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Alan Currie

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Editor-in-Chief	Malte Christian Claussen, MD Psychiatric University Hospital Zurich University of Zurich Lenggstrasse 31 8032 Zurich Switzerland malte.claussen@pukzh.ch
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The role of the sports psychiatrist

Alan Currie^{1,2} , Andres Ricardo Schneeberger³ , and Malte Christian Claussen^{4,5,6}

¹ Regional Affective Disorders Service, Cumbria Northumberland Tyne and Wear NHS Foundation Trust, Newcastle upon Tyne, United Kingdom

² Sport and Exercise Sciences, University of Sunderland, Sunderland, United Kingdom

³ Department of Psychiatry, University of California, San Diego, CA, USA

⁴ Department of Psychiatry, Psychotherapy, and Psychosomatics, Psychiatric University Hospital Zurich, University of Zurich, Zurich, Switzerland

⁵ Private Clinic Wyss AG, Münchenbuchsee, Switzerland

⁶ Adult Psychiatry, Psychiatric Services Grisons, Chur, Switzerland

Media coverage can be an additional mental health stressor for an athlete or team but can also raises awareness of important needs. This issue of *Sports Psychiatry* includes a review of media coverage of mental health issues during the recent, but delayed Tokyo Olympic Games [1]. As the authors indicate, many aspects of the media coverage were positive with athletes viewed as ‘human’ and relatable; perspectives that may allow for better consideration of their mental health needs and how these might be addressed.

This issue also contains another review highlighting the prevalence of mental health symptoms and disorders in sport (in this case football) [2] alongside a study of a population often neglected in research studies (the elite adolescent athlete) [3]. Both studies are confirmatory of previous findings of a substantial prevalence of mental health concerns. Yet there is still a risk that mental health concerns will be under-diagnosed or under-managed in a system with significant barriers to accessing expert mental health care and that fails to fully acknowledge the mental and physical connectedness of being human and of being an athlete [4].

In this context what then is the role of a sports psychiatrist? How can a psychiatrist benefit the individual athlete; support and work together with the athlete’s healthcare and performance team at an interdisciplinary and interprofessional level; and help to develop a mentally healthy culture in which athletes can thrive?

Sports psychiatry practice

Although well-being and illness are related concepts, they do not exist on a continuum [4]. Those who experience illness can also experience well-being whilst not all those who experienced a poor sense of well-being will do so

because of an illness. Looking after athlete well-being is insufficient to address all mental health concerns and the distinction between well-being (or lack of) and health (or illness) is an important one to address when promoting sports psychiatry practises for those experiencing mental health symptoms and disorders. Clinical expertise in assessment and treatment of mental disorders will still be required even if there is good provision for well-being needs and early, expert treatments produce better outcomes across a range of mental health disorders [5, 6]. Moreover, prevention and aftercare are also integral parts of medical, including psychiatric practice. Both require appropriate clinical expertise and for the sports psychiatrist should be just as much a matter of course in care concepts as assessment and treatment.

The psychiatrist working in sport must be able to accurately formulate an athlete’s difficulties and address sport specific diagnostic issues such as in eating disorders and Relative Energy Deficiency in Sport (RED-S) or in relation to over-training and depression and competition anxiety and anxiety disorders. In addition, they must understand the complexities and concerns when prescribing psychotropic medication for an unusual group with unusual physiological demands and exercise/performance needs [7]. The psychiatrist working in sport is also required to adapt their practises for use in a sport setting [8]. Elements of this include the flexibility to work around the busy schedules of the elite performer without over responding to the occasional expectation of favourable treatment or even unrealistic demands. It is necessary to understand the specific situation in which an athlete finds him/herself, especially in the case of existing psychiatric complaints and illnesses. This includes specific personality traits as well as a possible sport-specific manifestation of mental illnesses. Good working relations with the athlete’s health and performance team are also key requirements. For all

these reasons and more sports psychiatry emerges as a specialism and a valued resource for athletes, sports teams and sports organisations.

Mental health services for athletes

Whilst providing specialist mental health services at major events is important nonetheless evidence suggests that they are infrequently used with 8 consultations initiated by athletes and support staff during the Tokyo Olympic Games and 2 during the subsequent Paralympic Games [9]. There may be several reasons for this. There can be more immediate concerns such as musculoskeletal injury or sports performance at a major event and athletes and entourage members may be more willing to disclose their concerns to their own psychiatrist (if available) or other members of the healthcare team rather than to a stranger. Several national Olympic organisations already provide psychiatric services to their Olympic teams. Some of these were reviewed at the last symposium hosted by the International Society for Sports Psychiatry (ISSP) and are presented in this issue [10].

The characteristics of an effective mental healthcare service for athletes have been investigated and described [11]. Two central issues are the extent to which services should be sport specific and whether they are provided externally or integrated into the sports organisation or team [12]. Evidence suggests services are more likely to be utilised if they are available on-site, free and comprehensive. There are different tasks and a different focus for managing mental healthcare in the off season, mid-season and pre- and post-competition and it is preferable if services are provided year-round rather than just at a major event [11].

Describing the care pathway for an athlete with mental health symptoms is also important. Key points in the pathway begin with knowing how to access healthcare and facilitating this when necessary. Professionals should be clear about the roles and the responsibilities of all those involved in providing mental health support. Recently, the author proposed a concept for interprofessional collaboration between mental trainers and sports psychologists, as well as sports psychiatrists and psychotherapists when mental health complaints and illnesses arise [13]. This includes understanding who is best placed to help with a performance concern and when to seek advice from a clinician, therapist or mental health expert such as a sports psychiatrist [12]. Return to play decisions during recovery from a mental health problem also need careful management and demand close collaboration between the sports psychiatrist, wider mental health team and the performance team including coaches [14]. Furthermore,

appropriate return to play recommendations should be elaborated for all common mental illnesses in elite sports. In all cases the best interests of the athlete should be central to every decision and the athlete personally involved in decision-making at each stage. Considerable expertise, sound clinical judgement and an understanding of the stresses and pressures in the sports environment are all required when training and competition are reintroduced during recovery and where the skills and expertise of a sports psychiatrist may be invaluable. The aim is to create a virtuous spiral of increasing recovery and improved mental health as sports training and participation are reintroduced.

Mental health policy development

Finally, as recommended in this issue by Nahman and Tan [15], a sports psychiatrist can be at the forefront of research endeavours in the major issues facing elite sports and involved and contributing to new and better policies that safeguard the emotional welfare of sports participants.

Conclusion

Supporting mental well-being is a necessary but insufficient response to address concerns about athlete mental health. Athletes also need high quality mental health treatment and care such as provided by the sports psychiatrist with their specialist knowledge, skills and ways of working. Lastly, athletes deserve to work in an environment that is supportive of their mental health; that provides for them when they are ill and where there are no risks that their mental health will be harmed by sports participation [16]. The sports psychiatrist has a valuable contribution to make to the creation of this environment.

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ORCID


Alan Currie

 <https://orcid.org/0000-0001-5617-4868>

Andres Ricardo Schneeberger

 <https://orcid.org/0000-0001-8176-9126>

Malte Christian Claussen

 <https://orcid.org/0000-0002-8415-3076>

Alan Currie, MB ChB, MPhil, FRCPsych

Consultant Psychiatrist

Regional Affective Disorders Service

Cumbria Northumberland Tyne and Wear NHS Foundation Trust

St. Nicholas Hospital

Jubilee Road

Newcastle upon Tyne NE3 3XT

United Kingdom

alan.currie@cntw.nhs.uk



How should we ensure that children are safeguarded in gymnastics?

Carolyn Nahman and Jacinta O. A. Tan

Oxford Health NHS Foundation Trust, Nottingham, United Kingdom

Gymnastics has had multiple abuse scandals involving the USA, Australia, Europe and the UK [1]. These involve allegations of sexual abuse. In the UK, we are currently awaiting publication of the Whyte Report, an independent review looking into gymnasts' wellbeing and welfare as well as safeguarding issues [2].

A U.K. prevalence survey surveying 6000 participants in youth sports [3] – up to 75% of the individuals they studied reported experiencing emotional abuse as well sexual harassment (29%), physical abuse (24%), sexual abuse (3%). A lifetime prevalence estimate of all three types of interpersonal violence in elite athletes is about 24% with psychological abuse being most prevalent [4].

There is also an awareness that sexual abuse does not exist in isolation but thrives on a toxic and corrosive culture. In general disclosure of sexual violence is lower in sports [5] compared to reported prevalence. Within the child elite sporting environment, children are at risk because touch [5, 6] (often between children and adult males) is normalised and begins at an early age in order to help build the mechanics of the difficult skills required and in order for safety and to prevent injury. Furthermore, in many elite settings the coaches have high levels of authority and control which may be difficult to challenge, particularly if the coach is seen as being successful using their methods and regime. There is a further risk that because of a celebrity culture in which the perpetrators are emboldened by a bystander culture, where abuse is ignored and allowed to continue.

Although sexual abuse has received significant attention, there appears to be less research around emotional harm/abuse [5], particularly the more subtle forms, which can be equally pernicious and harmful especially if sustained over a long period of time or carried out by trusted authority figures. Within a sporting subculture there is some acceptance of an environment where psychological aggression (which could include bullying, constant criticism and

denigration) or coercive practices such as requiring training to the point of exhaustion are present and sometimes deemed necessary or even beneficent as enhancing performance of the athlete. Because there is often lack of evidence of malice or self-gratification on the part of the perpetrator and it may be perceived by all, including the athletes, as necessary to elicit maximal performance and success, this is often allowed to continue and can become normalised or accepted as the price worth paying for success. Even so, athletes and in particular child athletes who depend on the adults around them for psychological care, development of a healthy identity and positive self-regard can be harmed.

Children (aged under 16) in elite sport are particularly vulnerable. This is particularly true in sports like gymnastics where they typically enter intensive training in earlier childhood [5]. When they commit to intensive training from a young age, they may become solely focussed on performance in one sport whilst still unable to formulate their own long time life plans or make major life choices [7]. This can delay development of an individual identity and life goals distinct from the sport and a lack of self-esteem which is not bound up in sporting success, at a time when they depend on the adults around them to keep them safe. Developmentally a certain amount of adult paternalism is normal and appropriate for all children and the responsibility for the safety, wellbeing and healthy development of children generally lies with their parents and schools. However, in an elite sport environment, where children spend many hours training in gyms under the care and supervision of others, their coaches are by default in *locum parentis*, with coaches often spending more time and having more influence than parents themselves. There is significant power differential between the child athlete and coach [8, 9], and a high potential cost to reporting abuse – sometimes around the perceived shattering of future hopes and dreams and a fear of retaliation. Indeed, when children are involved and the abuse is normalised to the setting

and justified by sporting results, how do children even realise they are being abused?

None of the issues discussed above is unique to gymnastics. However, gymnastics is one of the early specialism sports where young children enter an elite training environment and perform many hours of training at a young age [6, 8, 9].

Over the last 40 years, the age of competitors at elite levels has not only become younger, but in addition from the 1970's when the scoring system changed the required acrobatic skills have increased in difficulty, has necessitated increased training at a younger age [10]. The pre-pubertal child has the advantage of a higher power to weight ratio, thus the prepubertal physique has become favoured, to enhance the potential to perform difficult acrobatics which require significant strength. It was about this time that male coaches also increasingly became involved in training of female gymnasts [10, 11, 12].

In accordance with the 1959 Declaration of the Rights of the child [13] children have the right to train and compete in a healthy environment, where well-being is privileged over performance enhancement. We believe children have the right to dignity and respect.

How do we find a way forward and how do we develop best practice? We suggest that this area of concern requires not just reviews and enquiries but the following: sound research into child welfare and wellbeing in sport and elite sport to develop methods of re-incorporating parental voices and a fresh emphasis on wellbeing and child development into the elite sports environment while supporting child athletes to develop their own voices [12, 13]; new approaches to governance and safeguarding in club and elite level sports which is more focussed on preventative and developmentally sound strategies to help children to grow and mature within positive, healthy sporting environments [7, 8, 11, 13]; and increased co-working between mental health specialists (including psychiatrists), child development experts and the sports community to enhance the wellbeing of all children engaging in sport, as well as supporting those who are elite athletes to perform at the highest levels without paying an unacceptable price for their success.

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History

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Dr Carolyn Nahman, MbChB, PhD

Child and Adolescent Psychiatry
Oxford Health NHS Foundation Trust
42 Lucknow Drive
Nottingham NG3 5EU
United Kingdom
cazzie@doctors.org.uk



Mental health services at the Tokyo 2020 Olympic and Paralympic Games during the COVID-19 pandemic

Masaki Nishida^{1,2}, Shunsuke Takagi^{1,3}, Tatsuya Yamaguchi^{1,4,5}, Hiroaki Yamamoto^{1,6}, Satoshi Yoshino^{1,7}, Kazuyoshi Yagishita^{1,8,9}, and Takao Akama^{1,2}

¹ The Tokyo Organising Committee of the Olympic and Paralympic Games, Tokyo, Japan

² Faculty of Sport Sciences, Waseda University, Tokorozawa, Saitama, Japan

³ Department of Psychiatry and Behavioral Neurosciences, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Bunkyo, Tokyo, Japan

⁴ Institute for Integrated Sports Medicine, School of Medicine, Keio University, Shinjuku, Tokyo, Japan

⁵ Department of Neuropsychiatry, Keio University School of Medicine, Shinjuku, Tokyo, Japan

⁶ Department of Psychiatry, Kitasato University Medical Center, Kitamoto, Saitama, Japan

⁷ Shinjuku Gateway Clinic, Shinjuku, Tokyo, Japan

⁸ Clinical Center for Sports Medicine and Sports Dentistry, Tokyo Medical and Dental University, Tokyo, Japan

⁹ Hyperbaric Medical Center, Tokyo Medical and Dental University, Bunkyo, Tokyo, Japan

Overview of The Tokyo 2020 Summer Olympic and Paralympic Games

The Tokyo 2020 Summer Olympic and Paralympic Games were held for nine weeks from July 23 to September 5, 2021. They are most notable for being held under the exceptional circumstance of the COVID-19 (coronavirus disease 2019) global pandemic. During this time, Tokyo was experiencing an outbreak of COVID-19 infection, which is why, most competitions were held without audiences as a safety measure along with restricted entry of all associates. Nevertheless, approximately 11,000 Olympic athletes and 41,000 of their associates, 4,400 Paralympic athletes, and 12,000 officials from over 200 countries participated in the games [1].

An Olympic village polyclinic was established to provide medical services at the athlete's village. The polyclinic provided services including internal medicine, orthopedics, dermatology, urology, ophthalmology, dentistry, female athlete clinic, physical therapy, 24-hour emergency services as well as mental health services, for which five qualified psychiatrists were assigned. Studies on previous

Olympic Games have reported a small number of mental health consultations with minor psychiatric manifestations in the Olympic polyclinic [2, 3]. However, we presume that due to the COVID-19 pandemic, unusual mental health issues would have been experienced during the 2020 Games.

