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Stress among sports coaches: A systematic review

El estrés entre los entrenadores deportivos: Una revisión sistemática

Estresse em treinadores esportivos: Uma revisão sistemática

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ABSTRACT

The purpose of the present study was to conduct a systematic review of stress among coaches. Papers published from 1994 to 2016 were selected from seven electronic databases, and the following keywords in English, Spanish and Portuguese were used in the search: *stress*, *estrés*, *estresse*, *coach(es)*, *entrenador(es)*, and *treinador(es)*. Thirty studies were included in this systematic review and selected according to their methodological quality; qualitative studies for stress assessment among sports coaches were predominant. The coaches were affected by organisational stressors such as social isolation, poor training facilities, the need to manage conflict, and interference of the athletes' relatives during training sessions and competitions. The coaches were also affected by performance stressors such as concern about their own and the athletes' performance, pressure from the media and managers to achieve results and concerns related to athletes' injuries. Thus, the results show that the stressors affecting sports coaches are multifactorial and are related to the coaches' level of competition. Future studies should analyse the practice time of coaches, which is a variable that can interfere with stress levels.

Keywords: Coaches, Stress, Sport Psychology.

RESUMEN

El objetivo del presente estudio fue realizar una revisión sistemática acerca del estrés entre entrenadores deportivos. Fueron seleccionados artículos publicados de 1994 a 2016 de siete bases de datos electrónicas. Las siguientes palabras clave/términos, en inglés, español y portugués, fueron utilizadas en la búsqueda: "estresse", "stress", "estresse", "coach(es)", "entrenador(es)", "treinador(es)". La búsqueda de los artículos en todos los bancos de datos fue realizada por dos investigadores independientes. 30 (treinta) estudios fueron incluidos en esta revisión sistemática y seleccionados de acuerdo con su calidad metodológica que muestra un predominio de estudios cualitativos para la evaluación del estrés entre los entrenadores deportivos. Los entrenadores fueron afectados por factores de estrés organizacionales, tales como

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aislamiento social, medios de formación pobre, la necesidad de gerenciar el conflicto y la interferencia de los parientes de los atletas durante entrenamientos y competiciones y factores de estrés organizacionales de desempeño, o sea, preocupación con el rendimiento y el desempeño de los atletas, presión de los medios de comunicación y de los gestores para obtener resultados y preocupación con lesiones de los atletas. De esa manera, los resultados muestran que los factores de estrés que afectan los entrenadores deportivos son multifactoriales y están relacionadas con el nivel de competición de esos profesionales. Los estudios futuros deben analizar el tiempo de práctica de los entrenadores porque es una variable que puede interferir con los niveles de estrés.

Palabras clave: Entrenadores, Estrés, Psicología del Deporte.

RESUMO

O objetivo do presente estudo foi realizar uma revisão sistemática sobre o estresse entre treinadores esportivos. Os artigos publicados de 1994 a 2016 foram selecionados de sete bases de dados eletrônicas. As seguintes palavras-chave / termos em Inglês, Espanhol e Português, foram utilizados na pesquisa: "estresse", "stress", "estrés", "coach (s), treinador (s), Treinador (s)". A busca dos artigos em todos os bancos de dados foi realizada por dois pesquisadores independentes. 30 (trinta) estudos foram incluídos nesta revisão sistemática e selecionados de acordo com sua qualidade metodológica, o que mostra uma predominância de estudos qualitativos para a avaliação do estresse entre treinadores esportivos. Os Treinadores foram influenciadas por factores de estresse organizacional, como o isolamento social, pobres condições de trabalho, a necessidade de gerenciar conflitos e a interferência dos familiares dos atletas durante o treinamento. Os treinadores também foram afetados por fatores relacionados ao estresse de desempenho, isto é, a preocupação com o desempenho próprio e o desempenho dos atletas, a pressão da mídia e dos gestores para obtenção de resultados e a preocupação com lesões dos atletas. Dessa forma, os resultados mostram que os fatores de estresse que afetam os treinadores esportivos são multifatoriais e estão relacionados ao nível de competição desses profissionais. Estudos futuros devem analisar o tempo de prática dos treinadores, pois é uma variável que pode interferir nos níveis de estresse.

Palavras chave: Treinadores, Estresse, Psicologia do Esporte.

INTRODUCTION

Coaches have a key role in sports settings because of the relevance of their work to the performance of teams. Within the context of professional sports, coaches are constantly pressed by athletes and their relatives, managers, fans and the media, which renders them vulnerable to workplace stress (Knight & Hawoord, 2009; Olusoga, Butt, Hays & Maynard, 2009). Outside the elite context, coaches are under the same pressure (Frey, 2007).

The literature about stress in sports settings indicates that greater attention has been paid to athletes' responses to stress than coaches' responses to stress (Fletcher & Scott, 2010; Frey, 2007). The scarcity of studies on coaches' stress may be explained by a lack of instruments scientifically validated for this purpose (Costa, Ferreira, Penna, Samulski & Moraes, 2012a; Goodger, Gorely, Lavalley & Harwood, 2007) and by difficulties accessing such professionals during training sessions and competitions, particularly in high-performance sports (Costa, Gomes, Andrade & Samulski, 2012b; Olusoga et al., 2009). Another relevant factor is the sports managers' lack of information on the deleterious effects of stress on athletes and clubs managed by stressed coaches. Although athletes are periodically subjected to health assessments, managers do not manifest a similar concern for coaches (Drezner et al., 2013; Harmon, Asif, Klossner & Drezner, 2011). As a rule, the latter are subjected to medical check-ups at the time they are hired or leave the job or when they exhibit a health problem at work. To summarize,

sports institutions rely on coaches to care for their physical and mental health by themselves.

