A Pilot Study of a Brief Compassion and ACT Based Sports Program on the Portuguese national female handball team (u18)

Estudio piloto de un Programa Deportivo Breve basado en Compasión y ACT en la selección Portuguesa de balonmano femenino (u18)

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Abstract

Introduction: Programs based on contextual-behavioural therapies have been developed for application in the sports context to promote attention to the present moment, and the acceptance of internal states in a non-judgmental and compassionate way during the last two decades.
Objective: Analyse the results of a pilot sport-compassion contextual-behavioural program for female young athletes (Portuguese National U18 handball team) by assessing state self-compassion and mindfulness on sport satisfaction, stress competition, coach leadership, and sport psychological skills measures before and after the intervention.
Methodology: BCOMP.ACT Program is a new semi-structured integrative intervention based on sport-compassion contextual-behavioural approach. The main four- session intervention taught the basics of mindfulness, compassion, and psychological flexibility. Participants completed validated surveys before and after the intervention.
Results: After the intervention, participants reported improvement in mindfulness ability, $t(18) = 5.20$, $p<.05$, self-compassion, psychological competencies $t(18)= -9.25$, $p<.05$; coach satisfaction $t(18)= -3.45$; $p<.05$; and decrease in competition stress $t(18)=8.98$; $p<.05$; injuries fear $t(18)= 12.63$; $p<.05$.
Discussion: in line with existing research, which has shown the emerging evidence and positive results that suggest that interventions based on contextual-behavioural therapies (eg.,mindfulness, compassion and psychological flexibility) can support and improve mental health and performance in athletes and decrease toxic stress and injuries
Conclusions: These findings indicate a potential benefit of short programs based on this type of approach, as BCOMP.ACT, for improving mindfulness, self-compassion, and psychological flexibility in teen's female athletes.

Keywords

acceptance and commitment therapy; bCOMP.ACT program; self-compassion; female athletes coach.

Resumen

Introducción: Durante las últimas dos décadas, se han desarrollado programas basados en terapias contextuales-conductuales para su aplicación en el ámbito deportivo con el fin de promover la atención al momento presente y la aceptación de los estados internos de forma compasiva y sin prejuicios.
Objetivo: Analizar los resultados de un programa piloto contextual-conductual de compasión deportiva para jóvenes atletas (selección portuguesa sub-18 de balonmano). Para ello, se evaluaron la autocompasión y la atención plena en relación con la satisfacción deportiva, el estrés en la competición, el liderazgo del entrenador y las habilidades psicológicas deportivas antes y después de la intervención.
Metodología: El programa BCOMP.ACT es una nueva intervención integrativa semiestructurada basada en el enfoque contextual-conductual de compasión deportiva. La intervención principal, de cuatro sesiones, enseñó los fundamentos de la atención plena, la compasión y la flexibilidad psicológica. Las participantes completaron encuestas validadas antes y después de la intervención
Resultados: Después de la intervención, los participantes informaron una mejora en la capacidad de atención plena, $t(18) = 5,20$, $p < .05$, competencias psicológicas $t(18) = -9,25$, $p < .05$; satisfacción del entrenador $t(18) = -3,45$; $p < .05$; y disminución del estrés competitivo $t(18) = 8,98$; $p < .05$; miedo a las lesiones $t(18) = 12,63$; $p < .05$.
Discusión: En consonancia con la investigación existente, que ha mostrado la evidencia emergente y los resultados positivos que sugieren que las intervenciones basadas en terapias contextuales-conductuales (p. ej., *mindfulness*, compasión y flexibilidad psicológica) pueden apoyar y mejorar la salud mental y el rendimiento en atletas, así como disminuir el estrés tóxico y las lesiones.
Conclusiones: Estos hallazgos indican un beneficio potencial de los programas cortos basados en este tipo de enfoque, como BCOMP.ACT, para mejorar la atención plena, la autocompasión y la flexibilidad psicológica en las atletas adolescentes.

Palabras clave

terapia de aceptación y compromiso; programa bCOMP.ACT program; autocompasión; deportistas femeninas; entrenadora.