Demographics of the mental health service

The mental health service at the polyclinic in the Olympic village was open three times a week from 10 am to 7 pm. Five board-certified psychiatrists were assigned to work in rotation, and on-call telephone support was provided during the absence of a physician on duty.

Eight patients (seven male, one female) visited the polyclinic for mental health services during the Olympics. Among them, three were athletes and five, members of the team staff. During the Paralympics, two patients (one male, one female), both of whom were members of the team

staff, visited the polyclinic for mental health services. Thus, 11 people were examined at the polyclinic throughout the Olympic and Paralympic games. All patients, except for one, met the diagnostic criteria for Adjustment Disorder. Plausible factors contributing to psychological stress are likely to be associated with the prolonged stay in the Olympic village, work-related exhaustion, and the behavior of others that may be considered harassment. None of the clients required hospitalization in the psychiatric ward in the hospital designated by the Tokyo Metropolitan Government and the organizing committee.

In addition, although two inquiries regarding the handling of psychostimulant medication for Attention-Deficit / Hyperactivity Disorder were made, they did not result in a formal medical visit. Specifically, one Olympian had stimulant drugs confiscated by the customs department for failure to follow the Therapeutic Use Exemption (TUE) procedures. However, the drugs were returned to the participant after following proper procedures. Moreover, another Paralympian was unable to bring Amphetamine/dextroamphetamine (Adderall®) due to incomplete TUE procedures. Although polyclinic staff was asked whether they could prescribe methylphenidate (Concerta®) as an alternative; it was only an inquiry, and no procedure or alternative medication was prescribed.

Services for people under quarantine

During the 2020 Olympic and Paralympic Games, those who tested positive for COVID-19 had to follow quarantine rules which possibly took a toll on their mental health. The organizing committee of the games announced that a total of 863 athletes and officials had tested positive, of which 41 were athletes [4]. Those who tested positive for COVID-19 were promptly quarantined at a designated isolation facility.

A patient in quarantine must meet all of the following criteria to be discharged:

(1) Symptomatic patients

- 10 days after the onset of symptoms and 72 hours after the symptoms have abated
- Negative results confirmed by two PCR tests at an interval of at least 24 hours, after 24 hours of symptom relief

(2) Asymptomatic pathogen retainers

- After 10 days from the date of specimen collection
- After 6 days from the date of specimen collection, confirmed negative results of two PCR tests at an interval of at least 24 hours.

Although previous studies have demonstrated that the lockdown affected the mental health of athletes, such as depressive mood and confusion [5], anxiety [6], and elevated distress [7], to our knowledge, no studies have reported psychiatric disorders caused by individual isolation during quarantine. Nevertheless, it is not contradictory that isolated athletes or associates were restricted freedom of action, including training, as well as tremendously distressed as they were deprived of the opportunity to participate in the main competition. Two quarantined, Olympic male staff members sought consultation complaining of severe anxiety symptoms. The psychiatrists provided online telemedicine consultations and treatment, as they were not allowed to visit isolation facilities due to infection control regulations. Eventually, one patient (an associate) was able to visit the polyclinic once their quarantine period had ended. A quarantine camp of Olympic and Paralympic athletes, known as “sporting bubbles,” which was specifically designed to reduce the risk of transmission, was shown to function effectively for conditioning [8]. The mental distress caused by individual quarantine was expected to be stronger for athletes and officials than for the public [9]. Moreover, being forced to abandon their participation in the main competition due to quarantine would make the despair and helplessness unimaginable. Therefore, although there were only two consultations for mental health services because of quarantine, we speculate that the need for psychological support in this scenario is more than that in ordinary situations. Thus, psychological support for individually quarantined people require further improvement.

Issues for future games

Although holding the Olympic and Paralympic games under pandemic conditions appears unprecedented, future games may need to be held in similar circumstances. Therefore, it is critical to summarize the issues ahead of the 2022 Beijing Olympic and Paralympic Winter Games. While it is uncertain whether the pandemic will be under control by then, we suggest that the psychological support system for athletes and officials should be further developed and expanded. The polyclinic at the 2020 Games consisted of only psychiatrists and lacked clinical psychologists. Therefore, the importance of deploying well-trained psychologists among the polyclinic staff should be emphasized [10].

In light of the increasing demand for clinical psychologists, more flexibility in locations and hours will be required for collaboration and to ensure more opportunities for online consultations. Although the mental health teams experienced no cases of admission to psychiatric hospitals

or wards, we strongly recommend careful coordination with affiliated hospitals in advance. Especially, as it is difficult for psychiatric hospitals to admit patients under pandemic conditions and provide mental health services to people from other countries.

Finally, although the polyclinic only catered to three athletes, several staff members, including coaches, athletic trainers, and team-doctors, were substantially exhausted by the unprecedented workload, highlighting the importance of also providing support for these professionals [11, 12].

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ORCID

Masaki Nishida

 <http://orcid.org/0000-0003-2661-4425>

Dr Masaki Nishida

Faculty of Sport Sciences

Waseda University

2-579-15, Mikajima

Tokorozawa


Saitama 359-1192

Japan

nishida@waseda.jp



Biosecurity/quarantine hubs and impact on athlete mental health

Ranjit Menon¹  and Mary Spillane²

¹ School of Psychology and Psychiatry, Monash University, Clayton, Australia

² The Australian Institute of Sport, Canberra, Australia

Covid 19 pandemic has caused global devastation and over 200 million infections and around 4 million deaths [1]. The response has led to the closure of international and internal borders. Concerns around further waves of infection has led to the establishment of strict biosecurity/quarantine hubs in repurposed facilities before, during and after competition.

The psychological impact of biosecurity hubs on athletes and support staff are poorly understood and concerning. Emerging reports from clinicians who have provided clinical care to athletes in such hubs indicate that they have led to significant mental distress for many athletes due to unfamiliarity and a lack of specialist services to screen, detect and manage those with pre existing mental illness or for those who develop new symptoms.

Mental distress and disorders

Athletes are just as susceptible as others to developing mental illness [2]. Primary prevention of mental disorders is promoting exposure to protective factors and reducing exposure to destabilising factors [3]. In hubs the reverse may occur resulting in an expression of illness. Athletes who have a psychiatric history may relapse and some with no prior history may develop a new illness requiring management.

There are significant differences in the individual needs of athletes and a one size fits all model is unsuitable. Differences between hubs result in a variety of structures and rules which lead to confusion and unpredictability. Outbreaks have led to sudden changes in plans and locations resulting in disruption of childcare arrangements, personal relationships, medical appointments and so on. Disconnection from loved ones can be compounded by unreliable communication services which adds to distress. Poor access or lack of appropriate training facilities may lead to de-conditioning and performance failure worries. Lack of

preferred dietary choices may lead to reduced/increased dietary intake. Lack of routine may result in boredom, increasing risk of online gambling or excessive use of pornography. Substance misuse may lead to more distress and increased risks.

There are emerging anecdotal reports of athletes developing acute anxiety after spending time in biosecurity hubs. Loosely coined by the authors as 'quarantine phobia' the symptoms of elevated anxiety and issues with re-adjustment appear to persist well after quarantine and ongoing anxiety at the prospect of further quarantine for the next event. This appears specific to these settings. Some athletes are withdrawing from selection to avoid hubs and the consequences are personally and professionally significant.

Proposed Strategies

If the practice of biosecurity hubs continues a few strategies may be considered to minimise mental health impact on athletes.

- (1) Design: Biosecurity hubs should be carefully selected with access to adequate training facilities, preferred dietary choices, adequate ventilation and fresh air, good telecommunication services and structured routines. Once finalised, athletes should be given a full briefing of these hubs and available services.
- (2) Management: Team doctors, already overburdened with the care of athletes in addition to usual medical care, are ill suited to being in charge of biosecurity hubs. The gatekeeper role may lead to deterioration in the therapeutic relationship with athletes. The management of hubs should be done by integrity teams within the relevant sport in consultation with team doctors.
- (3) Services: Specialist mental health professionals such as psychologists with experience in dealing with acute psychological symptoms and sports psychiatrists with expertise in managing psychiatric disorders such as

acute anxiety disorders, mood disorders, alcohol misuse disorder, disordered eating etc should be available. Resilience building, mindfulness, cognitive behavioural strategies should be instituted early and continuously to ensure that prevention strategies are ingrained. Mental health review should be incorporated into medical review prior to the hub to identify vulnerabilities. Standardised screens such as Kessler 10 [4], Baron Depression Screener for Athletes [5], Athlete Psychological Strain Questionnaire [6] etc. should be done at baseline and in symptomatic athletes for early intervention. Secondary prevention strategies including individualised care plans, early intervention, transitioning distressed individuals out of hubs, initiating risk management and monitoring are important to prevent further morbidity.

- (4) Time spent in biosecurity hubs: Athletes should spend the least possible time in such hubs and transition out as quickly as possible. Repeated or extended periods in hubs may have deleterious impacts on mental health.
- (5) Pre-Quarantine Education: Prior to entering a biosecurity hub or quarantine, athletes should be provided with psycho-education on prevention (i.e., self care strategies) as well as reactive strategies, such as early identification.
- (6) Staff Support: The contingent of staff travelling with teams should also have access to the same supports and education prior to, during, and post biosecurity hubs so they can better assist athletes.

Conclusion

Biosecurity hubs have been set up to allow sport whilst controlling the pandemic. Whilst they may reduce morbidity there is no sure way of avoiding psychological harm due to the nature of hubs. They may have profound impact on the mental health of athletes and support staff and careful evaluation of these settings over the coming months and

years will assist in developing these further and ensuring the health of athletes.

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ORCID

Ranjit Menon

 <https://orcid.org/0000-0002-9806-5771>

Ranjit Menon, FRANZCP

Adjunct Research Fellow

School of Psychology and Psychiatry

Monash University

Wellington Rd

Clayton, Victoria 3800

Australia

mentalogueclinic@gmail.com



Media portrayal of mental health at the 2020 Tokyo Olympic and Paralympic Games

Jennifer Keal¹, Thomas McCabe^{2,3}, Jade Wright⁴, and Patrick Renshaw⁵

¹ Berkshire Healthcare NHS Foundation Trust, Prospect Park Hospital, Reading, UK

² NHS Greater Glasgow and Clyde, Gartnavel General Hospital, Glasgow, UK

³ School of Medicine, Dentistry & Nursing, University of Glasgow, Glasgow, UK

⁴ Barnet, Enfield and Haringey Mental Health Trust, St Ann's Hospital, London, UK

⁵ South Health and Social Care Trust, Craigavon Hospital, Craigavon, UK

Abstract: *Introduction:* The media coverage of high-profile sporting events can bring increased pressure to athletes' psychological wellbeing. There may be speculation regarding athletes' mental state before, during and after competition potentially impacting on both the athlete's wellbeing and public perception of the individual if a negative tone is attached to an article. As mental health understanding and literacy develop, media reporting of elite athlete mental health may contribute to shaping of opinions and help seeking behaviour. Thus, we have aimed to understand and analyse the tone and content of media reporting on a high-profile sporting event using qualitative methods to explore key aspects of the articles sampled. *Methods:* We selected two UK broadsheet newspapers available online (The Guardian and The Telegraph) and identified all text articles including the terms "Mental Health" and "Olympics" or "Paralympics" published between 23rd July 2019 and 30th November 2021. We selected articles relevant to the Tokyo 2020 Olympic and Paralympic Games and including mental health as a subject. Relevant articles were read in full, and we conducted a thematic analysis to explore how mental health was portrayed. *Results:* 581 results were generated from our initial search. Following screening and removal of irrelevant articles, we had 95 articles for analysis. We identified four themes relating to portrayal of mental health: Pressure, impact of COVID, Lack of specific diagnostic terms, and athletes as humans. *Conclusion:* Media portrayal of mental health at the Tokyo Games was generally positive and portrayed athletes as relatable, inspiring, and "human" rather than superhuman. Reporting particularly focused on athlete-specific factors in mental health conditions and the pressures of high-level competition.

Keywords: Olympics, Paralympics, elite athletes, mental health, media

Introduction

Coverage of mental health issues within the sports medicine literature is becoming increasingly prominent [1, 2, 3, 4], partly driven by high profile disclosure of athletes' psychological challenges within traditional and social media outlets. Elite athletes face particular challenges associated with sports participation including competition related physical injury and rehabilitation, financial uncertainty, sports related brain injury, team dynamics, dietary requirements, and travel for competition or training [3, 4]. The impact of these factors isn't routinely disclosed to the public for fear of stigma associated with perceived weakness.

Media outlets can positively influence the perception of mental health by using direct quotes from those with mental health problems or including experiences of recovery and rehabilitation. However, newspaper reporting of mental health problems appears to be less frequent than of physical problems, with the majority of reports being negative in

tone [5, 6]. Stuart suggests some of the psychological damage this can cause – including adversely affecting health seeking behaviour and impairment to overall recovery-recommending a focus on cultivating a more positive media narrative [7].

The Olympic and Paralympic Games are viewed as the pinnacle of sporting achievement with over 200 countries competing in 55 sports. The Tokyo Games were delayed for 12 months because of COVID-19 resulting in disruption of 'four-year plans' and training schedules. Quarantine requirements and immunisation decision-making further contributed to uncertainty in the lead-up, competition and post-competition periods.

The media coverage of high-profile sporting events such as the Olympic Games can apply increased pressure on athletes' psychological wellbeing. There may be speculation regarding athletes' mental state before, during and after competition. This has the potential to impact upon both the athlete's wellbeing and public perception of the

individual if a negative tone is attached to an article. As mental health understanding develops and literacy improves, media reporting of mental health issues in elite athletes may contribute to shaping of opinions and help seeking behaviour for others. Thus, we have aimed to understand and analyse the tone and content of media reporting on a high-profile sporting event using qualitative methods to explore the key aspects of the articles sampled.

Methods

Our study researched two UK national newspapers available to read online. We chose broadsheet newspapers as articles tend to be longer, more detailed, and factual in nature when compared with tabloid media. We selected *The Guardian* and *The Telegraph*, two newspapers with relatively high UK circulation. We sought to maintain a balance between left- and right-leaning socio-political ideologies; with the *Guardian* and *Telegraph* newspapers providing moderate leanings to each of these respectively. Additionally, *The Guardian* was freely available online and *The Telegraph* was selected as an equivalent paper with a small paywall fee. We limited this study to published articles, not including social media posts of these outlets which tended to be short and generally linked back to the published articles.

We conducted searches of *The Guardian* and *The Telegraph* websites. Using a Google “advanced search”, we sought articles containing the terms “Mental Health” and “Olympics” or “Paralympics”. We included all articles published between 23rd July 2019 and 30th November 2021 to include articles published in the year preceding the original Tokyo Games before their postponement to 2021 due to the coronavirus pandemic. We included a period after the Tokyo Games ended on 5th September 2021 to capture any stories relating to post-event mental health problems, as well as any reporting on stories that emerged after the games completed.