Within the field of sports psychology, the studies on coaches' responses to stress have mostly focused on the identification of stressors, the consequences and negative effects of stress on the coaches' lives, and the coping¹ strategies they use when they are in adverse situations at work. Based on the origin of stressors, some studies sought to identify and classify stressors among sports coaches as organisational or performance types (Frey, 2007; Thelwell, Weston, Greenlees & Hutchings, 2008; Thelwell, Weston & Greenlees, 2010). Fletcher and Scott (2010) defined organisational stressors as the demands relating to the sporting organizations within which one operates. In turn, performance stressors are defined as the demands associated with either the performance of the coaches' athletes or their own need to perform in a coaching capacity.

Because of its negative effects on the physical and mental health and performance of coaches, stress ought to be properly investigated to allow for the development of preventive and monitoring strategies that target this particular population (Rumbold et al., 2012; Thelwell et al., 2008). A thorough understanding of the singular aspects of stress among sports

¹ A set of cognitive and behavioural efforts deployed by an individual to control, reduce or tolerate specific internal or external demands that arise in stress situations and are perceived as an overload (Lazarus and Folkman, 1984).

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coaches may facilitate the development of preventive models for recovery and promotion of the physical and mental health of these professionals and for the reduction in their work-related stress.

Emotionally balanced coaches who are able to manage stress effectively and who exhibit satisfactory indicators of physical and mental health are more likely to help their athletes and teams achieve better performance (Costa et al., 2012a; Frey, 2007; Olusoga et al., 2009). Conversely, emotionally imbalanced, stressed coaches with physical and mental problems might significantly impair the athletes and teams' development and performance, particularly in younger players (U19) (Fletcher & Scott, 2010; Olusoga et al., 2010).

Thus, being able to diagnose and prevent stress in coaches is of paramount importance. The studies that have sought to assess psychological stress in sports coaches have used psychometric instruments (Costa et al., 2012a; Georgios & Nikolaos, 2012; Tashman, Tenenbaum & Eklund, 2010) and semi-structured interviews (Chroni, Diakaki, Perkos, Hassandra & Schoen, 2013; Knight & Harwood, 2009). Additionally, physiological methods have been used to assess the level of stress in sports coaches; however, few studies have sought to assess stress based on that parameter (Kugler, Reintjes, Tewes & Schedlowiski, 1996; Loupos et al., 2004). The main parameters used as physiological markers of stress in sports coaches include salivary cortisol (Kugler et al., 1996; Loupos et al., 2004), salivary alpha-amylase (Hudson, Davison & Robinson, 2013) and plasma fibrinogen (Loupos, Tsalis, Alexiou & Gounaris, 2005). However, further studies are

required to establish a 'gold standard'² for the assessment of biological stress in sports coaches, namely, a method that effectively measures this parameter and predicts the deleterious effects of stress on the health of the targeted population.

No systematic reviews analysing stress in sports coaches could be found in the available literature. Given the problems caused by stress, the negative effects of stress on coaches, and the effect of this condition on the development of young and adult athletes, there is a need to combine all the scientific information presently available to properly discuss the advances made by science and the remaining gaps in the knowledge on this topic. Considering the aforementioned information, the goal of the present study was to conduct a systematic review of stress in coaches.

The theoretical framework of this study is understanding stress from an ecological perspective based on the action-theory approach (Nitsch, 2009). According to Nitsch (2009), personal (psychic and somatic processes) and environmental factors (performance and organizational stressors) interact in the process of stress emergence and management. Within this same ecological approach, Fletcher and Scott (2010) reinforced the need to understand stress in coaches from a biopsychosocial perspective, in which the interaction of environmental and personal factors may contribute to a greater or lesser incidence of stress.

The majority of the studies that investigated stress in sports coaches

² Gold standard are any methods that provide information that you need and reliably

evaluated a small number of variables that hinder the work activity of these professionals. Thus, one of the strengths of this study is that it provides a systematic review of the main results of stress studies in sports coaches to compile this information. This study also promotes discussion of the need of the scientific community to conduct more studies and provide more evidence to facilitate a better understanding of the psychological and physiological factors of stress that hinder the personal and professional lives of sports coaches.

Search strategy and data extraction

The systematic review of stress in sports coaches was conducted following the guidelines of several authors (Bento, 2014; Higgins & Green, 2011; Lefebvre, Glanville, Wieland, Coles & Weightman, 2013). Systematic reviews are the reference standard for synthesizing evidence because of their methodological rigour. This type of procedure has been applied in different studies (Araujo, Mesquita & Hastie, 2014; Rumbold et al., 2012) and shown to be an efficient tool when the goal is to increase the body of information on a given subject.

The search was conducted in the following electronic databases: SBIHS (Spanish Bibliography Index of Health Science), IIDSSH Psychology (Institute of Information and Documentation in Social Sciences and Humanities)], LACHSL (Latin American and Caribbean Health Sciences Literature), Medline/PubMed, SciELO (Scientific Electronic Library Online), ScienceDirect, Scopus, SPORTDiscus and Web of Science.

The search terms were combinations of the following

headings/terms in English, Spanish and Portuguese: *stress*, *estrés*, *estresse*, *coach(es)*, *entrenadors*, *entrenador(es)*, and *treinador(es)*. The Boolean operator 'and' was used to combine the search terms in the article search.

The search was independently conducted in all the databases by two researchers to minimise the risk of bias in the selection of the scientific articles (Bento, 2014). The criteria for inclusion in the review were as follows: (I) published between January 1994 and June 2016, (II) the inclusion of sports coaches from both sexes and (III) papers in English, Spanish or Portuguese. Studies were first screened based on their titles or abstracts. At a later stage, studies were excluded if (I) they were

duplicates, (II) the full text was not available, (III) they were literature reviews or (IV) they did not specifically focus on stress in coaches.