Introduction

Success and performance in sports are affected by stress factors, such as mental or physical mistakes, pain, disease, being cheated by opponents or seeing them succeed, being penalized by the referee, and being challenged by the coach´s staff (Kremer et al., 2012; Carraça et al., 2018a; 2021).

Stress in elite handball is often experienced during training and competitions as well as during the game period. The moments that provoke several emotional states that can vary from individual fulfilment and compassionate balance to states more self-critical, such as denial, worry, amotivation, and internal shame, which generate conflict behaviours that influence athletic performance and mental health (James et al., 2022; Oliveira et al., 2021).

However, some studies have documented an increase in different indicators of mental sickness in athletes (e.g., thought suppression, injuries, toxic perfectionist rituals, anxiety, and shame) associated with competitive sports (Moro & Auday, 2024; Rogers et al., 2023; Carraça et al., 2022; Lochbaum et al., 2022). Research has highlighted that elite athletes face unique and multi-faceted stressors and problems associated with their role. They are at an increased risk for perfectionism, negative cognitions, and emotional and behavioural difficulties (Goodman et al., 2014). The pressure exerted to obtain high performances may explain an increase in toxic stress on elite sports performance (Moro & Auday, 2024; Carraça et al., 2019; Correia & Rosado, 2018, Oforeh et al., 2023). Athletes learn to manage and minimize unwelcome thoughts, emotions, and sensations, aiming to focus all their energy on achieving peak performance (Moro & Auday, 2024; Bickley et al., 2016).

Numerous studies indicate that the stress faced by elite athletes can result in emotional distress and negatively impact their mental health (Markser, 2011; Kristiansen et al., 2011). In their pursuit of perfection and success, elite athletes often start to bottle up emotions that they may view as weak or inappropriate (Sinden, 2014). Consequently, the suppression of emotions can lead to increased distress, adversely affecting overall well-being (Ntovoli et al., 2024; Lundqvist & Raglin, 2015). If an athlete accumulates stress over time, they may encounter burnout, especially if they lack effective coping strategies (Gustafsson et al., 2013). Also self-criticism or self-punishment undermined athletes' self-regulation, emotional recovery, stress management, and performance (Tenenbaum et al., 2013).

These attitudes were likewise linked to negative emotional responses, avoidance, and a fear of not succeeding (Sagar et al., 2009). Recent studies focused on mindfulness and self-compassion has demonstrated encouraging findings concerning well-being, mental health, and performance within the sports environment (Cormier et al., 2023; Ntovoli et al., 2024).

Mindfulness is usually defined as "the awareness that emerges through paying attention, on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 1994, p. 4). For example, in a sample of basketball players, involvement in mindfulness training was associated with several benefits, which included heightened self-knowledge, calmer states of mind, and the ability to stay in the moment (Burns, 2016; Francisco et al., 2024). In a study involving female collegiate athletes, findings showed that a mindfulness-based intervention resulted in more significant decreases in substance use, emotional dysregulation, and psychological distress compared to a psychological skills training intervention (Gross et al., 2018).

Self-compassion has been defined as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it" (Gilbert & Choden, 2013, p. 94) and it is conceptualised by Neff (2003) as having three components, namely, *self-kindness* - being kind and understanding toward oneself in instances of pain or failure, rather than being harshly self-critical, *common humanity* - perceiving one's experiences as part of the larger human experience, rather than seeing them as separating and isolating;, and *mindfulness* - holding painful thoughts and feelings in balanced awareness, rather than over-identifying with them.

Thus, approaching oneself with greater mindfulness and compassion can be a more advantageous response to failure, allowing individuals to take accountability for their errors, show kindness to themselves, and strive for positive self-improvement (Allen & Leary, 2010). Consequently, mindfulness and self-compassion may prove beneficial for athletes who inevitably face setbacks, such as subpar performances or losses in competitions that may be unavoidable (Mosewich et al., 2013) and help reduce the stress-injury relationship. Studies related to the application of acceptance and commitment

therapy (ACT) techniques has indicated that athletes can gain advantages from practicing physiological flexibility during their recovery from injuries and their reintegration into sports (Bennett & Lindsay, 2016). Additionally, Scott-Hamilton and associates (2016) discovered that mindfulness training enhanced athletes' mindfulness and flow experiences while simultaneously reducing sport-specific pessimism and anxiety.