The search process identified 581 articles. These were screened by authors JK and JW to filter out irrelevant articles. Articles were deemed relevant if they related to the 2020 Tokyo Olympics or Paralympics and included content on the topic of mental health. Articles were discarded if they were duplicates, in a non-text format (e.g. video, audio), clearly unrelated to the Tokyo 2020 Olympic or Paralympic Games, clearly unrelated to mental health, were summaries of live reporting, or were daily briefing articles that contained information that would also be included in more detailed reports.

As the aim of our study was to look at the media’s representation of mental health during the 2020 Olympic and

Paralympic Games we opted for a reflexive thematic analysis. We chose thematic analysis for its theoretical flexibility. We took a mostly inductive, semantic approach to identify and progressively refine themes in the articles.

A final list of 95 articles was generated and this became the dataset for our analysis. We conducted the thematic analysis according to the six stages described by Braun and Clarke [8, 9]. Articles were distributed equally between the researchers and read in full to develop familiarity with the contents. We then discussed initial observations which would guide further analysis of the articles. Next, we re-read the articles and coded the data. Discussion took place between the researchers at several stages to aid consistent and comprehensive coding, taking an iterative approach to the analysis. The codes were reviewed, and we conceptualised recurring patterns as themes. We then reviewed the potential themes, grouping and refining them to finish with the four themes discussed in this paper. We undertook a detailed analysis of each of these themes.

Results

581 articles were identified after the initial search. Once articles that did not meet our criteria were discarded, we had 95 articles to include in our analysis. There was greater reporting of the Olympic Games than the Paralympic Games. We identified four key themes in the media reporting on mental health at the Tokyo 2020 Games: 1) Pressure on athletes, 2) Impact of COVID, 3) Lack of specific diagnostic terms, and 4) Athletes as human.

Pressure on athletes reflected the multiple pressures athletes faced including the pressure to perform well on the international stage, to win medals, to maintain their funding status, to please their coaches, and to engage with the media.

Impact of COVID covered the effects of uncertainty about whether the Games would go ahead and if athletes could travel, as well as the mental health aspects of quarantine procedures and isolation from support networks. It also covered teams’ responses to the need for additional resources to focus on mental wellbeing of athletes and their support networks.

Lack of specific diagnostic terms reflected the tendency to report on mental health using non-specific language, rather than identifying particular diagnoses, symptoms or treatments.

Athletes as human grouped together subthemes of athletes being viewed as ‘normal’ people rather than super-human or extraordinary, athletes’ portrayal as relatable for the public, and the idea that athletes speaking up could impacts society’s view of mental health problems.

Pressures on athletes

Several articles commented on the specific pressures experienced by athletes and this being a factor for mental health problems.

“Coming out of the Olympics... athletes have finally been able to talk about the impact that these pressures have on their mental health.”

“she had struggled with the demands of being one of the most famous athletes in the world, the unique pressure of these Games and the added challenge of being stuck in a Covid secure bubble.”

“Too Much Pressure could well stand as the unifying theme for [these] Games”

The pressures described included pressure to qualify for competition, to win medals, to represent particular sub-groups of the population (e.g. the LGBTQ+ community, female gender, ethnic groups) and to comply with additional expectations such as engaging with the media, including having a presence on social media.

“Playing for your country in a once-in-a-career home Olympic Games is difficult enough, but doing so after essentially being elected the face of the whole event is another level altogether.”

“Today’s sporting heroes face unprecedented pressure, not just to perform on the sporting field, but on social media and as the face of their own brands and businesses.”

Other pressures included meeting expectations of coaches and team managers, needing to gain or maintain funding for training, and team selection. Articles reported on negative experiences of pressure leading to athletes feeling they had failed themselves or others and the experience of disappointment.

“It was one of the biggest moments in my career, but when I watch it... rather than euphoria all I feel is relief. Prior to the Games we had been told that if we didn’t medal in Athens we’d lose all our funding.”

Athletes who do experience pressure and its consequences feel unable to talk openly about it, viewing struggling with pressure as a weakness.

“That’s another kind of pressure that athletes feel, many of us suffer from impostor syndrome... but as elite athletes you’re not supposed to talk about it, or show any signs of weakness.”

Many articles commended athletes who spoke about their difficulties, but others regarded mental health as a cause for poor performance and something that needed to be overcome. The stance of the two newspapers studied was

broadly supportive of athletes who experienced mental health problems and took a critical tone when reporting on other media sources that were less empathetic:

“Despite her obvious burden and the fundamental importance of mental health... some [media platforms] have portrayed Biles’s decision to withdraw not as a brave stand but rather as quitting in the face of adversity.”

Multiple articles reported on competitors withdrawing from competition for mental health reasons, often using language to suggest the withdrawal was ‘shocking’ or unexpected.

“dropped a bombshell... when she pulled out of the Games, citing mental health concerns”

“sent shockwaves across sport by admitting her “mind and body are not in sync” due to mental health issues.”

“The news followed her dramatic decision to stop competing in the women’s team event”

Impact of COVID-19

The impact of COVID-19 was a unique factor for the Tokyo 2020 Games. Articles commented on the mental health consequences of COVID-19 and the associated quarantining, isolation and complex testing procedures. Athletes reported that the measures in place were detrimental to their mental health - causing or worsening anxiety and reducing their access to informal support networks such as friends and family.

“[Athlete] admitted he was struggling mentally after spending the past six days in his room at the UK Athletics camp in Yokohama, being allowed out only to train.”

A number of articles referred to specific mental health support offered by organisations, highlighting a willingness to factor it into athletes’ needs at the Games, but there was little detail given about what form this took in terms of the professionals involved or input offered. This may be because organisations did not share such information with the media. The exception to this was that some detail was given around the Team GB set-up at the Tokyo Games, such as the 24-hour helpline.

“Anson also confirmed measures would be in place to protect the mental health of athletes, who will have to quarantine and face severe restrictions on their movements.”

“Calls to the Australian Institute of Sport’s mental health referral network have surged.”

“there will be unprecedented mental health and wellbeing support on offer for both athletes and staff as they head into a unique competitive environment.”

Quarantine requirements added to disruption of competition, training programmes and travel plans. One positive result from this delay was greater prioritisation of mental wellbeing and resource allocation than previously, with the reporting including quotes from team officials regarding this.

“We have overhauled a lot of our medical practices. A big shift in how we approach mental health. We believe happy riders are fast riders.”

“We have been putting in place mental health guidance for our own staff as well because it’s a tough environment for the team around Team GB. They’re very much confined to the village in a very hot country, in a very tight village – it’s tough for everyone.”

Lack of specific diagnostic terms

Despite recent interest into mental health in sporting populations in sports medicine literature, the nuanced aspects of identification and sports specific treatment options are relatively new concepts.

Generic terms seem to be favoured by both the athletes and the media rather than specific mental health diagnoses.

“For anyone saying I quit, I didn’t quit, my mind and body are simply not in sync... Physical health is mental health.”

“Mental health is not a sign of weakness.”

The term ‘mental health’ was also favoured by journalists when explaining why an athlete may have withdrawn from an event.

“... pulled out of Australia’s Tokyo campaign in the days ... due to mental health concerns.”

Disclosure of mental health difficulties by elite athletes within the articles suggested a variety of symptoms discussed both as precipitants to and as part of the psychological experience.

Terms such as ‘stress’, ‘struggling’, ‘pressure’, ‘difficulties’, ‘grief’ or ‘numbness’ tended to predominate in the articles to describe athletes’ psychological experience. Infrequent exceptions to this include the inclusion of the diagnostic terms ‘post-traumatic stress disorder’ and ‘attention deficit hyperactivity disorder’.

Athletes as human

A common theme identified was that experiencing mental health difficulties made athletes ‘human’, and that elite athletes are ‘just like us’.

“we are acknowledging a very human response to pressure even when athletic ability can seem impossible to comprehend.”

“Maybe not even looking at them as an athlete, but seeing them as a human is what people should try to do”

The articles contrasted this with previous portrayals of athletes as ‘superhuman’ or ‘machine-like beings’ with their self worth and public credibility relying upon sporting achievement.

“Her clip was a display of ... just some of the qualities that often compel us to view sportspeople in a sort of invincible, superhuman light.”

“we watched as the superhumans who had won record hauls of shiny medals revealed their vulnerabilities... they told us about the human side in so much more detail.”

Also within this theme was the portrayal of athletes who spoke out as being brave or inspiring. Athletes’ human experience of mental health difficulties was validated, independent of their sporting achievement.

“She has made it legitimate for any sportsperson to question whether sport is the most important thing on Earth... admitting the truth about her exit truly felt like the mark of a proper champion.”

“Her decision not to compete was courageous and extremely important for pushing the subject of mental health in sports forward.”

“It was brave of her to tell the world about her mental health issues.”

Additionally speaking about mental health difficulties was portrayed having a positive impact upon other athletes; reminding them of their humanity, regardless of their athleticism.

“Hearing the biggest names in sport talk so openly has helped athletes to own their emotions, and not feel ashamed.”

Experiencing mental health difficulties and seeking support was portrayed as relatable for the public, and links made between the pressure of Olympic sport and that of everyday life.

“if supreme performers are just like us after all, the field of sports psychology – traditionally the preserve of elite performers – has perhaps never been more relatable.”

Additionally, the media suggested that experiencing mental health difficulties made athletes valuable role models, reducing as the gap between them and ‘normal people’.

“It shows she is human and mental health still affects her just as it would other people.”

Discussion

The purpose of our study was to review the portrayal of mental health in media reporting on the 2020 Tokyo Olympic and Paralympic Games. These games were noted for a greater focus on mental health than in previous competitions, in a large part thanks to high-profile events bringing attention to mental health issues: such as Simone Biles' withdrawal from competition in the women's artistic gymnastics and Naomi Osaka's decision not to attend press conferences at the 2021 French Open just a couple of months earlier.

Media reporting gave an insight into the multiple pressures elite athletes faced at the Olympic and Paralympic Games. This offered some context to the stresses, and in some cases consequential mental health problems, for athletes despite the games often being a pinnacle of their careers.

Reporting focused on the mental challenges of performing under high pressure circumstances and the additional impact of COVID-19 protocols, but with less focus given to the pressures outside of the competition period that can also contribute to mental health problems, both specific to athletes and more general factors [3]. Some exceptions however were experiences of grief and bereavement.

Although much of the reporting was about individual athletes' personal experiences and symptoms, there was also some coverage of the support offered emphasising that mental health problems can be managed proactively and are worthy of resource allocation. What was perhaps less well covered in the reporting is the fact that support staff made as much, if not more, use of mental health provisions at the games [10].

One could postulate reasons for the non-specific language used in the articles; for example, athletes may not divulge a diagnosis due to potentially incurring stigma or fearing that a specific diagnosis could be misunderstood, misconstrued, or amplified. The athlete and/or journalist may not be literate with mental health terminology, requiring further education and development in this regard. Brief anti-stigma interventions and mental health literacy programmes that seek to increase knowledge of mental health symptoms have been shown to improve help-seeking intentions in elite athletes [11]. It is also possible that some athletes avoided going into detail so as not to detract from fellow competitors or other serious issues facing their countries in the light of a pandemic.

None of the articles sampled highlighted delays or concerns about accessing of psychological support. This disclosure can be a challenging aspect of the athlete's journey with reluctance to jeopardise any relationship with governing or funding bodies.

It was interesting to note that dealing with the psychological and mental health consequences of pressure was

reported in both negative and positive lights. There is still a stigma attached to experiencing mental health difficulties and perhaps an expectation that coping with extreme levels of pressure is part of elite athlete life [12]; that mental health shouldn't get in the way of successful performances. On the other hand, there is acknowledgement that even high-level athletes are not immune to mental health problems [13] and that those who speak up exemplify healthy attitudes to protecting their wellbeing. The UK broadsheet reporting appears generally empathetic and there is an air of criticism of those who are unsupportive of athletes' difficulties. That the broadsheet papers feel the need to publish articles countering negative opinions however demonstrates that stigmatising views are still held more widely within the media.

There is an interesting dilemma around the role of the media when it comes to athlete mental health. On the one hand there is potential benefit when athletes feel able to speak openly about their experiences. It can help highlight the prevalence of mental health problems within elite sport, enable more athletes to seek help, and influence how mental health is viewed within society more generally. The other side however is that the media can have a detrimental effect if athletes find it intrusive or pressurising. Media scrutiny is a psychosocial stressor for elite athletes [3] however research into its impact on mental health is lacking. One would hope that the spotlight on mental health difficulties during the Tokyo Games will increase awareness of such personal challenges of elite athletes. Over time, enhanced mental health literacy may lend itself to athletes being more open about specific diagnoses with concurrent sensitive reporting by the media.

Limitations

There is a vast availability of media sources reporting on mental health and our research only looked at a small section of this limited to two print newspapers due to time and resource constraints. Review of wider media reporting might have generated additional themes as would including alternative methods of reporting such as audio or video. Our search method of using a Google advanced search is not as robust as the Boolean search operation available when searching a database of articles and the algorithmic nature means some relevant articles may not have been identified. This was mitigated however by manually reviewing relevant sections of the two websites to identify any additional articles that met our criteria.

Conclusion

In recent years there has been greater awareness of athletes' susceptibility to mental health problems and the

media reporting at the 2020 Tokyo Olympic and Paralympic Games would appear to reflect this. Reporting tended to focus on the links between competitive sport and mental health and to highlight the unique experiences of elite athletes in this regard.

We did not seek to quantify what proportion of articles took a positive or negative stance on athlete mental health however this might be an interesting further study. Broadly however it would appear that articles were either supportive or neutral in their reporting. Scope for further work in this area might include a more quantitative assessment and breakdown of the number of articles published according to each sport or by athlete gender to identify any patterns in reporting on mental health within certain fields.

Based on our findings we concluded that broadsheet newspaper reporting on mental health at the 2020 Olympic and Paralympic Games was generally factual in nature, avoided sensationalist content and tended to take a neutral-to-positive attitude. We felt that they could have sought more commentary from qualified mental health professionals to strengthen the accuracy and credibility of the reporting.

The media remains closely linked to sport and has the potential power to influence the mental health agenda in sport via athletes' willingness to discuss or disclose mental health conditions. There is undoubtable value in patients, whether elite athlete or not, having a voice when it comes to speaking about mental health and being heard.