Figure 1 presents the summary of decisions made for identifying studies. Initially, studies were identified from the search in the electronic bases from the title or abstract (n=1.694). The first review deleted articles that had as a goal the coaches' stress (n=1.631). The next review deleted duplicate articles, review articles, full-text articles and articles whose primary focus was not stress in coaches (n=34). Only articles that assessed coaches' stress were analysed in this systematic review (n=30).

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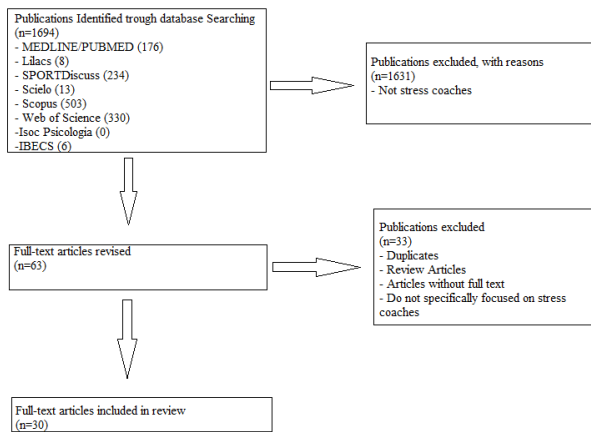


Figure 1- Study Flowchart

Assessment of methodological quality of studies

The methodological quality of the selected studies was assessed based on Downs and Black's (1998) scale. This instrument is used to evaluate the methodological quality of studies that are randomised and non-randomised clinical trials. This scale is thus considered to be reliable and more flexible than others

because it allows for the assessment of a wider variety of studies (Bento, 2014). The scale comprises 27 items that assess the quality of information, internal validity, external validity and ability to detect significant effects of studies. Each item is

given the score of one when present and zero when absent. Items that were not applied to the design of the analysed studies were removed from the 27-item checklist. Thus, the modified version comprised items 1, 2, 3, 4, 6, 7, 10, 12, 18, 20 and 21. For inclusion in the systematic review, the studies had to score at least six points on the modified Downs and Black's scale; a similar procedure was used by Almeida, Carvalho, Ruboldi, Uribe and Lopes (2013). The results of the evaluation of the quality of the studies are shown in Table 1.

Table 1. Assessment of the methodological quality of the selected articles

Articles	1	2	3	4	5	6	7	8	9	10	11	Score
Kellmann & Kallus (1994)	1	0	1	1	1	0	0	0	1	1	1	7
Kugler et al. (1996)	1	1	1	1	1	0	0	0	1	0	1	7
Kelley et al. (1999)	1	1	1	1	1	1	0	0	1	1	1	9
Hendrix et al. (2000)	1	1	0	1	1	1	0	0	1	1	1	8
Drake & Hebert (2002)	1	0	1	1	1	0	0	0	1	1	1	7
Loupos et al. (2004)	1	1	1	1	1	1	1	0	1	1	1	10
Loupos et al. (2005)	1	1	1	1	1	1	0	0	1	1	1	9
Frey (2007)	1	0	1	1	1	0	0	0	1	1	1	7
Thelwell et al. (2008)	1	0	1	1	1	0	0	0	1	1	1	7
Knight & Harwood (2009)	1	0	1	1	1	0	0	0	1	1	1	7
Levi et al. (2009)	1	1	1	1	1	0	0	1	1	1	0	8
Olusoga et al. (2009)	1	0	1	1	1	0	0	0	1	1	1	7
Dias et al. (2010)	1	0	1	1	1	0	0	0	1	1	1	7

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Malinauskas et al. (2010)	1	1	1	1	1	1	0	1	1	1	1	10
Olusoga et al. (2010)	1	0	1	1	1	0	0	0	1	1	1	7
Tashman et al. (2010)	1	1	1	1	1	1	0	0	1	1	1	9
Thelwell et al. (2010)	1	0	1	1	1	0	0	0	1	1	1	7
Costa et al. (2012)	1	0	1	1	1	1	1	0	1	1	1	9
Durand-Bush et al. (2012)	1	0	1	1	1	0	0	0	1	1	1	7
Georgios & Nikolaos (2012)	1	1	1	0	1	0	0	0	1	1	1	7
Olusoga et al. (2012)	1	1	1	1	1	0	0	1	1	1	1	9
Penteado et al. (2012)	1	0	1	1	1	0	1	0	1	1	1	8
Chroni et al. (2013)	1	0	1	1	1	0	0	0	1	1	1	7
Rhind et al. (2013)	1	0	1	1	1	0	0	0	1	1	1	7
Hudson et al. (2013)	1	1	0	1	1	1	0	0	1	1	1	8
Knight et al. (2013)	1	1	0	1	1	1	1	0	1	1	1	9
Richards et al. (2014)	1	0	1	1	1	0	1	1	1	1	1	9
Kellmann et al. (2015)	1	0	1	1	1	0	0	0	1	1	1	7
Judge et al. (2015)	1	0	1	1	1	0	1	0	1	1	1	8
Knights & Ruddock-Hudson (2016)	1	0	1	1	1	0	0	1	1	1	1	8

Notes. 1- Hypotheses or goals are clearly described; 2- Outcome is clearly described in the Introduction or Methods section; 3- The characteristics of the included participants are clearly described; 4- The study procedures are clearly described; 5- The main findings are clearly described; 6- The study provides estimates of the random variability in the data; 7- Actual probability values for the main outcomes are provided; 8- The participants are representative of the entire population; 9- The statistical tests are appropriate; 10- The main outcome measures are accurate; 11- The participants were recruited from the same population.

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RESULTS

Table 2 summarises the main information regarding the 30 articles selected for this systematic review.