The coach-athlete ratio is extremely important as it allows the coach to guide the athlete, support him, and provide him with guidance and support for individual and team strategies. In this sense, the relationship must be mediated by confidence, gratitude, commitment, compassion, cooperation, and mutual empathic understanding that contribute to optimizing performance, aiming not only to achieve the athlete's best performance but also to enhance the coach's mindful and compassionate skills (Carraça et al., 2023). Athletes also encounter a demand for mental toughness from their coaches, resulting in significant pressure to embody an idealized persona. Moreover, as a further implication of these expectations, elite athletes might hesitate to pursue instrumental assistance or emotional support due to concerns about compromising their "tough" image (Bär & Markser, 2013; Heird & Steinfeldt, 2013).

Considering this potential benefits, during the last two decades, different programs based on contextual-behavioural therapies have been developed for application in the sports context to promote attention to the present moment, and the acceptance of internal states in a non-judgmental and compassionate way (Carraça et al., 2018, 2019, 2020; Barczak & Eklund, 2018; Josefsson et al., 2019; Kaufman et al., 2009), such as Mindfulness-Acceptance-Commitment (MAC); Mindfulness Sports Performance Enhancement (MSPE); Mindfulness Meditation Training for Sport (MMTS), Mindfulness-based soccer program (MBSOCCERP).

These interventions have a different perspective to psychological skills training (PST) since they propose that optimal performance does not require the reduction or control of internal states but, rather, requires a non-judging moment-to-moment awareness and acceptance of one's internal state, whatever that may be, and an attentional focus on task-relevant external stimuli and behavioural choices that support one's athletic endeavour (Carraça et al., 2019; Moore, 2009). There is a dearth of literature related to interventions based on contextual cognitive models in the context of high competition in Portuguese national teams. Hence, this study aims to contribute to the absence of studies on compassion, acceptance, and commitment-based programs on athletes in Portuguese literature.

The main research´s objectives are: analyse the influence of baseline sport state self-compassion and mindfulness on sport satisfaction, stress, coach leadership, and psychological skills trait measures post-intervention; and explore relations among competition stress, sport state self-compassion, mindfulness, sport satisfaction, coach leadership satisfaction, and psychological skills traits, through the implementation of BCOMP.ACT program on Female Portuguese National U18 handball team.

This study also examines whether there was a significant difference between the athletic coping skills, compassion flow state, mindfulness, psychological flexibility, performance perception, coach ability, fear of injuries, and stress competition of the athletes in the experiment group before and after the application of the BCOMP.ACT program.

The study´s hypothesis that will be a competition stress reduction and a increase of self-compassion, mindfulness, sport satisfaction, psychological skills traits in athletes after the implementation of BCOMP.ACT program. Also it was hypothesis that will be differences in coach leadership satisfaction before and after the implementation of the program.

Method

The design is a pre-/post-pilot intervention study, quasi-experimental, repeated measures, with a mixed-methodology embedded design-qualitative and quantitative data and measures. This type of design is used to directly compare and contrast quantitative statistical results with qualitative findings or to validate or expand quantitative results with qualitative data (Ato et al., 2013).

Participants

The study was conducted with 18 female elite Handball players (*M*=17.04 years, *SD* =.64), predominantly Caucasian (85.3%) from the national U18 team -Handball Portuguese Federation, who at the time of data collection, trained in this brief intervention in preparation for the European competition. All the players had elite years of practice (*M*= 4.02 years).