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ORCID

Jennifer Keal

<https://orcid.org/0000-0002-4660-4227>

Thomas McCabe

<https://orcid.org/0000-0002-2775-8669>

Jennifer Keal

Berkshire Healthcare NHS Foundation Trust

Prospect Park Hospital

Honey End Lane

Reading RG30 4EJ

United Kingdom

jennifer.keal@berkshire.nhs.uk

Factors associated with disordered eating and eating disorder symptoms in adolescent elite athletes

Nadja Walter¹, Thomas Heinen², and Anne-Marie Elbe¹

¹ Sport Psychology, Faculty of Sport Science, Leipzig University, Germany

² Perceptual Research and Movement Arts, Faculty of Sport Science, Leipzig University, Germany

Abstract: *Introduction:* Recent studies indicate high prevalences of disordered eating or eating disorders in adult athletes and a worrying increase in adolescent athletes. Although several risk factors for developing eating disorders have been identified for adult athletes (e.g., personality factors, sport-related pressure), research on risk factors in adolescent athletes is scarce. *Methods:* This study investigates the prevalence of disordered eating and eating disorder symptoms and its association with personality- and sport-related risk factors in a sample of 439 elite athletes aged 13–18 years. Self-regulatory personality factors, sports and social pressure, as well as sports biographical data, were investigated in relation to different weight control methods and the Eating Disorder Examination Questionnaire measuring disordered eating and eating disorder symptoms. *Results:* Results indicate a prevalence rate of clinically significant eating pathology of 5.5% for the total sample, in which female athletes aged 15–18 years show the highest rate (9.6%). The structural equation model indicates a predominant association of sports and social pressure and personality factors with eating disorder symptoms. *Conclusion:* Being in the age range 15–18 years, being female, and being an athlete in a high-risk sport (e.g., aesthetics, weight class, or endurance sports) were identified as risk factors as well as athletes' mental association with weight loss and success, and athletes' perceived social pressure on eating and on body shape. Disordered eating and eating disorders are not only of concern for adults but also for young elite athletes and recommendations for adolescent elite athletes, coaches, and parents are given.

Keywords: eating disorders, adolescent elite athletes, sports and social pressure, personality, structural equation model

Introduction

Eating disorders are characterized by disturbing thoughts and emotions concerning eating and a cognitive distortion of one's body image and appearance, which in turn result in unhealthy eating and weight control behaviours [1]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, [1]) four clinical eating disorders exist including e.g., anorexia nervosa and bulimia nervosa. However, there are several other problematic eating behaviours, which are termed unspecified eating disorders (F50.9, [1]), hereafter termed disordered eating, that may be exhibited, for example, in unhealthy weight control or in compensatory behaviours such as permanent dieting, excessive exercising, self-induced vomiting, or orthorexic dieting. In the sports context, particularly dieting is often associated with performance improvement and is described on a continuum from healthy dieting to the use of unhealthy weight control methods (i.e., disordered eating) such as fasting and vomiting [2].

In the context of competitive sport, high prevalences of disordered eating or eating disorders in athletes with up

to 45% of female and 19% of male athletes are described [3, 4]. Several risk factors have been identified for adult athletes (e.g., personality factors, gender-specific and sociocultural aspects, sport-related pressure) (see Table 1), however, research on adolescent athletes is scarce. This is particularly surprising as ontogenetically, the development of an eating disorder or disordered eating often occurs during the transition from childhood to adulthood [5, 6] and warrants targeted investigation of adolescent athletes. Existing studies merely investigated prevalence rates of adolescent athletes as part of an adult sample [7], physiological aspects, such as the female athlete triad syndrome or injuries [8, 9], and psychopathological aspects such as anxiety disorders and depression [10]. However, studies with adolescent athletes failed to investigate associated (sport-specific) risk factors.

The aims of the present study, therefore, were to investigate (1) symptoms of disordered eating and eating disorder symptoms and their association with gender, age, and type of sport and to investigate (2) the associated personality-related and sport-specific risk factors in adolescent athletes (see Table 1). We hypothesize that adolescent elite athletes

Table 1. Risk factors for eating disorders and investigated aspects in the present study [1, 3, 4, 5, 18, 25, 27, 29, 30, 31]

Risk factors	Indices
Biology	Gender-related (e.g., femininity, drive for muscularity, drive for a thin body type) Genetics Age* Pubertal status
Psychology	Personality-related (e.g., low self-esteem, high perfectionism, high neuroticism, anxiety, depression) Self-regulatory factors (e.g., self-discipline, impulse control)* Obsessive-compulsive tendencies Negative affects Body dissatisfaction
Sociocultural	Modeled behaviours (e.g., peers and family) Social pressure by peers and the media related to body shape* Society's focus on physical appearance and attractiveness Bullying Media consumption (e.g., appearance-focused social media platforms such as Instagram or Snapchat)*
Sport	Type of sport (e.g., sports emphasize leanness)* Rules and regulations (e.g., weight limits, judging criteria) Personality-related (e.g., mental association of weight loss and success, drive for thinness and performance)* Early admission to competitive sports (sport-specific training and participation in competitions)* Coaching behaviour Stress and hassles (e.g., injuries) Doping
Eating behaviour	Orthorexic dieting Weight control methods (e.g., permanent dieting)* Compensatory behaviours (e.g., excessive exercising, self-induced vomiting)*
Physical and/or sexual abuse	

Note. *Investigated risk factors in the present study.

will show symptoms of disordered eating and eating disorders as a function of gender, age, and type of sport and that disordered eating will predict eating disorder symptoms. Furthermore, we expect that personality and sports risk factors will be associated with disordered eating and eating disorder symptoms.

Method

Participants

The sample consisted of $N = 439$ 13- to 18-year-olds ($M_{age} = 14.9$, $SD = 1.4$; 182 females, 257 males) categorized into high-risk ($n = 303$, 69%, e.g., endurance sports, aesthetics and weight class sports), and low-risk sports ($n = 136$, 31%, e.g., technical and team sports) with regard to developing eating disorders [7]. All participants either attended an elite sport school or were members of an elite sports club and competed at a national level.

Procedures and measurements

This study was approved by the university's ethics committee. Participants were informed about the aims of the study

and gave written consent. For underaged athletes, their parents gave written consent. Participants completed the following paper and pencil questionnaire anonymously during their annual sports capability test: the German version of the Eating Disorder Examination Questionnaire for children short form (ChEDE-Q8 [11, 12]), the German version of the ATHLETE questionnaire [13], the Appearance-related Social Pressure Questionnaire (FASD [14]) and the German version of the Volitional Components Questionnaire (VCQ [15, 16]). To determine eating behaviour that could represent disordered eating, the number of meals and snacks per day were assessed, as athletes with disordered eating often do not understand the importance of balanced eating and therefore cut down the number of meals to reduce weight [17]. Furthermore, the regularly used weight control methods were assessed, as the regular use of at least one weight control method can be described as disordered eating [5, 7, 8, 9, 18]. Therefore, disordered eating was measured as the sum of weight control methods used and the number of meals and snacks consumed per day.

In addition to the standardized questionnaires, sociodemographics, as well as media consumption, were assessed. Table 2 presents the used measurements in detail.

Data analysis

Statistical analyses for descriptives and group differences (*t*-test, Chi-square test) were conducted using Statistical Package for the Social Sciences (SPSS) version 27. The R Studio version 4.0.4 was used for structural equation modeling (SEM). A level of significance of $\alpha = 5\%$ was defined a priori. To calculate prevalence rates for clinically significant eating pathology for the total sample as well as for gender and age groups the cut-off scores stated in Kliem et al. [12] were used (see Table 2).

First, to analyze group differences between gender, age group, and type of sport with respect to the dependent variables *t*-tests and Chi-square tests were conducted. Independent variables were gender (male vs. female), age group (age group 1: 13–14 years vs. age group 2: 15–18 years), type of sport (low-vs. high-risk sports), eating behaviour, and the ChEDE-Q8 score. Dependent variables were biographical factors (age at the start of sport-specific training and first competition), the ATHLETE, FASD, and VCQ questionnaires, and media consumption items (daily screen time, number of social media channels viewed, number of appearance-related media content items viewed). To analyze group differences ‘number of social media channels viewed’ and ‘number of appearance-related media content items consumed’ were counted. Effect sizes are presented as Cohens’ *d* for *t*-tests and Cramér’s *v* for Chi-square tests [19]. Missing values were imputed with gender, age, and type of sport weighted means.

Second, structural equation modeling was used to test the association of eating disorder symptoms (assessed by the ChEDE-Q8) with self-reported disordered eating (assessed by the number of regularly used weight control methods and the number of meals and snacks per day) and its association with personality factors, sports and social pressure as well as sports biography. For media consumption in the sports and social pressure factor an index was calculated by the mean of the three *z*-transformed variables: daily screen time, the number of social media channels viewed, and the number of appearance-related media content items viewed.

We defined a measurement model consisting of four latent variables, namely the three risk factor categories personality, sports and social pressure, and sports biography as well as disordered eating. Disordered eating was regressed on sports biography, personality, and sports and social pressure, and the score of the ChEDE-Q8 was regressed on disordered eating. Figure 1 graphically depicts the model along with the model coefficients for fitting the complete dataset.

Several fit indices were calculated to evaluate the SEM. First, we calculated χ^2 to assess the overall model fit. χ^2 is known to be sensitive to sample size, and given this study’s

rather large sample, the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were additionally calculated [20].

In the first step, the model was fitted to the whole dataset. In a second step, we performed a groupwise analysis for female and male athletes, as well as for age group 1 (13–14 years) and age group 2 (15–18 years) to identify possible differences in factors associated with eating disorder symptoms between the different gender and age groups. For this analysis we used the same model as in the first step.

Results

Demographic characteristics

Descriptive statistics for all questions are presented in Table 3, for the total sample and separately for gender, the two age groups, and type of sport. The response rate was 49.8%.

Participants reported 3.3 hours ($SD = 1.6$) of daily screen time and followed up to five different social media channels ($M = 1.5$, $SD = 0.9$). Regarding content, participants mostly watched series and movies (39.0%) and consumed sports and fitness content (21.2%). Appearance-related content, such as casting shows like *Germany’s Next Top Model* or *The Bachelor* were consumed (6.4%), followed by beauty and lifestyle content (4.7%).

Regarding eating behaviour, athletes had around three meals and two snacks per day. 33.0% of participants used at least one weight control method (maximum = 6, females 43.3%, males 25.7%). For these $n = 145$ athletes, the most frequently reported weight control methods were permanent dieting (43.3%) and increased exercising (30.4%).

The prevalence rate for clinically significant eating pathology based on the ChEDE-Q8 [12] was 5.5% (see Table 2). It ranged between 3.8% (age group 1) and 9.6% (age group 2) for female athletes. No clinically significant eating pathology was found for male athletes in age group 1, whereas 2.6% of the 15- to 18-year-old male athletes were affected. A prevalence rate of 2.6% was found in low-risk and 6.6% in high-risk sports.

Group differences

All significant group differences are displayed in Table 3. Females showed significantly higher scores for both FADS subscales (ideals modeled by team norms $p = .036$; $d = .206$, ideals modeled by friends $p \leq .001$, $d = .316$), for the ATHLETE score ($p \leq .001$, $d = .408$) and for two VCQ subscales (self-discipline $p = .004$, $d = .284$; informed introjection $p \leq .001$, $d = .355$). No differences were found for

Table 2. Instruments, items and questions

Instrument/item	Number of items/subscale(s)	Example item(s)/question(s)	Answer format	Psychometric properties
<i>Sociodemographics and sports biography</i>				
Sociodemographics	7 items	1. Age, 2. gender, 3. body height, 4. body weight, 5. type of sport, 6. training hours per week, 7. competition level/squad	1. – 6. description fields, 7. competition level/ squad: A/OK, B/PK, C/NK1, DC/NK2, D ¹	
Sports biography	2 items	1. "When did you start your career?" 2. "When did you participate in your first competition?"	Age	
<i>Eating behaviour (Disordered eating and eating disorder symptoms)</i>				
Meals, snacks and weight control methods [5, 10, 18, 29]	2 items	1. "Please record how many meals and snacks per day do you consume!" 2. "Please select the weight control methods that you use regularly!"	1. Number of meals and snacks 2. E.g., permanent dieting, using diet pills, using laxatives, self-induced vomiting, increasing exercising	
Eating Disorder Examination-Questionnaire for children and youth short-form (ChEDE-Q8) [11, 12]	8 items total scale	"Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?"	7-point Likert-scale from 0 (none of the time/no days/not at all) to 6 (all the time/every day/markedly)	Internal consistency: Cronbach's $\alpha = .87$ to .90, cut-off scores for clinically significant eating pathology: general cut-off score = 3.25, 13- to 14-year-olds cut-off score = 3.25 resp. 3.75 (males/females), 15- to 18-year-olds cut-off score = 3.13 resp. 3.88 (males/females)
<i>Personality factors</i>				
Volitional Components Questionnaire (VCQ) [15, 16]	18 items subscales: 1. Self-determination 2. Impulse control 3. Self-discipline 4. Informed introjection	1. "Feeling at one with my decision." 2. "Feeling defenseless in view of a temptation." 3. "I often put myself under pressure." 4. "Feeling obliged to meet the expectations of others."	4-point Likert scale from 0 (not at all) to 3 (totally)	Internal sub-scale consistency: Cronbach's $\alpha = 0.75$ to 0.95
<i>Sports and social pressure and media consumption</i>				
ATHLETE questionnaire [13, 21]	6 items subscale: body and sport	"I often wish I were leaner so I could perform better."	5-point Likert-scale from 1 (strongly disagree) to 5 (strongly agree)	Internal sub-scale consistency: Cronbach's $\alpha = .78$
Appearance-related Social Pressure Questionnaire (FASD) [14]	8 items subscales: 1. Ideals modeled by friends (mates) 2. Ideals modeled by team norms	1. "My teammates do a lot to look good" 2. "An athlete who doesn't look good in our team is usually an outsider"	5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree)	Internal consistency: Cronbach's $\alpha = .65$ to .83
Media usage per day, screen time, number of social media platforms and consumed media content [30]	4 items	1. "How much do you use your cell phone per day?" 2. "How much is your daily screen time?" 3. "What type of social media platform do you use most?" 4. "What kind of content do you prefer to consume online?"	1. From medium (≤ 1 hour per day) to much (> 2 hours per day) 2. Daily screen time 3. E.g., Facebook, Twitter, Instagram 4. E.g., casting and dating shows ² , daily-soaps, sports and fitness	

Note. ¹In Germany athletes are assigned to A/OK, B/PK, C/NK1, DC/NK2 or D squads according to age and level of performance, where C/NK1, DC/NK2 and D-squads host junior elite athletes and A/OK and B/PK-squads are for senior/adult elite athletes. ²Casting and dating shows were divided into appearance-related shows such as Germany's Next Top Model or The Bachelor, and shows such as The Voice or Farmer Wants a Wife.