Table 2. *Characterisation of the articles included in the systematic review*

Authors	Purpose	Sample characteristics	Measures	Main conclusions	Quality score
Kellmann & Kallus (1994)	To examine the interrelation between stress and coaches' behaviour during rest periods.	Elite and non-elite coaches (n=154)	Questionnaire: Rest Period Questionnaire; The Bibliographic Questionnaire	Analysis indicated that coaches who are highly stressed by the practice rate themselves as significantly less active and less authoritarian during rest periods than do their less stressed colleagues. In addition, coaches who are highly stressed by the competition rate themselves as significantly less warm-hearted than the low-stress group.	7
Kugler et al. (1996)	a) To investigate the effects of a real-life stress situation on salivary IgA and cortisol concentrations and b) to analyse the time kinetics of stress-induced changes in sIgA and cortisol levels.	Elite German soccer coaches (n=17)	Salivary Cortisol Imunoglobulin A	The coaches' stress levels were higher during soccer matches than before and after matches. The salivary cortisol and immunoglobulin levels were higher among coaches than in controls.	7
Kelley et al. (1999)	a) To compare the stress between male and female coaches and b) to investigate the relationship between stress and symptoms of burnout.	Non-elite American tennis coaches (n=249)	Questionnaires: MBI; PSS, Coaching Issues Survey Hardness Scale SCAT-Coach	The perceived level of stress was lower among male coaches than among female coaches. The coaches' stress levels exhibited a relationship with factors that tend to cause burnout in coaches.	9

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Hendrix et al. (2000)	To investigate hardiness, social support and training issues to predict the evaluation of stress and the ability to assess stress to predict burnout in college coaches	Non-elite American football coaches (n=118)	Questionnaire: Hardness Scale SSQ; PSS	The coaches with the lowest hardiness and social support levels and higher training-related levels tended to report higher perceived stress levels. Higher perceived stress levels were associated with emotional exhaustion, depersonalisation and lower levels of personal fulfilment.	8
Drake & Hebert (2002)	To describe the conflict and stressors experienced by coaches	Non-elite American coaches (n=2)	Semi-structured interview	The stressors mentioned by coaches were coaching more than one sport, interference by the athletes' families and conflict with other coaches.	7
Loupos et al. (2004)	To investigate the psychophysiological responses of swimming coaches experiencing 5 days of competitive stress and the relation of these responses to the perceived importance of competition.	Elite and non-elite Greek swimming coaches (n=8)	Questionnaire: Salivary cortisol	The coaches' salivary cortisol concentrations did not exhibit significant differences during the competition period. The importance of the competition was not associated with the stress variables.	10
Loupos et al. (2005)	To investigate the effects of competition stress in swimming coaches	Elite Greek swimming coaches (n=14)	Plasma Fibrogen t-PA antigen	The coaches' stress levels were higher during the competition than they were 30 minutes before and 10 minutes after the competition.	9
Frey (2007)	To understand coaches' experiences with stress, the perceived effects of stress on their coaching performance, and their coping strategies	Non-elite American baseball, basketball, diving, swimming, volleyball and tennis coaches (n=10)	Semi-structured interview	The coaches indicated the following as stressors: level of competition, years of experience, interference by the media, self-imposed expectations, and professional duties. Behavioural strategies and social support were the primary coping strategies used by the coaches.	7
Thelwell et al. (2008)	To assess the variation of	Elite British soccer, cricket, rugby, field	Semi-	The performance stressors mentioned by	7

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	performance and organizational stressors experienced by coaches dealing with high-level athletes	hockey, golf, gymnastics, athletics, and sailing coaches (n=11)	structured interview	the coaches were concerns with the athletes' and their own performance. The organisational stressors mentioned were concerns with the team's organisation and the leadership role.	
Knight & Harwood (2009)	a) To explore the stressors that tennis coaches associate with parents and b) to examine how such stressors may differ depending on a player's developmental stage of participation.	Non-elite British tennis coaches (n=70)	Semi-structured interview	The coaches observed that lack of knowledge, inadequate behaviour and interference by the athletes' parents in training and competitions were the sources of several stressors related to training and competition. The coaches identified the parents' influence at different stages of the athletes' development as a stressor.	7
Levy et al. (2009)	a) To identify and determine the frequency of organisational stressors and coping strategies reported by an elite coach and b) to identify coping strategies used to manage organisational stressors.	Elite British coach (n=1)	Interview	The organisational stressors mentioned by the coach were management of the training and competition environments, excessive workload and travel, and leadership in the workplace. The coping strategies used by the coach were problem-focused, emotion-focused and avoidance.	8
Olusoga et al. (2009)	To Identify the stressors of coaches who deal with world-class athletes	Elite British diving, sailing, swimming, bowls, equestrian, field hockey and table tennis coaches (n=56)	Semi-structured interview	The coaches mentioned the following as stressors: conflict management, interference by the media and athletes' relatives, pressure and expectations of satisfactory results, preparation for competition and social isolation.	7
Dias et al. (2010)	To identify the main sources of stress and coping strategies that coaches used in stress situations	Elite Brazilian, Portuguese and Swedish volleyball, athletics, soccer, basketball and handball coaches (n=6)	Semi-structured interview	Concern for the athletes' performance was reported by the coaches as the main stressor. Emotional self-control and positive reassessment of the situation were the main strategies reported by the coaches to cope with stress.	7