Inclusion criteria and exclusion criteria for participants were defined. The inclusion criteria: (a) were actively competing; (b) had Portuguese language proficiency (i.e., taking into account the evaluation protocol and the training program were designed in Portuguese and for young athletes); (c) were under 19 years. The exclusion criteria: are (a) having mental health disorders and/or consumption of psychiatric drugs, (b) having significant previous experience with mindfulness programs and (c) being older than 18 years.

Participants were assigned at pre-intervention (time 1) and post-intervention (time 2), assigned to pilot BCOMP.ACT training program.

Procedure

The study was carried out under the Declaration of Helsinki (WMA 2000, Bošnjak 2001, Tyebkhan 2003), which establishes the fundamental ethical principles for research involving human subjects and in compliance with the Research Ethics Standards in Sports and Exercise Sciences (Harriss et al., 2019) and also by the National Handball Federation. The participants voluntarily agreed to participate in the study, and informed consent was obtained in all cases (athletes/parents/coaches). All participants, coach, and parents gave their informed consent to participate in the study and their names were coded in the data file for anonymization. After allocation, the protocol and participants' instructions were given one week before the study commencement to ensure clarity of delivery. A book guide with general information and exercises about this research was provided to the coaches and athletes of the Handball national team u18 before the start of the pilot BCOMP.ACT Program.

Instruments

Data collection took place in the Portuguese sports context, during sports training, and one of the researchers was present to clarify any doubts. All measures were based on self-report questionnaires completed by athletes pre-post intervention program.

Demographics. General demographic information was collected at baseline (e.g. gender, age, school year).

Sports State Self-Compassion Indicators- SSSCI (Carraça & Magalhães, 2022): The Portuguese teen SSSCS is an adapted seven-item, self-report measure based on the 26-item Self-Compassion Scale (SCS; Neff, 2003). This measure was developed for this specific teen's sports context. The SSSCI was translated and adapted to the Portuguese language following the translate–translate-back method (Sousa & Wilaiporn, 2011) and linguistic and semantic equivalence was considered, according to recommendations for this kind of study (International Test Commission, 2010). In the present study, the SSCS demonstrated good internal reliability (α=.84 test and retest, α=.84). Likewise, other study (Pendrous & Hulbert-Williams, 2017) developed a similar state adaptation of the SCS that had a reported α =.78.

Children's Acceptance and Mindfulness Measure – CAMM (Greco, Smith, & Baer, 2011; Portuguese version by Cunha, Pinto-Gouveia, & Paiva, 2013). This self-report scale consists of 10 items for the assessment of mindfulness skills in adolescents. It had an adequate internal consistency in the Portuguese version (α=0.80; FC=0.85) and test-retest reliability (r =0.46), and in the present study (α= 0.83).

*Stress Questionnaire in Sports Competition – QSCD (*Mellalieu et al., 2006; Portuguese version by Gomes, 2015). This questionnaire assesses the sources of stress associated with income sports of athletes, based on indications in the literature on factors of pressure and stress. This instrument is made up of 24 items, spread over six subscales, spread over six subscales: sports performance (four items; α =.70), injuries (four items; α =.62), competitive status (four items; α =.69), committing errors (four items; α =.79), social expectations (four items; α =.72) and opponents (four items; α =.86). It demonstrated good reliability in the present study (α=.96).

Inventory of Psychological Skills for Sport – ICPD (Mahoney et al., 1987; Portuguese version by Cruz, 1996). consists of 45 items intended to assess 6 skills essential psychological aspects of sports performance and success. The items are organized into 5 subscales, where each subscale assesses one psychological competence. The reliability of the scale, in several studies, is between α = 0.70 and .90. In this study, the reliability was α = 84.

Athletes Satisfaction Questionnaire - QSA (Riemer & Chelladurai, 1998; Portuguese version by Gomes, 2008a). Assesses different aspects of athletes' sports experience, there is positive data about its use with young Portuguese athletes. It consists of 11 subscales, however in this study only use the four subscales related to satisfaction with leadership. The reliability obtained in several studies were between α = .70 and 0.94, and this sample was α = .80.

Process evaluation

Daily Mindfulness Log. Adapted from Segal et al.'s (2002) Homework Record Form: this measure asks participants to keep a daily account of whether they practiced mindfulness skills and the length of their practice, as well as any observations they note.