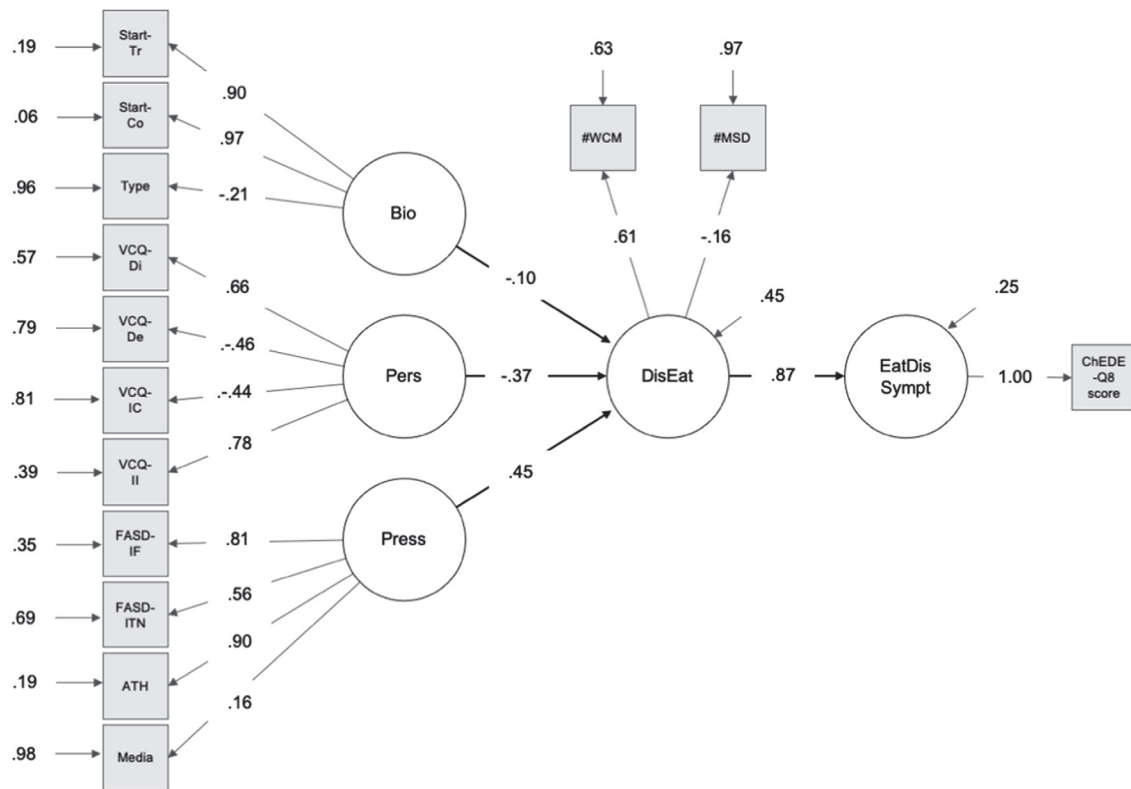


Figure 1. Structural equation model for eating disorder. Notes: DisEat = Disordered eating, EatDisSympt = Eating disorder symptoms, Pers = Personality, Bio = Sports biography, Press = Sports/social pressure, #WCM = number of weight control methods, #MSD = number of meals and snacks per day, Start-Tr = Start of sport-specific training, Start-Co = Start competition, Type = Type of sport, VCQ-Di = Self-discipline (VCQ), VCQ-De = Self-determination (VCQ), VCQ-IC = Impulse control (VCQ), VCQ-II = Informed introjection (VCQ), FASD-IF = Social pressure on eating: ideals modeled by friends (FASD), FASD-ITN = Social pressure on eating: ideals modeled by team norms (FASD), ATH = Social pressure on body shape and expectation (ATHLETE), Media = Media consumption index.

daily screen time and number of social media channels, but for appearance-related media content such as casting and dating shows ($p \leq .001$, $d = .234$). Furthermore, females applied significantly more weight control methods ($p \leq .001$, $d = .307$) and scored significantly higher in the ChEDE-Q8 ($p \leq .001$, $d = .858$) than males.

Males in age group 2 (15–18 years) viewed significantly more social media channels ($p = .048$, $d = .125$) and scored significantly higher in the ChEDE-Q8 ($p = .031$, $d = .259$) than males in age group 1. No differences were found for the ATHLETE, FADS, and VCQ questionnaires or media consumption.

Female athletes in age group 2 applied significantly more weight control methods ($p \leq .001$, $d = .543$) and showed significantly higher scores in the ChEDE-Q8 ($p = .050$, $d = .267$), in one FASD subscale (ideals modeled by friends $p = .022$, $d = .327$), the ATHLETE questionnaire ($p = .031$, $d = .326$), and the VCQ subscale self-discipline ($p = .012$, $d = .380$) than younger female athletes.

Group differences regarding the type of sport were found for the number of social media channels ($p = .040$, $d = .213$) and the number of weight control methods

($p = .035$, $d = .202$). Athletes in low-risk sports frequented significantly fewer social media channels and used fewer weight control methods. Athletes in high-risk sports scored significantly higher in both FASD subscales (ideals modeled by team norms $p \leq .001$, $d = .582$; ideals modeled by friends $p = .002$, $d = .292$) and the ATHLETE questionnaire ($p \leq .001$, $d = .520$).

Risk factors associated with eating disorder symptoms

SEM analysis using the complete dataset led to convergence after 121 iterations (diagonally weighted least squares estimator). The model exhibited the following fit indices: $\chi^2(70) = 156.81$, $p < .05$, CFI = .95, RMSEA = .06. The small RMSEA (<.08) and the large CFI (>.90) indicates an acceptable model fit. Eating disorder symptoms could be predicted well with an explained variance of approximately $R^2 = .75$. Disordered eating exhibited an explained variance of $R^2 = .55$. Sports biography explained the smallest amount of variance, followed by personality, and then sports and social pressure. The number of weight control methods

Table 3. Descriptive statistics of sociodemographic aspects, standardized questionnaires, eating behaviour and media consumption

	Type of sport ¹						Male (n = 257)			Female (n = 182)		
	Total (N = 439)	Low-risk sport (n = 136)	High-risk sport (n = 303)	Total		15–18 years (n = 155)	Total	13–14 years (n = 78)	15–18 years (n = 104)			
Age (years)	14.9 (1.4)	14.7 (1.3) [†]	15.1 (1.5) [†]	15.1 (1.5) [†]	13.6 (0.5)	16.1 (1.0)	14.7 (1.2) [†]	13.5 (0.5)	15.6 (0.8)			
Weight (kg)	63.4 (12.7)	67.1 (13.5)	61.8 (12.1)	66.5 (13.7) [†]	59.2 (12.7) [*]	71.4 (12.1) [*]	58.8 (9.5) [†]	56.5 (9.9) [*]	60.6 (8.8) [*]			
Height (cm)	173.8 (10.3)	178.3 (10.5)	171.7 (9.6)	177.2 (10.8) [†]	171.9 (11.8) [*]	180.7 (8.5) [*]	168.6 (7.0) [†]	168.3 (8.3) [*]	168.8 (5.9) [*]			
BMI	20.8 (2.87)	20.9 (2.9)	20.9 (2.8)	21.1 (2.9)	19.8 (2.5) [*]	21.9 (2.9) [*]	20.6 (2.8)	19.9 (2.6)	21.2 (2.8)			
Start of sport-specific training (age)	7.7 (2.7)	7.9 (2.7)	7.6 (2.6)	7.9 (2.7) [†]	7.8 (2.6)	8.1 (2.7)	7.4 (2.5) [†]	7.3 (2.3)	7.5 (2.7)			
Age at first competition	8.6 (2.5)	8.9 (2.3) [†]	8.4 (2.5) [†]	8.8 (2.5) [†]	8.6 (2.2)	8.9 (2.7)	8.2 (2.3) [†]	8.1 (2.3)	8.3 (2.5)			
Years in sport	7.2 (2.9)	6.7 (2.6) [†]	7.5 (2.9) [†]	7.1 (3.0)	5.8 (2.7) [*]	7.9 (2.9) [*]	7.3 (2.7)	6.2 (2.4) [*]	8.2 (2.6) [*]			
Media												
Media usage per day, n (%)												
Medium (≤1 hour per day)	64 (14.6)	12 (8.8)	52 (17.2)	35 (13.6)	19 (18.6)	16 (10.3)	29 (15.9)	13 (18.0)	15 (14.4)			
Little more (1–2 hours per day)	178 (40.5)	56 (41.2)	122 (40.3)	95 (37.0)	44 (43.1)	51 (32.9)	83 (45.6)	33 (42.3)	50 (48.1)			
Much (>2 hours per day)	187 (42.6)	65 (47.8)	122 (40.3)	120 (46.7)	37 (36.3)	83 (53.5)	67 (36.8)	29 (37.2)	38 (36.5)			
Daily screen time, n = 137, M (SD)	3.3 (1.6)	3.1 (1.6)	3.3 (1.6)	3.2 (1.7)	2.9 (1.2)	3.7 (1.9)	2.9 (1.2)	3.2 (1.5)	2.8 (1.0)			
Social media channels used, n (%) ²												
Facebook	5 (0.7)	0	1 (1.7)	4 (1.0)	2 (1.4)	2 (0.8)	1 (0.3)	0	1 (0.6)			
Twitter	12 (1.7)	1 (0.5)	11 (2.2)	11 (2.7)	2 (1.4)	9 (3.5)	1 (0.3)	0	1 (0.6)			
Instagram	262 (37.8)	77 (39.3)	185 (37.2)	139 (34.6)	39 (26.9)	100 (38.9)	123 (42.3)	43 (32.8)	80 (50.0)			
Snapchat	117 (16.9)	31 (15.8)	86 (17.3)	55 (13.7)	11 (7.6)	44 (17.1)	62 (21.3)	32 (24.4)	30 (18.8)			
YouTube	218 (31.5)	64 (32.7)	154 (31.0)	169 (42.0)	77 (53.1)	93 (35.8)	49 (16.8)	23 (17.6)	26 (16.3)			
TikTok	79 (11.4)	23 (11.7)	56 (11.3)	24 (6.0)	14 (9.7)	10 (3.9)	55 (18.9)	33 (25.2)	22 (13.8)			
Number of social media channels, M (SD)	1.5 (0.9)	1.4 (0.8) [†]	1.6 (0.9) [†]	1.5 (0.9)	1.4 (0.9) [*]	1.7 (0.9) [*]	1.6 (0.9)	1.7 (0.9)	1.5 (0.9)			
Media content consumed, n (%) ²												
Casting and dating shows ¹³	52 (6.4)	14 (5.2)	38 (7.0)	4 (0.9)	1 (0.5)	3 (1.1)	48 (13.8)	21 (13.0)	27 (14.5)			
Casting and dating shows ²⁴	29 (3.6)	11 (4.1)	18 (3.3)	5 81.1)	3 (1.6)	2 (0.7)	24 (6.9)	13 (8.1)	11 (5.9)			
Daily-soaps	25 (3.1)	7 (2.6)	18 (3.3)	12 (2.6)	5 (2.7)	7 (2.5)	13 (3.7)	8 (5.0)	5 (2.7)			
Sports and fitness	172 (21.2)	68 (25.5)	104 (19.1)	115 (24.8)	42 (22.5)	73 (26.4)	57 (16.4)	26 (16.1)	31 (16.7)			
Beauty and lifestyle	38 (4.7)	10 (3.7)	28 (5.1)	14 (3.0)	3 (1.6)	11 (4.0)	24 (6.9)	7 (4.3)	17 (9.1)			
Series and movies	316 (39.0)	101 (37.8)	215 (39.5)	175 (37.7)	69 (36.9)	106 (38.3)	141 (40.6)	62 (38.5)	79 (42.5)			
Gaming and e-sport	109 (13.4)	38 (14.2)	71 (13.1)	103 (22.2)	48 (25.7)	55 (19.9)	6 (1.7)	4 (2.5)	2 (1.1)			
Music (videos)	70 (8.6)	18 (6.7)	52 (9.6)	36 (7.8)	16 (8.6)	20 (7.2)	34 (9.8)	20 (12.4)	14 (7.5)			
Number of appearance-related media content ⁵ , M (SD)	0.6 (0.7)	0.7 (0.1)	0.7 (0.1)	0.5 (0.1) [†]	0.5 (0.1)	0.6 (0.1)	0.9 (0.1) [†]	0.8 (0.1)	0.9 (0.1)			

Table 3. Descriptive statistics of sociodemographic aspects, standardized questionnaires, eating behaviour and media consumption (Continued)

	Total (N = 439)	Type of sport ¹		Male (n = 257)		Female (n = 182)			
		Low-risk sport (n = 136)	High-risk sport (n = 303)	Total	13–14 years (n = 102)	15–18 years (n = 155)	Total	13–14 years (n = 78)	15–18 years (n = 104)
Eating behaviour									
Meals per day, M (SD)	2.8 (0.4)	2.8 (0.4)	2.8 (0.5)	2.8 (0.4)	2.8 (0.4)	2.8 (0.4)	2.8 (0.5)	2.8 (0.5)	2.8 (0.4)
Snacks/energy bars per day, M (SD)	2.3 (1.5)	2.3 (1.3)	2.3 (1.6)	2.4 (1.5)	2.6 (1.4)	2.3 (1.5)	2.2 (1.5)	2.1 (1.5)	2.3 (1.5)
Number of weight control methods, M (SD)	0.5 (0.9)	0.4 (0.7) [†]	0.6 (0.9) [†]	0.4 (0.8)	0.3 (0.7)	0.4 (0.8)	0.7 (0.9)	0.4 (0.5)*	0.9 (1.2)*
Use of at least one weight control method, n (%)	145 (33.0)	36 (26.5)	109 (36.0)	66 (25.7)	23 (22.5)	43 (27.7)	79 (43.4)	27 (34.6)	52 (50.0)
Use of two weight control methods, n (%)	38 (8.7)	9 (6.6)	29 (9.6)	23 (8.9)	8 (7.8)	15 (9.7)	15 (8.2)	2 (2.6)	13 (12.5)
Use of > 3 weight control methods, n (%)	18 (4.1)	4 (2.9)	14 (4.6)	7 (2.7)	2 (2.0)	5 (3.2)	11 (6.0)	0	11 (10.6)
No use of weight control methods, n (%)	294 (67.0)	100 (73.5)	194 (64.0)	191 (74.3)	79 (77.5)	112 (72.3)	103 (56.6)	51 (65.4)	52 (50.0)
Weight control methods used, n (%) ⁶									
Diet pills	19 (8.5)	5 (9.4)	14 (8.2)	7 (6.8)	2 (5.7)	5 (7.4)	12 (9.9)	3 (10.3)	9 (9.8)
Laxatives	4 (1.8)	1 (1.9)	3 (1.8)	1 (1.0)	0	1 (1.5)	3 (2.5)	2 (6.9)	1 (1.1)
Diet trends ⁷ (vegan, paleo)	24 (10.7)	9 (17.0)	15 (8.8)	11 (10.7)	4 (11.4)	7 (10.3)	13 (10.7)	5 (17.2)	8 (8.7)
Fasting (permanent dieting)	97 (43.3)	19 (35.8)	78 (45.6)	41 (39.8)	12 (34.3)	29 (42.6)	56 (46.3)	14 (48.3)	42 (45.7)
Increase exercise/training	68 (30.4)	18 (34.0)	50 (29.2)	38 (36.9)	16 (45.7)	22 (32.4)	30 (24.8)	4 (13.8)	26 (28.3)
Vomiting	5 (2.2)	0	5 (2.9)	1 (1.0)	0	1 (1.5)	4 (3.3)	0	4 (4.3)
Others	7 (3.1)	1 (1.9)	6 (3.5)	4 (3.9)	1 (2.9)	3 (4.4)	3 (2.5)	1 (3.4)	2 (2.2)
ChEDE-Q8 global score, M (SD)	0.88 (1.13)	0.76 (0.95)	0.94 (1.20)	0.51 (0.79) [†]	0.39 (0.61)*	0.59 (0.88)*	1.40 (1.32) [†]	1.21 (1.17)*	1.56 (1.42)*
ChEDE-Q8 prevalence rate, n (%) ⁸	24 (5.5)			6 (2.3)	0	4 (2.6)	18 (9.9)	3 (3.8)	10 (9.6)
ATHLETE, M (SD)	1.8 (0.8)	1.5 (0.5) [†]	1.9 (0.8) [†]	1.7 (0.7) [†]	1.6 (0.5)	1.7 (0.8)	1.9 (0.8) [†]	1.8 (0.7)	2.1 (0.9)
FASD 1, M (SD) ⁹	2.2 (0.8)	1.9 (0.6) [†]	2.3 (0.8) [†]	2.2 (0.8) [†]	2.1 (0.7)	2.2 (0.8)	2.3 (0.9) [†]	2.2 (0.7)	2.4 (0.9)
FASD 2, M (SD) ⁹	1.9 (0.7)	1.8 (0.6) [†]	2.0 (0.7) [†]	1.8 (0.7) [†]	1.8 (0.6)	1.9 (0.7)	2.1 (0.7) [†]	1.9 (0.6)*	2.2 (0.8)*
VQC self-discipline, M (SD)	6.2 (2.5)	6.2 (2.3)	6.1 (2.5)	5.9 (2.3) [†]	5.6 (2.3)	6.0 (2.2)	6.6 (2.7) [†]	5.9 (2.7)*	6.9 (2.5)*
VQC self-determination, M (SD)	9.4 (1.9)	9.5 (1.8)	9.4 (2.0)	9.6 (1.9)	9.8 (1.8)	9.4 (2.1)	9.2 (1.9)	9.4 (1.9)	9.1 (1.9)
VQC impulse control, M (SD)	10.1 (2.4)	10.5 (2.5)	10.0 (2.3)	10.3 (2.3)	10.2 (2.3)	10.4 (2.3)	9.9 (2.4)	9.9 (2.4)	9.8 (2.4)
VQC informed introjection, M (SD)	5.3 (3.4)	5.3 (3.1)	5.3 (3.5)	4.8 (3.1)	4.6 (2.9) [†]	4.8 (3.2)	5.9 (3.7) [†]	5.7 (3.8)	6.1 (3.6)