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Malinauskas et al. (2010)	To investigate the associations between burnout and perceived stress	Non-elite Lithuanian coaches (n=203)	Questionnaire: CBQ; PSS	The majority of the assessed coaches showed high levels of perceived stress. The majority of the coaches with burnout symptoms exhibited high scores of perceived stress.	10
Olusoga et al. (2010)	a) To investigate the responses and effects of stress for world-class UK sports coaches and b) to explore the coping strategies used by these coaches in attempting to manage stress.	Elite diving, sailing, swimming, bowls, equestrian, field hockey, lacrosse and table tennis coaches (n=12).	Semi-structured interview	The coaches reported mistakes in cognitive answers, unpleasant emotions, reduced motivation, difficulties in interpersonal relationships and physical and physiological problems as stress responses. The coaches were aware that their responses to stress had direct and indirect effects on the athletes. Organisation and planning were the primary coping strategies used by the coaches.	7
Tashman et al. (2010)	To investigate the effect of perceived stress on the relation between perfectionism and burnout in coaches	Non-elite American basketball, baseball, softball, swimming, tennis, golf, volleyball and bowling coaches (n=177)	Questionnaire: MBI; PI; PSS	Maladaptive forms of perfectionism resulted in increased stress, potentially leading to the experience of burnout. In turn, adaptive forms of perfectionism did not appear to result in increased appraisals of stress or the risk of burnout.	9
Theilwell et al. (2010)	a) To identify the stressors experienced by coaches and b) to examine the coping strategies that elite-level coaches employ to overcome stressors.	Elite British soccer coaches (n=3)	Semi-structured interview	The main stressors mentioned by the coaches were actual performance poorer than expected, conflict management and inadequate training infrastructure. Emotion- and problem-focused strategies were the main coping strategies used.	7

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Costa et al. (2012)	To evaluate and compare the differences presented by futsal and football coaches regarding the constructs of stress and recovery evaluated by RESTQ-Coach	Elite and non-elite Brazilian soccer and futsal coaches (n=217)	Questionnaire RESTQ-Coach	The levels of global and specific stress were higher among futsal coaches than in soccer coaches.	9
Durand-Bush et al. (2012)	a) To provide insight into strategies that coaches utilize to meet the daily demands and expectations of their profession and remain effective in stressful environments and b) to identify the coping strategies used by coaches.	Elite Canadian curling, hockey and vignette coaches (n=3) Non-elite Canadian hockey, synchronised skating, paddling, rowing, and Alpine skiing coaches (n=5)	Semi-structured interview	The main stressors mentioned by the coaches were competition, organisation of training sessions and travel arrangements, parents' interference and meeting their own and other people's expectations. Self-regulation was the main coping strategy used.	7
Georgios & Nikolaos (2012)	To examine a theoretical model of personal/environmental factors, stress and burnout to explore the factors that can predict the occurrence of burnout in coaches of individual sports.	Elite and non-elite Greek athletics coaches (n=164)	Questionnaires: MBI; PSS; SSQ; Hardiness Scale	The coaches with higher stress levels exhibited a greater susceptibility to burnout than coaches with lower levels of stress.	7
Olusoga et al. (2012)	To identify the manners in which coaches have developed their ability to coach successfully in highly stressful situations, with the ultimate goal of helping coaches develop the strategies, skills, and attributes required for world-class performance under pressure	Elite British (n=8)	Semi-structured interview	Psychological attributes, preparation, and coping at the event were factors that coaches perceived to be important for successful Olympic coaching. In addition, coaches offered specific suggestions for training and development. Key themes included coach interaction and simulating Olympic pressure.	9

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Penteado et al. (2012)	Assessing aspects related to stress, work and quality of life in technical and physical trainers of football	Elite Brazilian Soccer Coaches (n=13) Physical Trainers (n=13)	Semi-structured Interview; Questionnaire: JSS; QLV	Coaches and physical trainers obtained scores of stress at work within an acceptable limit, understood to be active work.	8
Chroni et al. (2013)	To distinguish between training-specific and competition-specific stressors based on answers to the question 'What stresses coaches in training and in competition'?	Elite and non-elite Greek basketball, soccer, volleyball, athletics, Alpine ski, and rhythmic gymnastics coaches (n=49)	Semi-structured interview	The main stressors associated with training mentioned by the coaches were athletes' injuries, concern with the athletes' performance, concern with their own performance, and interpersonal relationships with athletes and their parents. The main stressors in competitions were results of matches, concern for the athletes' performance, criticism, and concern with their own performance.	7
Hudson et al. (2013)	To conduct a multidisciplinary <i>in situ</i> examination of coaches' psychophysiological responses to competition stress that is underpinned by reversal theory	Non-elite British coaches (n=10)	Questionnaires: SMIA (Modificado) TESI Physiological: Alpha amylase	On competition day, the coaches exhibited higher levels of subjective stress, unpleasant emotions and alpha-amylase than on a non-competition day.	8
Knight et al. (2013)	a) To identify coaches' levels of perceived stress and b) to examine the personal and situational factors that may influence coaches' perceptions of stress.	Non-elite Canadian coaches (n=502)	Questionnaire: PSS	The perceived stress levels were higher among coaches than among healthy men. Salary and a lack of social support were mentioned by the coaches as stressors.	8

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Rhind et al. (2013)	To investigate the organizational stressors experienced by professional coaches from soccer	Elite British soccer coaches (n=10)	Semi-structured interview	The organisational stressors mentioned were job role (lack of time, low salary), players (injury, lack of discipline), managers (decision-making), support staff (lack of quality), training environment (poor facilities, poor equipment), away matches (travel and delays) and soccer culture (media pressure).	7
Richards et al. (2014)	To examine how role stressors, burnout, and resilience experienced by teacher/coaches differ from what is experienced by non-coaching teachers	Non-elite coaches (n=417)	Questionnaire: TRSS; MBI-ES; CD-RISC	Overall, the results suggest that there are more similarities than differences among teacher/coaches and non-coaching teachers. These findings suggest that it is not safe to assume that dual role teacher/coaches will always experience more role stress and burnout than non-coaching teachers.	9
Kellmann et al. (2015)	To examine the recovery–stress balance of professional coaches in one team for the duration of a competitive season	Elite Australian soccer coaches (n=6)	Questionnaire: RESTQ	The two-week vacation had a positive but short-lived influence on recovery for these coaches. There was a fluctuation in scores during the season. The study highlights the importance of recovery in managing recovery–stress balance in the challenging work environments of coaches.	7
Judge et al. (2015)	To investigate sources of occupational stress for NCAA Division I and Division III track and field coaches during the championship season	Elite and non-elite Coaches (n=67)	Questionnaire: ASI; PRQ	When the predictors and the interaction of years of experience were entered into the model, the social support and NCAA Division were significant predictors of task-based stress. As social support increased, task-based stress decreased.	8