State Flow Self-Compassion Practices Feedback notebook: At the end of the training week, participants were asked to complete a qualitative flow state self-compassion experience measure, assessing the frequency, nature, and intensity of their flow state self-compassion experience and inviting them to provide general feedback on the tasks.

Daily Sports Performance Log: Created for this study, this log asks participants for data on their sports performances that occur between workshop sessions, including the nature of their athletic activities (training or competition), the scores they obtain, and their satisfaction with their scores.

Description of the BCOMP.ACT Program

The Brief COMP.ACT (*BCOMP.ACT*): Based Sports intervention is a semi-structured program of psychological skill mindful compassion training program that was designed to enhance one's ability to be mindful, flexible, and self-compassionate specifically within the context of teams over a 7 intensive day- period, with 2 sessions (main sessions of 60/90 m + mini sessions of 15m) per day in 5 days training and game context (from 2nd to 10th March 2022). Each main session has the following sequence: 1- Initial exercise of mindfulness (informal meditation), 2- Review of the previous session/practice at home; 3- Specific psychoeducational content of the session; 4- Exercise focused on the task of the session, I yoga for beginners / stretching; 5- Summary of the session and plan of future practices; 6- Homework/practice prescription; 7-Practice final attention/compassion (formal meditation); 8- Mindfulness diary and session evaluation). The four small sessions are designed as Compassion and Psychological Flexibility (ACT) practical exercises. A more detail session structured is presented in table 1.

Fidelity of the intervention and compliance: To maintain the fidelity to the contents and program consistency of the program and protocol the author of the current study led the intervention and conducted the sessions, along with a co-trainer as described above. Also, during the implementation of the Portuguese version of the program, it was written down the major points to analyse, maintain, or change.

Compliance measured by noting group attendance and assessing the frequency and duration of formal compassion and psychological flexibility (ACT) practice and the frequency of informal mindfulness practice (i.e. breath awareness and daily sports life mindfulness and state self-compassion).

Table 1. Pilot Brief Compassion ACT Training Structure for Elite Teen Athletes (BCOMP.ACT)

Sessions	Key Concepts/Learning Goals	Contents	After-Session Assignment
Main Session 1	Introduction –BCOMP.ACT	_____	_____
Session 1.1 small exercise session in training: Super Power 1:Mindful Joy	Mindfulness Superpower 1. The mindful athlete;	Mindfulness of Music. Team cohesion exercise, Exercise "Be Smart, Start Mindful Mind"	Diaphragmatic breathing, mindful eating - Selected pre-, match, and post-match exercises: STOP
Session 1. 2 In Game Superpower 1	*S.T.O.P.* is an informal mindfulness practice that allows us to take a breath and check in to see how we're doing. It can assist us in shifting from states of distraction and automatic pilot to being present and intentional.	S — Stop, or pause T — Take a breath O — Observe the body, thoughts, feelings, emotions, and physical sensations P — Proceed with more awareness	_____
Session 2 - Opening UP	Psychological flexibility part 2-Experiential acceptance and fusion/defusion process. Defusion helps us observe that thought without getting caught up with it, so naming it would transform *"I'm a failure"* to *"I am noticing the thought that I'm a failure"* or *"Here's the failure story."*	Chess board exercise, observation of thoughts, thanking your mind exercise" and compassionate imagery	Body scan or compassionate sports imagery exercise
Session 2.1 -The mind flex RAIN	RAIN is a mindfulness practice that will help you focus on the present and cope with uncomfortable thoughts and emotions	R.- Recognize your thoughts, feelings, and physical sensations. Name your feelings out loud or silently to yourself. A-Allow- Observe your experience as if watching a movie. Let your thoughts, feelings, and sensations come and go as they are. Let go of any judgment—it is okay to feel however you are feeling. You may tell yourself, "This is how it is right now." I-Investigate What words are going through your mind? What emotions are you feeling, and where are they coming from? How are these feelings experienced in your body? And reflect on what it needs, such as acceptance, forgiveness, love, or belonging. Investigate N-Nurture. Be kind toward your experience. Give yourself a comforting message, such as "I love you," or "You are okay," Think of a friend, family member, pet, or spiritual figure, and imagine their love flowing to you. Let in healing and compassion until you feel calm and centered.	_____
Session 3 Doing What Matters	Experiential avoidance and "learn to fly"; Purpose in life sports	Values and actions exercise. Acceptance versus control: The unwelcome guest exercise, Meditation: The Sky and the Weather/the compassionate friend	Meditation: The Sky and the Weather/The compassionate friend
Session 3.1 Just do It with courage exercise	The poet Mary Oliver said, "You only have to let the soft animal of your body love what it loves." work the compassion and courage constructs in a sports competition context (Anchoring, Opening, Responding Compassionately with courage and empathy to the learning process of shame, failure, and criticism).	Compassionate courage movement exercise: two chairs, half of the athletes blindfolded, the athletes throw themselves with their backs on top of their colleagues, make an obstacle course, and kick the ball towards the goal. This exercise is always guided by a teammate who gives guidance. then the colleagues switch positions	_____