Note. ¹low-risk sports = technical sports, ballgame/team sports, high-risk sports = aesthetics, weight class sports, endurance sports, ²multiple choice, ³includes shows such as *Germany's Next Top Model* or *The Bachelor*, ⁴includes shows such as *The Voice* or *Farmer Wants a Wife*, ⁵includes items casting and dating shows 1, beauty and lifestyle and sport and fitness, ⁶refers to participants that used at least one weight control method, multiple choice, ⁷includes diet trends such as vegan or paleo diet, ⁸cut-off-scores for prevalence rates according to Kiem et al. [12], ⁹FASD 1 = ideals modeled by team norms; FASD 2 = ideals modeled by friends, [†]significant differences between low- and high-risk sports, ^{*}significant differences between male and female athletes, ^{*}significant differences between age groups 1 and 2 within the gender group male or female.

seemed to strongly more influence disordered eating than the sum of meals and snacks per day. With regard to sports biography, the age of the first competition, as well as the start of sport-specific training, explained more variance than the type of sport. Informed introjection was most closely related to personality, followed by self-discipline, impulse control, and self-determination. Finally, the body and sport subscale (ATHLETE questionnaire) was most closely related to sports and social pressure, followed by modeling by friends, and team norms (both FASD questionnaires). Media consumption was less related to sports and social pressure.

Examining the model with the data for females and males as well as for the two age groups revealed the following: Eating disorder symptoms could be predicted slightly better in female athletes ($R^2 = .74$) than male athletes ($R^2 = .72$). For both genders, sports and social pressure had the strongest association with disordered eating (.56 and .49). Biography was not significantly related to disordered eating in females (.01, $p > .05$) and of minor association in male athletes (−.16). Personality was significantly related to disordered eating in females (.39) but not in males (.20, $p > .05$). Concerning age groups, eating disorder symptoms could be predicted better in older ($R^2 = .81$) than younger athletes ($R^2 = .60$). For younger and older athletes, personality had approximately the same influence on disordered eating as sports and social pressure (.40 and .42). Sports biography, however, exhibited a nonsignificant relationship to disordered eating in both age groups (−.10 and −.01, $p > .05$). Additionally, media consumption played a stronger role for male athletes (.36) and no significant role for females (.02, $p > .05$). It played a small yet significant role for older athletes (.18), but not for younger athletes (.14, $p > .05$). Type of sport showed an effect in older (−.34) but no effect in younger athletes (−.05, $p > .05$). On average, type of sport had a small effect on male (−.19) and no effect on female (−.15, $p > .05$) athletes.

Discussion

The results showed a higher prevalence rate for clinically significant eating pathology for female athletes (3.8% to 9.6%), for athletes in high-risk sports (6.6%), and for age group 2 (males: 2.6%, females: 9.6%). The prevalence rate for female athletes in age group 2 is particularly alarming, as this means that almost every tenth 15- to 18-year-old female athlete shows symptoms of an eating disorder. These age differences within the gender groups are a novel finding and highlight that adolescence is a sensitive period for developing an eating disorder and indicates that an athlete's age might play an important role in developing an eating disorder [5, 6].

The SEM confirmed that disordered eating can precursor eating disorder symptoms. In general, eating disorder symptoms could be predicted well with the aforementioned risk factors. Sports and social pressure had the strongest association. Within this risk factor, the ATHLETE questionnaire and one FASD subscale (ideals modeled by friends) were most strongly associated with sports and social pressure, whereas the FASD subscale ideals modeled by team norms and media consumption were less related to sports and social pressure. This means that athletes' mental association of weight loss and success and perceived social pressure on eating and body shape have the strongest association with athletes' eating behaviour and predict symptoms of eating disorders. This finding is in line with earlier studies on adults [21] and highlights the strong impact others can have on developing an eating disorder. With regard to personality, particularly informed introjection and self-discipline had the highest association with athletes' eating behaviour, compared to impulse control and self-determination. Again, this emphasizes the aforementioned result, as informed introjection measures athletes' perceived obligation to meet the expectations of others and therefore highlights perceived external pressure [16]. The influence of self-discipline and impulse control on disordered eating and eating disorder symptoms can be considered in line with earlier studies regarding similar personality traits such as high perfectionism in adult athletes [3, 4].

Limitations and future research perspectives

The survey was conducted in 2020 during the athletes' annual sports capability test. It is possible that due to the COVID-19 pandemic, training and competition restrictions during the year also impacted the answers given. Future studies, therefore, should be conducted when the pandemic is over. Additionally, disordered eating was assessed with two questions concerning eating behaviour, i.e., number of meals and snacks per day and number of regularly used weight control methods. A limitation of the latter is that in our analyses, possible healthy methods such as "diet trends" scored the same as unhealthy eating behaviours such as "vomiting". In future research, this could be addressed by using the disordered eating continuum [2] or using standardized instruments to assess subclinical forms of eating disorders, such as early-onset restrictive eating disturbances or orthorexic dieting [22, 23, 24]. Moreover, our brief assessment of media risk factors could be examined in more depth. In addition, questions regarding muscularity-oriented body image concerns or the desire for muscle gain in male participants warrant further investigation. Last but not least, our cross-sectional study does

not permit causal interpretation of results warranting longitudinal studies.

Practical implications

Several recommendations, particularly for coaches, can be made based on results concerning the detection and prevention of early-onset disordered eating. Our results highlight that athletes' disordered eating behaviour can precursor eating disorder symptoms. Therefore we recommend that not only coaches but also athletes, parents, and relevant personnel (e.g., physicians, physiotherapists, teachers) should be made aware of the symptoms of disordered eating (i.e., regular use of unhealthy weight control methods) and that it is a warning sign that should not be taken lightly or ignored [25, 26]. 33% of participants use at least one weight control method regularly, and athletes use up to six weight control methods at the same time, which both can be described as disordered eating [5, 7, 8, 9, 18]. However, concerning the used weight control methods, differences should be made between benign or healthy weight control methods to pursue slow and steady weight loss compared to the use of several methods at the same time and unhealthy methods such as the use of diet pills or laxatives [2]. On the other hand, although the most frequently used weight control methods – permanent dieting and increased exercising – might at first seem less dangerous when compared to methods such as vomiting or the use of medication. However, their regularity should not be taken lightly given that the dangers of regular use of weight control methods might be underestimated by athletes [27], and that disordered eating may lead to eating disorders [18].

Consequently, particularly coaches should be aware of the potential consequences when making comments that suggest an association between leanness/thinness and performance (i.e., athletes use methods to lose weight fast). Instead, coaches should educate athletes about the negative short- and long-term psychological and physiological consequences of fast and unhealthy weight loss and give appropriate advice for healthy dieting or refer athletes to an expert [9, 25, 26]. Results also indicated that athletes' attitudes and expectations regarding an ideal body are modeled by friends and team norms. Thus, another recommendation is to discourage activities and comments that draw attention to athletes' weight, such as public weighing or comparing athletes' bodies [17, 27]. Coaches should also intervene when they hear negative body-related comments expressed by athletes on the team.

Conclusion

Our study identified personality- and sport-related risk factors associated with eating disorder symptoms in

adolescent elite athletes. To our knowledge, this is the first study investigating prevalence together with such a large number of risk factors in two age groups of adolescent elite athletes. Our findings are in line with previous studies conducted with adult elite athletes and illustrate that competitive, sport-related pressures are associated with athletes' eating behaviour and symptoms of eating disorders. In this study, the sports-related factors most closely associated with these behaviours and symptoms are (1) pressure on body shape, (2) emphasis on physical appearance imposed by friends and team norms, (3) the mental association between weight loss and success and (4) the drive for thinness and performance. Furthermore, self-regulatory personality factors play an essential role. Finally, not only the female gender but an athlete's age is also relevant to the development of an eating disorder. Both the onset of disordered eating and the existence of an eating disorder during adolescence can have serious long-term negative consequences. Short-term physiological effects such as weakness, injuries, or stress fractures impact performance. More alarming are the long-term psychophysiological consequences of an adolescent eating disorder, such as heart palpitations, dyspnea, depression, anxiety, or even suicidal thoughts, which can seriously impact an athlete's well-being [9, 25, 26]. Therefore, and according to previous suggestions, we call for the timely screening of disordered eating and eating disorders in male and female athletes, for all types of sports, and particularly during athletes' transition from early to late adolescence [5, 6, 17, 18, 28].

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ORCID

Nadia Walter

 <https://orcid.org/0000-0002-2413-9563>

Thomas Heinen

 <https://orcid.org/0000-0003-0176-3221>

Anne-Marie Elbe

 <https://orcid.org/0000-0002-8392-2451>

Nadia Walter

Faculty of Sport Science

Leipzig University

Jahnallee 59

04109 Leipzig

Germany

nadja.walter@uni-leipzig.de

Mental health difficulties among professional footballers

A narrative review

Gary Woods¹, Thomas McCabe², and Amit Mistry³

¹ School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, UK

² School of Medicine, Dentistry and Nursing, University of Glasgow, Glasgow, UK

³ Cygnet Health Care, London, UK

Abstract: *Introduction:* In parallel with several current and former players' high-profile disclosures of psychological difficulties, academic studies published during the past decade have begun to examine the mental health of professional footballers. To date, a comprehensive review and critical analysis of these studies has yet to be conducted. *Design:* A narrative review of the literature was conducted following a Medline database search. *Results:* Thirteen studies were included in the review. A variety of mental health difficulties were explored, including depression, anxiety, distress, disordered eating, sleep disturbance and alcohol and substance use. Female players reported symptoms of common mental disorders more frequently than their male counterparts. Retired footballers reported increased rates of all mental health difficulties compared to active players. It is difficult to compare prevalence rates with both the general population and groups of other athletes due to the use of a variety of screening measures. *Conclusion:* The prevalence of symptoms of common mental disorders appears to be largely consistent with general population levels and in keeping with studies of other elite athlete groups, but further research is required to clarify this definitively. Injury and being retired were frequently associated with symptoms of common mental disorders, indicating that the screening and support of players during these vulnerable transitional periods may be of particular importance.

Keywords: mental illness, sport psychiatry, athletes, injury

Introduction

Unidentified or untreated mental disorder may lead to sub-optimal performance and reduced quality of life among professional football players yet, as recently as a decade ago, the medical examinations of footballers rarely, if ever, included a psychiatric or psychological component [1, 2]. More recently, soccer organisations have aimed to address mental illness and minimise its deleterious impact via the dissemination of information in well-publicised campaigns and the formulation of pathways to medical expertise [3, 4, 5]. Thus far, various interventions within elite level soccer have lacked the support of a firm research base from which to expand.

Participation in professional football is associated with beneficial long-term health outcomes compared to the general population, chiefly superior cardiovascular health [6, 7]. Conversely and somewhat alarmingly, the findings of research examining the neurocognitive sequelae of being a professional football player have not been as positive [8, 9]. This has in part led to adaption of training schedules and rule changes in some jurisdictions [10, 11]. The mental health of elite athletes has received greater attention in recent years, leading to the development of consensus

statements from governing bodies and the launch of sport-specific screening tools aimed at the early recognition of mental illness [12, 13]. These publications have, however, highlighted the limitations of the current research exploring mental health in sport. Following the publication of a number of studies examining this in football during the past 5–10 years, a comprehensive review and critical analysis may aid future strategy and research development within the sport.

Objectives

The review aimed to both:

- (i) evaluate the existing literature examining the prevalence of mental health symptoms and disorders among professional footballers.
- (ii) provide suggestions for clinical practice and future research in this area.

Methods

A literature search of the Medline database was conducted by one author (GW), combining the keywords “soccer” OR “football” with (AND) any of the following keywords:

“psychiatry”; “psychology, clinical”; “psychology, sports”; “psychology, medical”; “psychology”; “mental health”; “mental disorders”; “stress, psychological”; “depression”; “affective symptoms”; “mood disorders”; “anxiety”; “anxiety disorders”; “psychotic disorders”; “schizophrenia”; “alcoholism”; “alcohol drinking”; “substance-related disorders”; “drug misuse”; “prescription drug misuse”; “gambling”; “feeding and eating disorders”; “suicide”; “suicide, attempted”; “personality disorders”; “attention deficit disorder with hyperactivity”; “sleep wake disorders”. The results were screened independently by all three authors according to the inclusion and exclusion criteria listed below. Studies examining head injury and cognitive deficits were deemed to be beyond the remit of the review for two reasons: the growing number of recent publications examining this area in the context of repeated heading and the greater impact among retired versus current players.