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Knights & Ruddock-Hudson (2016)	To examine the experiences and perceptions of occupational stress and social support of AFL senior coaches	Elite Australian football coaches (n=12)	Semi- structured interview	Five themes emerged from the findings. These included (i) pressurized workplace environments, (ii) development and improvement of others and self, (iii) accountability and responsibilities to others, (iv) advice, support and comfort from others and (v) stress and adversity— the ramifications.	8
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Note. - RESTQ-Coach (Recovery Stress Questionnaire for Coaches); MBI (Maslach Burnout Inventory); PSS (Perceived Stress Scale); SSQ (Social Support Questionnaire); CBQ (Coach Burnout Questionnaire); SMIA (State of Mind Indicator for Athletes); TESI (Tension Effort Stress Inventory); PI (Perfectionism Inventory); JSS (Job Stress Scale); QLV (Quality of Life in Voice); TRSS (Teacher Role Stressors Survey); ASI (Administrative Stress Index); PRQ (Personal Resource Questionnaire)

Overview of the studies

The results of the review are stratified into three different aspects: (I) methodology that covers the methodological profile of the study, that is, qualitative, quantitative or mixed; (II) a competitive profile of the coaches analysed that refers to the level of the evaluated coaches, elite or non-elite; and (III) sources of stress among sports coaches that verifies whether the stress is of psychological, physiological or psychophysiological origin.

Methodological approach

According to the results, 86.8% of the analysed studies used qualitative methods (Chroni et al., 2013; Costa et al., 2012a; Dias, Cruz & Fonseca, 2010; Drake & Hebert, 2002; Durand-Bush, Collins & Mcneill, 2012; Frey, 2007; Georgios & Nikolaos, 2012; Hendrix et al., 2000; Kelley, Eklund & Ritter-Taylor, 1999; Kellmann & Kallus, 1994; Kellmann et al., 2015; Judge et al., 2015; Knight & Harwood, 2009; Knight, Reade, Selzer & Rodgers, 2013; Levi, Nicholls, Marchant & Polman, 2009; Knights & Ruddock-Hudson, 2016; Malinauskas, Malinauskiene & Dunciene, 2010; Olusoga et al., 2009; Olusoga et al., 2010; Olusoga, Maynard, Hays & Butt, 2012; Penteadó et al., 2012; Rhind, Scott & Fletcher, 2013; Richards, Templin, Levesque-Bristol & Blankenship, 2014; Tashman et al., 2010; Thelwell et al., 2008; Thelwell et al., 2010), only 6.6% of the analysed studies used a quantitative methodological approach (Kugler et al., 1996; Loupos et al., 2005) and 6.6% used quantitative and qualitative methods concomitantly in the assessment of stress among sports coaches (Hudson et al., 2013; Loupos et al., 2004).

With regard to the quantitative methods, the measurement of physiological

markers was the primary approach used to assess stress among sports coaches. Salivary cortisol, immunoglobulin A (Kugler et al., 1996; Loupos et al., 2004), plasma fibrinogen, tissue plasminogen activator (tPA) antigen (Loupos et al., 2005) and alpha-amylase (Hudson et al., 2013) were the most commonly used physiological markers. The results of the quantitative studies showed that the levels of all the investigated physiological markers of stress were significantly elevated during competitions compared with the resting state (Hudson et al., 2013; Kugler et al., 1996; Loupos et al., 2005).

Competitive profile of the analysed coaches

To classify the level of competition of the sample following Thelwell et al. (2008), the coaches who trained professional athletes were categorised as elite coaches, whereas those who worked in amateur sports, high schools or universities and within junior categories were classified as non-elite coaches.

The results regarding the level of competition of the coaches analysed in this review showed that 43.3% of the sample corresponded to elite coaches (Dias et al., 2010; Kellmann, Altfeld and Mallett, 2015; Knights & Ruddock-Hudson, 2016; Kugler et al., 1996; Levy et al., 2009; Loupos et al., 2005; Olusoga et al., 2009; Olusoga et al., 2010; Olusoga et al., 2012; Penteadó et al., 2012; Rhind et al., 2013; Thelwell et al., 2008; Thelwell et al., 2010), another 33.3% corresponded to non-elite coaches (Drake and Hebert, 2002; Frey, 2007; Hendrix et al., 2000; Hudson et al., 2013; Kelley et al., 1999; Knight & Harwood, 2009; Knight et al., 2013; Malinauskas et al., 2010; Richards et al., 2014; Tashman et al., 2010), and 23.4% of the studies

included both elite and non-elite coaches (Chroni et al., 2013; Costa et al., 2012a; Durand-Busch et al., 2012; Georgios & Nikolaos, 2012; Judge et al., 2015; Kellmann & Kallus, 1994; Loupos et al., 2004).