Session 4 Opening up 2 you/team	self-compassion superpower skill 2 – the power of kindness and human imperfection as a tool. Self-compassion versus self-criticism.	Compassion friend exercise, letter of self-compassion. Loving-kindness meditation	Loving-kindness meditation
Session 4.1- gratitude be grateful to be human and BCOMP.ACT	Gratitude and Compassion practice can change the way we see the world and move through it. Whatever we focus on regularly becomes the way we see the world. This is a short exercise you can do every day, ideal for first thing at the beginning of the match. Is short and succinct to show that we can also go into that space when we do not have so much time.	The gratitude meditation exercise in the athletes' locker room at the beginning and end of the BCOMPACT Program	————————

Data analysis

The data were screened to test the assumption of normality and homoscedasticity of the T-test and Pearson test. The internal consistencies of the instruments were evaluated by Cronbach's alpha. The statistical analyses were completed using SPSS- version 23.0. (Marôco, 2018). Pearson product-moment correlations were used to test the study Hypothesis, that among competition stress reduction, sport self-compassion, mindfulness, sport satisfaction, coach leadership satisfaction, and psychological skills traits, through the implementation of BCOMP.ACT program.

Results

The means and standard deviations of all measures for all participants at pre-test measurements were analysed. The table 2 provide descriptive statistics for the intervention group on the different measures for both the pre-test and post-test, namely the subscales that have significant results.

Table 2. In-Group Comparisons from pre to post-test for all Study Variables (n= 18).

Variable	Intervention Group (n=18)		t	Pvalue
	PRE	POST		
	Average DT	Average DT		
CAM-total	15.56* ± 3.42	24.5* ± 3.96	5.20	.00
SSCQ-competition	3.22* ± .53	1.99* ± .25	8.98	.00
SSCQ-Athlete performance	3.70* ±.32	2.12* ±.24	14.95	.00
SSCQ-task errors	3.69* ±.39	2.07*±.24	13.94	.00
SSCQ- social	3.33*±.50	1.15*±.33	14.44	.00
SSCQ-opponents	3.01*±.57	1.01*±.39	12.00	.00
SSCQ-injury	3.41*±.38	1.85*±.37	12.63	.00
ASQ-G. perform.	9.99*±1.6	12.00*±1.37	-3.63	.002
ASQ-Coach leader	19.25*±3.72	23.6*±2.59	-3.45	.003
PSSI-total	2.32*±.42	3.24*±.23	-9.25	.000
SSSCI-total	19.10* ± 2.5	19.91* ± 2.6	.70	.05

*Significant differences, p< .05.
Mindfulness (CAMM), State Sport Self-Compassion Indicators (SSSCI), Athlete Satisfaction Questionnaire (ASQ), Psychological Sports Skills Inventory (PSSI), and Sport Stress Competition Questionnaire (SSCQ**)**

Nota: Pérez et al. (2024).