A manual search of reference lists was also undertaken and one author (GW) additionally searched the *BMJ Open Sport and Exercise Medicine* journal (not searched via Medline) for the keywords “soccer” and “football”.

Inclusion criteria:

1. Professional/elite level footballers.
2. Quantitative or qualitative data on mental health disorders or their symptoms.
3. English language.

Exclusion criteria:

1. Non-professional/non-elite status (e.g. amateur players).
2. Review articles.
3. Case reports.
4. Book chapters.
5. Conference abstracts.
6. Full text article unavailable.

Results

A total of 13 studies met the inclusion criteria. The Medline database search yielded 75 results, from which 9 publications were retained after initial screening of study titles. A total of 4 studies were ultimately included after abstracts or, where necessary, full publications were reviewed. A search of the *BMJ Open Sport and Exercise Medicine* for the keywords “football” and “soccer” yielded 287 and 210 results respectively, although many publications appeared in both lists. From these results, 9 studies were retained after the screening of study titles, with a final total of 5 studies included after abstracts or full publications were reviewed. A further 4 studies were identified via a manual search of the reference lists of both the included studies and recently published book chapters.

The publication dates for the 13 included studies ranged from 2015 to 2021 and sample populations included professional footballers based in Europe (Belgium, Finland, France, Germany, Ireland, Netherlands, Norway, Scotland, Spain, Sweden, and Switzerland), South America (Brazil, Chile, Paraguay, and Peru), the United States, Australia, New Zealand and Qatar. The majority of studies were cross-sectional in design ($n=9$), but two case-control studies, an observational prospective cohort study and a retrospective cohort study were also reviewed. The studies sampled male ($n=7$), female ($n=4$) and mixed-sex ($n=2$) populations, examining mood (11 studies) [14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24], anxiety (10 studies) [14, 15, 16, 17, 18, 19, 21, 22, 23, 25], distress/burnout (6 studies) [14, 15, 16, 17, 18, 23], disordered eating (5 studies) [14, 15, 16, 17, 23], sleep disturbance (6 studies) [15, 16, 17, 18, 23, 26], alcohol use (6 studies) [14, 15, 17, 18, 23, 24], substance misuse (1 study) [23] and gambling (1 study) [23]. Full details of the studies are reported in Table 1.

Depression

Five studies utilised the General Health Questionnaire-12 (GHQ-12) [27] screening tool, unfortunately with the result that depression and anxiety symptoms were not separately assessed (see anxiety summary below also). A global six country 2015 study of 253 male current and former footballers found a 26% prevalence of depression/anxiety symptoms among current players and a 39% prevalence among former players [14]. Although the authors noted that the prevalence of common mental disorders was higher than that observed in other studies of both the general public (prevalence of common mental disorders ranging from 5 to 25%) [28, 29, 30] and French Olympic athletes (17% encountering previous mental health problems) [31], they did not report specific comparative figures for depression/anxiety. Major life events in the preceding 12 months were associated with depression/anxiety in both current (OR 1.4; $p<0.01$) and former (OR 1.4; $p<0.05$) players. Low social support from teammates was also associated with depression/anxiety in current players (OR 1.1; $p<0.01$).

A further 2015 study of 540 male footballers within five European countries demonstrated a range of depression/anxiety from 25.0% in Spain to 43.3% in Norway [15]. The authors noted typically lower reported rates of depression/anxiety (ranging from 13% to 25%) in Australian and European general population studies [28, 32, 33]. Life events and career dissatisfaction were associated with depression/anxiety. A global study of 607 male footballers [16] published the same year reported a prevalence of depression/anxiety of 37.9%, again comparing the rate with the rates of depression/anxiety reported in the three

Table 1. Summary of included studies

Study; year; country	Study type	Participant characteristics, n (male:female)	Mental health questionnaire	Summary of key findings
Foster <i>et al.</i> ; 2017; Brazil [25]	Longitudinal case-control	52 (0:52)	BAI	Premenstrual syndrome (PMS) associated with higher levels of anxiety ($p=0.002$).
Goutteborge <i>et al.</i> ; 2015; Australia, Ireland, Netherlands, New Zealand, Scotland, USA [14]	Cross-sectional	253 (253:0) 149 current players (149:0) 104 former players (104:0)	GHQ-12 Utrecht Burn-Out Scale Distress Screener (adapted 4DSQ) 4 questions on nutritional habits AUDIT-C Rosenberg's Self-Esteem Scale SARRS	The prevalence of mental health complaints ranged from 5% (burnout) to 26% (anxiety/depression) in 149 current players and from 16% (burnout) to 39% (anxiety/depression) in 104 former footballers. In both current and former players, mental health problems were significantly associated with low social support (odds ratio [OR]=1.1) and recent life events (OR=1.4–1.6).
Goutteborge <i>et al.</i> ; 2015; Finland, France, Norway, Spain and Sweden [15]	Cross-sectional	540 (540:0) Current players	GHQ-12 Distress Screener (adapted 4DSQ) 4 questions on nutritional habits PROMIS (short form) AUDIT-C SARRS	The greatest prevalence of symptoms related to common mental disorders were 18% for distress (Sweden), 43% for anxiety/depression (Norway), 33% for sleep disturbance (Spain), 17% for adverse alcohol behaviour (Finland), and 74% for adverse nutrition behaviour (Norway). In Finland, France and Sweden, both life events and career dissatisfaction were associated with distress, anxiety/depression, adverse alcohol behaviour, and adverse nutrition behaviour.
Goutteborge <i>et al.</i> ; 2015; Belgium, Chile, Finland, France, Japan, Norway, Paraguay, Peru, Spain, Sweden and Switzerland [16]	Cross-sectional	607 (607:0) Current players	GHQ-12 Distress Screener (adapted 4DSQ) 4 questions on nutritional habits PROMIS (short form) AUDIT-C SARRS	The prevalence of symptoms of common mental disorders and adverse health behaviours ranged from 4% for smoking and 9% for adverse alcohol behaviour to 38% for anxiety/depression and 58% for adverse nutrition behaviour. Significant associations were found for a higher number of severe injuries with distress, anxiety/depression, sleeping disturbance and adverse alcohol behaviour; an increased number of life events with distress, sleeping disturbance, adverse alcohol behaviour and smoking; as well as an elevated level of career dissatisfaction with distress, anxiety/depression and adverse nutrition behaviour. Statistically significant correlations ($p<0.01$) were found for severe injuries and career dissatisfaction with most symptoms of common mental disorders.
Goutteborge <i>et al.</i> ; 2016; Finland, France, Norway, Spain, Sweden [17]	Cross-sectional	540 (540:0) Current players	GHQ-12 Distress Screener (adapted 4DSQ) PROMIS (short form) AUDIT-C 4 questions on nutritional habits	The prevalence of symptoms of common mental disorders (CMDs) ranged from 3% for smoking to 37 % for anxiety/depression and 58% for adverse nutrition behaviour. The number of severe musculoskeletal injuries during a football career was positively correlated with distress, anxiety and sleeping disturbance, while the number of surgeries was correlated with adverse alcohol behaviour. Footballers who had sustained ≥ 1 severe musculoskeletal injuries during their career were two to nearly four times more likely to report symptoms of common mental disorders than professional footballers who had not suffered from severe musculoskeletal injuries.

Table 1. Summary of included studies (Continued)

Study; year; country	Study type	Participant characteristics, n (male:female)	Mental health questionnaire	Summary of key findings
Gouttebarga <i>et al.</i> ; 2017; Finland, France, Norway, Spain, Sweden [18]	Observational prospective cohort	262 (262:0) Current players	GHQ-12 Distress Screener (adapted 4DSQ) PROMIS (short form) AUDIT-C SARRS	The incidences of symptoms of CMD were 12% for distress, 37% for anxiety/depression, 19% for sleep disturbance and 14% for adverse alcohol use. Footballers reporting recent adverse life events, a conflict with trainer/coach, or career dissatisfaction were more likely to report symptoms of CMD, but statistically significant associations were not observed. A typical professional football team's squad of 25 players can expect symptoms of CMD to occur among at least 3 players per season.
Junge and Feddermann-Demont; 2016; Switzerland [19]	Cross-sectional	471 (289:182) Current first league (FL) male and female players and male U-21 players	CES-D GAD-7	Mild to moderate depression in 33 (7.6%) players and major depression in 13 (3.0%) players. At least a moderate anxiety disorder in 6 (1.4%) players. Depression prevalence similar to the general population and prevalence of anxiety disorders significantly ($\chi^2=16.7$; $p<0.001$) lower in footballers. Significant differences observed with regard to player characteristics, such as age, gender, player position, level of play and current injury. One severe depression per female FL and male U-21 team and per every two male FL teams. Only one player reported current antidepressant use.
Junge and Prinz; 2019; Germany [21]	Cross-sectional	290 (0:290) Current players (184 first league [Bundesliga] and 106 lower league)	CES-D GAD-7	Mild to moderate depressive symptoms in 48 (16.6%) and severe symptoms in 41 (14.1%) players. At least a moderate generalised anxiety disorder in 24 (8.3%) players. The prevalence of depression and generalised anxiety disorder symptoms was similar to the female general population of similar age. Significantly more second league players, however, reported symptoms of depression than first league players, with the prevalence of depression symptoms in second league players therefore higher than in the general population. Only a third of the 45 (15.7%) players who stated that they currently wanted or needed psychotherapeutic support received it.
Khalladi <i>et al.</i> ; 2019; Qatar [26]	Cross-sectional	111 (111:0)	PSQI ISI ESS	The prevalence of poor sleep quality (PSQI \geq 5) was 68.5%, with subthreshold insomnia (ISI \geq 11) 27.0% and daytime sleepiness (ESS $>$ 8) 22.5%. Sleep quality was positively associated with insomnia ($r=0.42$; $p<0.001$) and daytime sleepiness ($r=0.23$; $p=0.018$). Age, anthropometry, body composition and ethnicity were not associated with any of the reported sleep quality parameters. Approximately 10% ($n=11$) of players reported the use of sleep medications within the preceding month.

Table 1. Summary of included studies (Continued)

Study; year; country	Study type	Participant characteristics, n (male:female)	Mental health questionnaire	Summary of key findings
Kilic <i>et al.</i> ; 2021; Australia [23]	Cross-sectional	362 (230:132) 281 current (149:132) 81 (81:0) former footballers	PHQ-9 GAD-7 APSQ K10 ASSQ AUDIT-C BEDA-Q CD-RISC NORC Diagnostic Screen for Gambling Disorders	The most prevalent mental health symptoms (MHS) among active and former footballers were sport-related psychological distress (63%) and alcohol misuse (69%) respectively. Global psychological distress, sleep disturbance, alcohol misuse and substance misuse were significantly lower among active male footballers than among former players. Increased psychological resilience among active male footballers was associated with a decrease in symptoms of sport-related and global psychological distress, anxiety and depression. Increased psychological resilience among female players was associated with decreased symptoms of depression. Problem gambling and sleep disturbance were associated with injury in the previous 6 months among active male and female footballers respectively.
Prien <i>et al.</i> ; 2020; Germany, Netherlands [22]	Case-control	66 (0:66) 66 retired footballers and 45 retired non-contact sport athletes	HADS Mental health subscale of the SF-36 CNSVS CPT CPT FTT FTT SDC ST VBM VMT	No significant between-group differences for anxiety or global mental health. Depression score was significantly higher in football players and significantly associated with frequent heading but not concussion. Clinical relevance of findings is questionable, as average depression scores in both study populations (football: 2.7; control: 1.7) lower than normative values reported in the general German population (3.9–4.5) and far lower than the published clinical cut-off values ($\geq 8/11$).
Prinz <i>et al.</i> ; 2016; Germany [20]	Cross-sectional	157 (0:157) German First League players	CES-D PHQ-2	Fifty players (32.3%) had symptoms of a major depression, and 39 (25.2%) of a mild or moderate depression at least once during their football career. Significant differences in the average depression score were observed for playing positions ($F=2.75$; $p<0.05$) [attackers and goalkeepers higher depression scores] and level of play ($F=3.53$; $p<0.01$). Almost half of players (49.7%) reported conflicts with coach/ management as an important reason for depressed mood, followed by reduced performance/injury (48.4%) and lack of support/ acknowledgement from their coach (40.0%). During their career, almost 40% of players wanted or needed psychological support, but only 10% received it. After retirement, the percentage of players wanting or needing psychological support decreased to 24%, of whom 90% received it.

Table 1. Summary of included studies (Continued)

Study; year; country	Study type	Participant characteristics, n (male:female)	Mental health questionnaire	Summary of key findings
Russell <i>et al.</i> ; 2020; UK [24]	Retrospective cohort	7676 (7676:0) Former players and 23028 matched population controls		Former footballers had lower rates of psychiatric hospitalisation for anxiety and stress, depression, drug use disorders, alcohol use disorders, and bipolar and affective disorders. No significant difference in suicide risk or age at suicide.

Notes. APSQ, Athlete Psychological Strain Questionnaire; ASSQ, Athlete Sleep Screening Questionnaire; AUDIT-C, Alcohol Use Disorders Identification Test-Concise; BAI, Beck Anxiety Inventory; BEDA-Q, Brief Eating Disorder in Athletes Questionnaire; CD-RISC, Connor-Davidson Resilience Scale; CES-D, Center for Epidemiologic Studies Depression Scale; CNSVS, CNS vital signs; CPT, Continuous Performance Test; ESS, Epworth Sleepiness Scale; 4DSQ, Four-Dimensional Symptom Questionnaire; FTT, Finger Tapping Test; GAD-7, Generalized Anxiety Disorder-7; GHQ-12, General Health Questionnaire-12; HADS, Hospital Anxiety and Depression Scale; ISI, Insomnia Severity Index; K10, Kessler Psychological Distress Scale; NORC, National Organisation for Research, University of Chicago; PHQ-2, Patient Health Questionnaire-2; PHQ-9, Patient Health Questionnaire-9; PROMIS, Patient-Reported Outcomes Measurement Information System; PSQI, Pittsburgh Sleep Quality Index; SARRS, Social Athletic Readjustment Rating Scale; SAT, Shifting Attention Test; SDC, Symbol Digit Coding Test; SF-36, SF-36v2 Health Survey; ST, Stroop Test; VBM, Verbal Memory Test; VMT, Visual Memory Test.

population studies above [28, 32, 33], but with the acknowledgement that it is difficult to compare data due to the use of different screening instruments. Career dissatisfaction and severe injuries were associated with depression/anxiety.

A subsequent five country European prospective cohort study of 135 male current footballers reported a 12-month incidence of depression/anxiety of 37% [18]. A 2016 study [17] examining the impact of injury observed a 37.3% prevalence of depression/anxiety among 540 male footballers. Depression/anxiety was not, however, associated with total number of severe musculoskeletal injuries or number of surgeries.