Sources of stress among sports coaches

The results indicated that the coaches were affected by organisational stressors such as social isolation (e.g., Levy et al., 2009; Olusoga et al., 2009), poor training facilities (e.g., Knight et al., 2013; Thelwell et al., 2010), the need to manage conflict (e.g., Chroni et al., 2013; Rhind et al., 2013) and interference of the athletes' relatives during training sessions and competitions (Drake & Hebert, 2002; Durand-Bush et al., 2012). With regard to performance stressors, the coaches mentioned the following: concern with their performance (e.g., Olusoga et al., 2010; Thelwell et al., 2010) and the athletes' performance (e.g., Dias et al., 2010; Frey, 2007, Thelwell et al., 2008), pressure from the media and the managers (e.g., Chroni et al., 2013; Olusoga et al., 2009), concern for the athletes' injuries (e.g., Olusoga et al., 2009; Rhind et al., 2013) and concern over the results of competitions (e.g., Hudson et al., 2013; Kugler et al., 1996).

DISCUSSION

The goal of the present study was to conduct a systematic review of stress in coaches. The results revealed that the majority of the analysed studies used qualitative methods, thus agreeing with the findings of Hudson et al., (2013). Goellner et al. (2010) observed that in addition to being easy to apply, qualitative methods do not involve invasive procedures that might

deter volunteers from participating. Such features might help explain the predominance of qualitative methods in the assessment of stress among sports coaches because these types of methods commonly use semi-structured interviews and questionnaires.

Conversely, only 6.9% of the reviewed studies used quantitative methods to assess stress among sports coaches. Physiological parameters such as salivary cortisol, immunoglobulin A, plasma fibrinogen and the tPA antigen were used for quantitative assessments of stress. Kugler et al. (1996) considered such physiological markers to be relevant instruments to assess stress because cardiovascular diseases may be associated with physiological stress responses (Stalnikowicz & Tsafirir, 2002). However, the financial costs and the procedures involved in sample collection, which are sometimes invasive, may explain the infrequent use of the aforementioned markers for the quantitative assessment of stress among sports coaches. In addition, because very little is known regarding the sensitivity of those markers in assessing stress at work among sports coaches, additional studies using physiological parameters are required to consolidate those findings. Finally, because of the small number of studies on the physiological aspects of stress among sports coaches, the results of the measurements have not yet been normalised, which hinders the comparison among coaches from different sports and levels of competition.

Only 6.9% of the studies used qualitative and quantitative methods concomitantly. Because both approaches exhibit particular advantages and

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disadvantages, their concomitant use is an attempt to better understand the complex process of the assessment of stress among sports coaches. In addition, according to Loupos et al. (2004), because stress is a multifactorial variable, to evaluate it more accurately, it is necessary to analyse other variables, such as anxiety.

For coaches at the competitive level, this systematic review identified that these professionals are involved with the independent labour stress that occurs at the competitive level. The results of this study indicate that coaches of both elite and non-elite athletes are affected by various sources of stress although a larger number of investigations are conducted with elite coaches. The results indicated that the sources of stress differ based on the competitive level on which the coach is working. Non-elite coaches, for example, experience different stressors than do elite trainers, such as the influences of and friction with the families of athletes in training and competitions (e.g., Durand-Bush et al., 2012; Knight & Harwood, 2009). Conversely, non-elite coaches are less affected by stress from the economic and commercial pressures of sport, the media, and leaders of the fans, who are more present in elite sports environments (Chroni et al., 2013; Rhind et al., 2013). In summary, the characteristics and types of sources of stress are directly related to the uniqueness of the environment in which a trainer is inserted because certain stress factors are quite specific to certain contexts. Understanding the particularities of the coach's work environment becomes important because it will facilitate the development specific programmes for stress management, which will benefit the health and performance of coaches.

Olusoga et al. (2009) highlighted the need to enlarge the scope of stress assessment among elite coaches to improve knowledge of the consequences of stress among professionals working in high-performance sport. However, interviewing or subjecting elite coaches to scientific studies to assess components related to their professional performance is a difficult task for researchers because of the limited time availability and limited interest of such professionals in subjecting themselves to evaluations and scientific research procedures. In short, coaches are not aware of the relevance of this type of study to the development of their professional careers and their sport. As a rule, sports coaches view assessments as threats and criticism of their behaviour in the workplace rather than as useful tools that may contribute to their professional and personal growth.

With regard to the sources of stress, the present systematic review observed that coaches are exposed to both performance and organisational stressors. One of the primary performance stressors was the coaches' concern with the athletes' performance in training and competition settings, which they experience on a daily basis. The concern for their athletes' performance is justified because the coaches believe that the odds of keeping their jobs depend on the athletes' performance during training and competitions and on their own ability to motivate the athletes to learn and improve their performance (Gould, Greenleaf, Guinan & Chung, 2002). Thelwell et al. (2008) identified other performance stressors, including athletes' injuries, inadequate preparation, the technical level of opponents and competitions. Such performance stressors have a multifactorial

nature and are often interrelated and manifested in the course of the coaches' work, resulting in increased stress levels at work. Some researchers consider that some performance-related aspects cannot be fully controlled by coaches, such as injuries resulting from contact with an opponent, referees' mistakes, or the quality of the opponents (Chroni et al., 2013; Frey, 2007; Olusoga et al., 2009; Rhind et al., 2013). To be able to tolerate such adverse conditions, Thelwell et al. (2010) indicated that coaches ought to develop satisfactory coping and stress control strategies so that they can focus exclusively on the sources of stress that they can affect and control.

One further performance stressor detected in the present study was the concern of coaches with their own performance. This source of stress derives from the pressure for results and winning championships that coaches are exposed to regardless of the level of competition on which they work and whether the sport is individual or collective (Chroni et al., 2013; Durand-Bush et al., 2012; Frey, 2007; Levy et al., 2009; Olusoga et al., 2010; Thelwell et al., 2008). According to some studies, coaches' stress levels increase during competitions (Hudson et al., 2013; Kugler et al., 1996; Knight & Harwood, 2009; Loupos et al., 2005), and their concern with results is often because of the fear that a poor performance might cost them their jobs (Levy et al., 2009).