The group has significant decrease in SSCQ-competition (t=8.98; *p*<.01); SSCQ-athlete performance (t= 14.95; *p* <.01); SSCQ-task errors (t= 13.94; *p*<.01);SSCQ -social (t= 14.44; *p* <.01); SSCQ-opponents (t= 12.00; *p* <.01); SSCQ-injury (t= 12.63; *p* <.01);and increase in PSSI-total (t= -9.25; *p* <.01); ASQ-coach (t= -3.45; *p* <.01); and ASQ-G performance (t= -3.63; *p* <.01), CAMM total (t= 5.20; *p* <.01); and SSSCI total (t=.70; *p* <.01). The level of athletes satisfaction with coach leadership, mindfulness, psychological skills, individual and team performance, and state self-compassion level improved from pre to post test, with high impact in analysed athletes variables. Thus, we can state that the greater the level of performance attained, the greater the concern for, self-compassion, mindfulness, and the more strategies of self-regulating sports performance activity the program participants possessed.

A correlational analysis was carried out between the previous scales presented in Table 3.

Table 3. Correlation analyse for Study Variables (n= 18).

VARIABLES	CAMM-POST	SSSCI-POST	ASQ-POST	PSSI-POST	SSCQ-total POST	SSCQ-opponents POST	SSCQ-social POST	SSCQ-performance POST	SSCQ-injuries POST
CAMM total -PRE						-0.47*	-.48*		
SSSCI total -PRE							-.48*	-.59*	
ASQ-PRE									
PSSI total -PRE								-.53*	-.55*
SSCQ-total PRE									
SSCQ-opponents PRE									
SSCQ-social PRE									
SSCQ-performance PRE									
SSCQ-injuries PRE									

*Significant differences, p< .05.

As can be seen in table 3, it was found from pre to post-test main results indicate significant and negative correlations, moderate to high impact between total CAMM pre and SSCQ-opponents post (r =-0.47; $p \leq .05$); post SSCQ-Social (r = -0.48; $p \leq .05$); total SSSCI pre and post-SSCQ-performance (r = -0.59; $p \leq .05$); post SSCQ-Social (r = -0.48; $p \leq .05$, total ICPD pre and post-SSCQ-performance (r = -0.53; $p \leq .05$), post SSCQ- injury (r = -0.55, $p \leq .05$).

According to the results, we can state that greater level of mindfulness decreases sport stress competition, especially in opponents, social and performance and injuries.

As noted the results showed that there were significant differences between pre and post-pilot BCOMP.ACT intervention program, thus we consider that the BCOMP.ACT program affects performance, self-regulation strategies, state of self-compassion, coach-athlete relationship, mindfulness traits, and psychological flexibility training.

Discussion

The results of this study reflect a significant positive shift across almost all of the outcomes measured. A significant reduction in stress, anxiety, and unhelpful forms of self-criticism was found, alongside significant increases in psychological flexibility, state self-compassion, coachability, and the ability to improve compassionate actions to and from the teammates. These findings are largely in line with existing research, which has shown the emerging evidence and positive results that suggest that mindfulness and compassion can support and improve well-being and mental health of athletes, including a range of mental health-related benefits, such as reduced stress, anxiety and rumination, and enhanced self-awareness and quality of sleep and life (Arboleda-Serna et al, 2024; Aditya et al., 2024; Astuti et al., 2024), as well as the efficacy of intervention, for example, adopting a COMP.ACT approach (Carraça et al., 2018, 2019, 2021) to reduce symptoms of anxiety, and stress (Carraça et al., 2023; Frostadottir & Dorjee, 2019).

Also the significant shift observed in levels of state self-compassion, well-being, and self-criticism in the present group were comparable to those obtained in a recent study, which utilized an eight-week MBSoccerP framework within the Elite male soccer players (Carraça et al., 2023; Carraça et al., 2021; Carraça et al., 2019, 2020). It is important to address that according Neff (2003), self-compassion is a skill to handle adversity and suffering in life, which in the high-performance context may be about the athletes' own struggles (burnout, depression and anxiety) and when there are struggling.

