explore ways of enhancing the performance of beach volleyball players. Therefore, investigating psychological methods that can regulate anxiety and stress, enhance concentration, mitigate mental fatigue, and overturn unfavourable circumstances are highly seems interesting objectives to investigate. Furthermore, comprehending how interpersonal relationships impact performance will also bring contributions to the field.

CONCLUSIONS

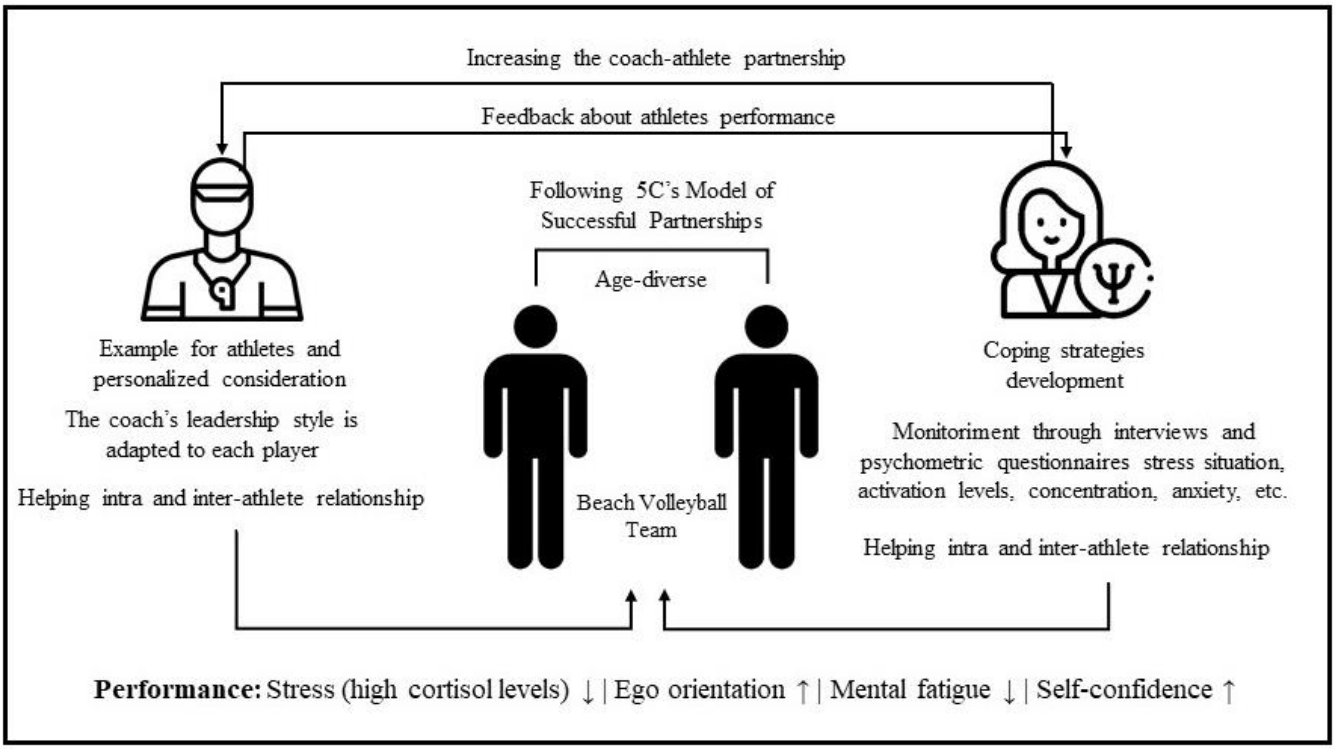
In conclusion, the 18 studies in the current review were split into nine main topics, but a small number of studies was included for each topic. Overall, the studies followed observational methods, which allowed known psychological demands and behaviours in competition. However, drawing a line of intervention based on science is difficult because experimental methods were not used. Moreover, we provide insights into each topic for future research. Finally, the results suggest that there is still many gaps to be investigated in beach volleyball in relation to psychological variables.

PRACTICAL APPLICATION

Developing a robust intervention guideline for the psychological elements of beach volleyball is a difficult task due to the limited use of experimental methods, and the inclusion of only a small number of papers for each category. However, the findings of the review have allowed us to provide guidance on how coaches and sports psychologists can support players. It is crucial for coaches to understand that they need to be viewed positively by their athletes and to understand how their leadership style can affect performance. Additionally, the coach possesses a greater understanding of the technical-tactical aspects. Therefore, they can report to sport psychologists about the beach volleyball performance indicators in both training and competition. This will aid the sports psychologist in monitoring the effectiveness of interventions, as well as identifying potential interventions necessaries (e.g., manage anxiety). For sport psychologists, psychometric instruments (listed in Table 1) and interviews are recommended to support work with athletes. The development of psychological skills must be the focus of the programme, and Stefanello (2009) provides some recommendations based on practice with Olympic athletes. Moreover, it is also recommended to improve self-confidence, stress control skills, avoid mental fatigue before training session and official matches, and goal-orientation to the task should consider the player's level. Finally, Figure 2 summarises the psychological factors that appear to be key to beach volleyball performance and

how coaches and sport psychologists can work together.

Figure 2
A synthesis and practical recommendation to coaches and sport psychologist



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The authors declare that there is no conflict of interest.

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BibTex files can be requested from the corresponding author.

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