The media influence was mentioned as a performance stressor mainly by elite coaches but played no role in the work

environment of non-elite coaches (Drake & Hebert, 2002; Hendrix et al., 2000). The results of studies conducted with elite coaches indicated that the

pressure exerted by the sports media increases the pressure on the coaches' work because coaches have no control over what is published in the media. Coaches complained that the information reported by the media is not always true and does not always reflect actual facts. One further problem mentioned by the coaches was the repercussions of the information spread by the media, which might influence the behaviour of managers, athletes and fans and increase the pressure on athletes and the technical staff (Olusoga et al., 2009; Rhind et al., 2013). In summary, performance stressors often differ depending on the performance level of the coach; however, this type of stress is present in the coach's work environment.

The results indicated that among the organisational stressors, the interference of the athletes' relatives in training sessions and competitions was one of the most relevant stressors for non-elite coaches (Drake & Hebert, 2002; Durand-Bush et al.,

2012; Knight & Harwood, 2009). Coaches who develop athletes are more likely to find themselves in such situations because parents generally follow their children's performance closely. Smoll, Cumming and

Smith (2011) observed that the influence of parents plays a crucial role in the athletic development of the children; however, parents who interfere with the coaches' actions exert a negative effect on both the coaches' and the athletes' sports performance. Thus, parents must understand what their actual role is and be aware of the adverse effects of an inappropriate attitude.

The social isolation of the profession leads to coaches having little

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time with family and friends, which is emphasised as a source of organizational stress (Levy et al., 2009; Olusoga et al., 2009; Rhind, et al. 2013). According to Levy et al. (2009), the frequent traveling and heavy workload reduces the time coaches need to rest. Gould et al. (2002) considered that participation in social activities with friends and family is important for coaches to control the stress caused by social isolation.

Furthermore, regarding organisational stressors, the investigated

coaches mentioned the need to manage conflict in the workplace (Olusoga et al., 2009; Levy et al., 2009; Thelwell et al., 2008; Thelwell et al., 2010). Independent of the competitive level, maintaining a conflict-free environment is necessary for athletes to exhibit a satisfactory performance (Thelwell et al., 2008). The need for coaches to manage conflict arising

among athletes in training sessions and competitions negatively affects the team's performance because coaches must shift their attention to issues other than the technical, tactical, physical and psychological aspects relevant for success.

In some studies, an inadequate training infrastructure stood out as another organisational stressor for elite and non-elite coaches (Durand-Bush, et al., 2012; Knight et al., 2013; Levy et al., 2009; Olusoga et al., 2009; Rhind, et al., 2013; Thelwell et al., 2010). Sports managers often do not consider the work conditions provided to coaches, and regardless of whether such conditions are good or bad, coaches are continuously pressed for results (Thelwell et al., 2010). Thus, coaches working in satisfactory work conditions are less susceptible to this organisational stressor.

The interference of upswings in stress in coaches was also identified. According to Kallus and Kellmann (1994), stress levels of coaches during a labour action were reflected in the behaviour of these professionals during periods off. Kellmann et al., (2015) noted that a recovery period of two weeks was beneficial for stress control in coaches. Therefore, it is up to the coaches and sports managers to recognise the importance of recovery periods for the health of coaches and to maximize their work performance in order to attain the highest level of performance from their athletes.

Several studies reported a positive correlation between stress and burnout syndrome symptoms (Georgios & Nikolaos, 2012; Hendrix et al., 2000; Kelley et al., 1999; Malinauskas et al., 2010; Tashman et al., 2010). Thus, the results of the present review highlight the need to control chronic stress to improve the coaches' health because the studies showed that professionals who are exposed to chronic stress at work are susceptible to developing burnout syndrome symptoms.

Finally, the present study also observed that the control of stress may contribute to enhancing the coaches' physical, psychological and social wellbeing, thus maximizing the ability of coaches to perform their work, with consequent improvement in the athletes' performance (Frey, 2007; Levy et al., 2009; Olusoga et al., 2010).

In addition to organising and systematising the available information on coaches' stress that affects their lives, one further merit of the present study was bringing into the discussion the need to achieve better control of stress and thus help these professionals who are involved

with the development of children, youth and adults in elite and non-elite sports settings. The presence of emotionally balanced professionals who are able to create a healthy environment for learning and development is of paramount importance for sports institutions. As a limitation, the present study only analysed articles published in English, Spanish and Portuguese over the past 20 years; thus, other, relevant studies might have been excluded. Another limitation is that the present review analysed articles corresponding to various sports and coaches from different countries, allowing us to conclude that the stressors affecting coaches' work are multifactorial and vary according to the various contexts.

CONCLUSION

The results of the present study support the conclusion that there are differences in the types of performance and organisational stressors to which elite and non-elite coaches are exposed.

Despite such variability among studies, some common stress factors were also identified, such as the coaches' concern for their athletes' performance and their fear of losing their jobs in the event of poor athletic performance.

Additionally, the necessity to make sports managers and the scientific community aware of the relevance of assessing stress in sports coaches was identified because of the consequences of stress on the coaches' health and work performance and on the performance of their athletes.

In turn, coaches ought to be more receptive and participate in studies on this

subject to advance the understanding of the stress that they are exposed to at work and that impairs their performance within and outside of the sports environment. Moreover, assessment tools specific to this population must be validated to define the 'gold standard' markers for stress assessment in elite and non-elite coaches using a three-dimensional approach that includes biological, psychological and social aspects and affords a multifactorial understanding of the negative effects of

stress on the coaches' state of health, quality of life and performance. Healthy coaches who are able to control their level of stress at work play a more efficient role in the development of athletes and sports teams.

To improve the psychological skills of sports coaches, it is necessary to develop training courses and programmes that seek to develop the psychological skills of coaches so that they can better cope with the problems they face in their professional lives.

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