Also it is shown that there is a significant difference between the pre-test and post-test scores, obtained in terms of coping with adversity, coachability, concentration, goal setting and mental preparation, and freedom from worry. Bernier et al. (2009), studied the effects of the psychological skills training, based on mindfulness-based acceptance and mindfulness-based cognitive therapies, on the performance of elite golfers, and the study showed that the mental skills of the athletes in the experiment group were improved. It was also found by other researchers that optimal performance is related to being present and now. This finding is consistent with the results of other studies.

Also the results represent an important avenue for sport psychology intervention, particularly among complex elite sports challenges, as overall well-being and management of anxiety have been associated with improved ability to cope with stress competition more effectively, as well as decreased cognitive

fusion and somatic symptoms. As such, the findings of the present study complement the existing evidence base and provide further support for the use of group-based interventions for female elite teen athletes experiencing difficulties with self-criticism in the context of elite handball competitions.

A study by John et al. (2011) on the relationship between mindfulness meditation therapy and pre-competition anxiety for elite male archers shows that there is a significant decrease in pre-competition anxiety in connection with the salivary cortisol which is a physiological indicator of stress. In another study by Thompson et al. (2011), where a mindfulness-based performance enhancement program was developed to improve the athletic performance and psychological aspects of athletes, it was found that there was a significant increase in the finish times and mindful behaviors of runners and that there was a decrease in their irrelevant thoughts and task-related concerns. These findings are consistent with the findings of this research. A study on 483 elite athletes in various branches of sports shows that there is a negative relationship between mindfulness and stress and a positive relationship between mindfulness and achievement in sports (Francisco et al., 2024; Ayça et al., 2020).

Research indicates that independent appraisal of health, performance perception, compassion state flow, and quality of life is significantly impacted by components such as pain, fatigue, injuries, and the uncertainty associated with handball success perceptions and relation with coach rules (Carraça et al., 2023; Vveinhardt & Kaspare, 2022).

Conclusions

Based on the findings in the literature, it can be suggested that through contextual behavioural practices, an increase in athletes' focus on the present moment and concentration skills with self-compassion assertiveness on the game, and a decrease in their stress competition level can be achieved. In this sense, this study is the first one to focus on the effectiveness of a Compassion and psychological flexibility ACT-based training program on an elite National team young women's handball in Portugal.

Certain study limitations need to be considered when these findings are interpreted. For example, the lack of a group control and diversifying participants, could improve generalizability. Moreover, in this study, the BCOMP.ACT program was implemented during the training periods of athletes. Other aspect is that only females composed the sample.

Regarding specific future research to broaden the understanding of the intervention's effects are necessary. It can be recommended to apply compassion and ACT based interventions in individual and team sports that are professionally carried out starting from the infrastructures in the field of sports.

Comparison can be made with this study by applying BCOMP.ACT-based training programs to different elite sports branches and elite male athletes. For future studies, it is strongly recommended that the effectiveness of the BCOMPACT-based training program can be compared by taking follow-up and biological measurements. Also, the findings demonstrate positive results of BCOMP.ACT intervention in managing stress, psychological flexibility, self-compassion, mindfulness, and concern over sports mistakes. Hence fostering a BCOMP.ACT can be a frame of mind that is a potential coping resource for elite teen athletes in National team sports contexts. It is important to valorize, the optimization of elite sports practice and the well-being of athletes. The promotion of skills of mindfulness, psychological flexibility, self-compassion, and the reduction of stress/anxiety associated with better results in intrinsic motivation and team cohesion on training practice, and game performance.

Additionally, practical applications should be considered, taking into consideration the potential of approaches based on mindfulness, compassion and psychological flexibility to improve athlete's well-being and prevent mental health problems. Therefore the employee of certain skills can be useful such as: refining the terminology, making the language more palatable to athletes; outcomes and intentions of the clinical approaches were directly linked to performance goals or injury prevention (James et al., 2022).

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