Three studies used the Center for Epidemiologic Studies Depression Scale (CES-D) [34], or a modified version of this tool. A 2016 study of 432 male and female Swiss first league and male U-21 footballers reported a 7.6% prevalence of mild-moderate depression and a 3.0% prevalence of severe depression [19]. Among first league players, depression rates were consistent with the general population of the same gender, but the male U-21 players demonstrated an increased prevalence. Higher CES-D scores were significantly associated with lower age, lower number of matches played, attacking playing position and current injury, but not with the total number of injuries during the preceding 12 months. The study authors noted that, despite 13 players returning scores indicative of major depression, only one antidepressant prescription was reported (0.2% of all players), consistent with a previous reported prescription rate of 0.14% among footballers deduced via a 10-year analysis of urine doping samples [35].

Within a 2016 study [20] of 157 current and retired female German First League footballers, 50 players (32.3%) reported symptoms of a major depression and 39 players (25.2%) symptoms of a mild or moderate depression at least once during their career. Footballers reported symptoms of major depression more frequently than the lifetime prevalence observed in general population studies involv-

ing diagnostic interviews, although these prevalence rates were acknowledged to vary widely between studies [36, 37]. Depression scores were not significantly associated with age, number of injuries, career duration or time since career ended but significant differences were observed for playing position (increased among goalkeepers and attackers) and level of play (increased in second highest and second lowest groups). Almost 40% of players wanted or needed psychotherapeutic support (counselling or treatment by a psychologist or psychotherapist) during their careers, with only a quarter of those (10% of players overall) receiving it. In retirement, 24% of players wanted or needed psychotherapeutic support, with almost 90% of those (20% of players overall) successfully obtaining it.

A 2019 study [21] of 290 female German footballers observed mild to moderate depressive symptoms in 48 players (16.6%) and severe symptoms in 41 players (14.1%), which were reported to be in keeping with a similarly-aged female German general population. Significantly more second league players reported depressive symptoms, with one in five (20.6%) of them reporting symptoms of a severe depression. Only a third of the 45 (15.7%) players who stated that they currently wanted or needed psychotherapeutic support received it. Compared with similarly-aged general population females, no difference was observed for all players or first league (Bundesliga) players, but significantly more ($\chi^2=5.85$; $p<0.05$) second league players reported symptoms of depression. Lower match experience and the subjective need for psychotherapy were significant predictors of depressive symptoms. No associations were observed for playing position or current injury, albeit the authors advised that severely injured players would not have been present at the training session during which players were asked to complete the study questionnaire. The authors noted that the overall depression prevalence (31%) was much higher than that previously observed in Swiss first league players (13%) [19] and suggested that

this may be the result of greater psychological pressures associated with competing at a higher standard.

A 2020 study [22] chiefly examining neurocognitive performance observed that 66 retired female footballers scored worse than 45 female retired non-contact athletes on the depression subset of the Hospital Anxiety and Depression Scale (HADS) [38]. Depression scores were associated with heading frequency but not with concussion history. The authors, however, questioned the clinical significance of the findings, as both study populations demonstrated depression scores lower than the national average and much lower than the utilised measure's depression threshold.

A recent Australian study [23] of 281 current (male and female) and 81 former footballers (all male) utilised the Patient Health Questionnaire (PHQ-9) [39], which requires a minimum symptom duration of two weeks, in keeping with the International Classification of Diseases-10's [40] diagnostic criteria for depression. The study reported prevalence rates of depressive symptoms of 6.8%, 10.6% and 12.5% among male players, female players and retired male players respectively. Increased psychological resilience was associated with lower depression scores in both male and female active players. Depression scores did not demonstrate an association with injury during the preceding six months.

A large 2020 United Kingdom (UK) retrospective cohort study [24] with a median follow up period of 18 years observed that retired male Scottish footballers with known high neurodegenerative disease mortality had a lower rate of hospitalisation for depression (0.50%) than the general population (0.73%) ($p=0.02$), with an older age at first admission for depression in footballers.

Anxiety

The most commonly employed screening tools for anxiety were the General Health Questionnaire-12 (GHQ-12) [27] and the Generalized Anxiety Disorder-7 (GAD-7) [41], with the Beck Anxiety Inventory (BAI) [42] and the Hospital Anxiety and Depression Scale (HADS) [38] also utilised. As previously outlined, the use of the GHQ-12 made it impossible to distinguish anxiety from depression and the five studies employing this tool have therefore already been summarised above.

One study of female footballers showed a correlation between premenstrual syndrome (PMS) and increased BAI scores [25]. Using the GAD-7, a cross-sectional observational study of 290 female current footballers playing in Germany reported at least moderate generalised anxiety disorder (GAD) among 8.3% of participants [21].

The study examining male and female current Swiss first league (FL) footballers along with male U-21 players

observed that anxiety disorders were significantly less prevalent (1.4% of players) than among the general population ($\chi^2=16.7$; $p<0.001$) [19]. GAD-7 anxiety scores correlated with CES-D depression scores ($r=0.584$; $p<0.001$), age ($r=-0.120$; $p<0.05$) and the number of matches played ($r=-0.204$; $p<0.001$), but not with injury frequency within the previous 12 months. Male FL players possessed significantly lower anxiety scores than male U-21 ($t=2.26$; $p<0.05$), female FL players ($t=5.00$; $p<0.001$) and the general population ($t=4.96$; $p<0.001$). The average anxiety scores of FL female players and of male U-21 players were similar to gender-matched population norms. Average anxiety scores differed significantly between playing positions (with attackers and defenders exhibiting larger scores) ($F=2.46$; $p<0.05$) and the three levels of play ($F=5.17$; $p=0.01$) for the entire group.

Using the GAD-7, the Australian study of current and former footballers reported the presence of anxiety symptoms in 4.7% of current male players, 8.3% of current female players and 11.3% of male former players [23]. Among male players, increased psychological resilience was associated with reduced anxiety levels (OR 0.77; 95% CI 0.65 to 0.90).

The case-control study of 66 female retired footballers and 45 female former non-contact athletes did not observe a significant between-group difference in anxiety levels (on the HADS anxiety subscale) [22]. Among the footballers, however, significantly greater anxiety scores were noted in frequent headers of a football compared to those that rarely headed a football (MD=2.179; CI 0.29 to 3.83; $p=0.030$).

The Scottish retrospective cohort study comparing 7676 male former professional soccer players to 23028 matched population controls found that former professional footballers had a lower rate of psychiatric admission for anxiety and stress (HR 0.37; 95% CI 0.25 to 0.55; $p<0.001$) [24].

Distress/burnout

Distress was measured in several publications via a "Distress Screener" based on the Four-Dimensional Symptom Questionnaire (4DSQ) [43]. The Athlete Psychological Strain Questionnaire (APSQ) [44] and the Kessler Psychological Distress Scale (K10) [45] were used in one study. Burnout was assessed by the Utrecht Burn-Out Scale (UBOS) [46].

One cross-sectional study found that both distress (via the Distress Screener) and burnout rates (via the UBOS) were higher in 104 male former professionals than in 149 male current players (18% vs. 10% and 16% vs. 5% respectively) [14]. In current players, major life events in the previous 12 months were associated with both distress ($p<0.01$) and burnout ($p<0.05$). In former players, low social support was associated with both distress ($p<0.05$) and burnout ($p<0.01$).

Three international prevalence studies of active male players found that distress (via the Distress Screener) ranged from 11.4 to 18.2% [15, 16, 17]. Distress displayed small to moderate correlations with life events [15, 16], career dissatisfaction [15, 16] and severe injuries [16, 17]. Those players who had sustained more than three severe musculoskeletal injuries during their career were more than twice as likely to report distress (OR 2.69; 95% CI 1.23 to 5.87; $p < 0.01$) as those with three or fewer such injuries [17].

Another 12-month observational prospective cohort study involving 135 male current footballers from five European Countries (Finland, France, Norway, Spain and Sweden) reported an 11.9% (95% CI 7.3 to 18.5) incidence rate for distress (via the Distress Screener), with non-significant associations observed for recent adverse life events, conflict with trainer/coach and career dissatisfaction [18].

In the Australian cross-sectional mixed-sex study of current and former players, sport-related psychological distress (via the APSQ) was reported by 52.0% of active male players and 62.9% of female players [23]. Global psychological distress (via the K10) was highest in former male players (26.3%), followed by active female (18.9%) and male footballers (9.5%). Increased psychological resilience among active male footballers was associated with reduced reporting of sport-related (OR 0.91; 95% CI 0.85 to 0.97) and global psychological distress (OR 0.86; 95% CI 0.77 to 0.96).

Disordered eating

Adverse nutrition behaviours (assessed via answering four yes/no statements) were higher in former male players than current footballers with reported prevalence rates of 42% and 26% respectively [14]. Surprisingly, within the male current footballers, the total number of previous severe injuries was negatively associated with adverse nutrition behaviour ($p < 0.01$). In contrast, a subsequent European cross-sectional study of male footballers did find that adverse nutrition behaviour was significantly associated with having one or more severe joint injuries (OR 0.49; 95% CI 0.31 to 0.79; $p < 0.01$) and three or more surgeries (OR 0.42; 95% CI 0.25 to 0.73; $p < 0.01$) [17].

Two additional international cross-sectional studies using the same assessment method identified adverse nutritional behaviours in 47.4–74.3% of male players [15, 16]. Within the recent Australian cross-sectional study [23], 35.1% of current male players, 43.8% of current female players and 40.0% of former male players reported disordered eating behaviours via the Brief Eating Disorder in Athletes Questionnaire (BEDA-Q) [47].

Sleep disturbance

Sleep disturbance was assessed using self-report screening tools, typically the Patient-Reported Outcomes Measure-

ment Information System (PROMIS) questionnaire [48], but also the Athlete Sleep Screening Questionnaire (ASSQ) [49], the Pittsburgh Sleep Quality Index (PSQI) [50], the Insomnia Severity Index (ISI) [51] and the Epworth Sleepiness Scale (ESS) [52].

Using the PROMIS, a 12-month prospective cohort study of 135 male European footballers reported a sleep disturbance incidence rate of 18.5% [18]. Among male footballers in Australia, higher rates of sleep disturbance (assessed by the ASSQ) were seen in former versus current players, with prevalence rates of 32.5% and 12.2% respectively ($p < 0.01$) [23]. The rate of sleep disturbance observed among current female players (32.6%) was similar to that in retired male players. Female footballers injured within the last six months had higher rates of sleep disturbance (OR 2.65; 95% CI 1.20 to 5.85).

A cross-sectional Qatari study of 111 male players used three sleep screening tools (PSQI, ISI and ESS) to assess sleep quality, excessive daytime sleepiness and subclinical insomnia respectively [26]. The results showed that 68.5% reported poor sleep quality ($PSQI \geq 5$), 27.0% had subclinical insomnia ($ISI \geq 11$) and 22.5% reported excessive daytime sleepiness ($ESS > 8$). Approximately 10% of players had used hypnotic medication within the preceding month. Factors such as age, body composition and ethnicity did not impact on any of the sleep quality parameter results. The authors recognised that the prevalence of sleep disorders in this sample was much higher than that observed in previous Australian and European footballers [53, 54]. It was suggested that specific cultural and environmental factors including late night training to avoid extreme daytime temperatures, consequent late dining, and early rising for morning prayer may have affected the findings, therefore rendering them of interest mainly to professionals in the Middle East.

Within the trio of international prevalence studies examining active male players, sleep disturbance rates ranged between 18.8% and 32.9% via the PROMIS [16, 15, 17]. Players with three or more previous severe injuries (OR 2.32; 95% CI 1.22 to 4.42; $p < 0.01$) reported greater rates of sleep disturbance than those who had not suffered from injuries during their career [17].

Alcohol use

All studies examining footballers' alcohol consumption used the Alcohol Use Disorders Identification Test-Concise (AUDIT-C) questionnaire [55] to identify either "adverse alcohol use/behaviour" (a score of ≥ 5) or "alcohol misuse" (score of ≥ 4 in males and ≥ 3 in females).

In one six nation global study of male footballers, adverse alcohol behaviour was identified in 19% of current players and 32% of former players [14]. A similarly designed

worldwide study reported a prevalence of adverse alcohol behaviour of 9.4% (95% CI 7.0 to 11.9) among 530 male footballers [16]. Statistically significant correlations were found between adverse alcohol behaviour and higher numbers of severe injuries, surgeries and life events, and higher levels of career dissatisfaction. One study reported the prevalence of adverse alcohol behaviour among male footballers within each of five European countries, with rates ranging from 6.9% (95% CI 3.2 to 13.9) in Norway to 17.0% (95% CI 10.5 to 26.5) in Finland [15].

A study of active male footballers examining the effects of severe musculoskeletal injuries reported a 10.3% prevalence (95% CI 7.5 to 13.0) of adverse alcohol behaviour, with significant associations between adverse alcohol behaviour and a history of two severe injuries (OR 3.4; 95% CI 1.3 to 8.9; $p < 0.01$) or, specifically, a history of one (OR 3.4; 95% CI 1.4 to 8.2; $p < 0.01$) or two (OR 3.0; 95% CI 1.1 to 7.8; $p < 0.01$) severe joint injuries [17].

A 12-month prospective cohort study of male European footballers reported a 14.1% incidence of adverse alcohol use, which displayed non-significant associations with recent adverse life events, conflict with trainer/coach and career dissatisfaction [18].

The Australian study reported alcohol misuse (requiring a lower AUDIT-C score of ≥ 4) in 50.7% (95% CI 42.7 to 58.6) of active male players, 43.8% (95% CI 35.6 to 52.4) of active female players and 68.8% (95% CI 60.2 to 79.0) of retired male players [23]. The authors did, however, advise caution when comparing these high rates to those reported in other studies, many of which assessed for harmful use of alcohol using the higher (≥ 5) AUDIT-C score, but the authors maintained that the rates indicated footballers' need for alcohol education. It is noted that an earlier Australian study had observed even higher rates of alcohol misuse (AUDIT-C score of ≥ 4) among elite rugby league players, during both preseason (68.6%) and in-season (62.8%) [56].

Male former Scottish professional footballers were hospitalised for treatment of a primary alcohol disorder at a lower rate than their matched population controls (HR 0.62; 95% CI 0.51 to 0.76) [24].

Substance misuse

Substance misuse was examined in only one publication, the Australian cross-sectional study of 281 male and female current players and 81 male former players [23]. The CAGE Adapted to Include Drugs (CAGE-AID) Questionnaire [57] was used, with a score of ≥ 2 (from a maximum possible score of 4) deemed indicative of the presence of substance misuse. The questionnaire did not collect details of the specific substances being misused. Prevalence rates were reported as 2.0% (95% CI 0.4 to 6.1) among current male

players, 1.5% (95% CI 0.1 to 5.8) among current female players and 10.0% (95% CI 6.1 to 19.9) among male ex-players. The prevalence of substance misuse was significantly lower in the group of active male players than in their retired counterparts ($\chi^2 = 7.189$; $df = 1$; $p < 0.01$).

Gambling

The Australian study was also the sole publication to examine footballers' gambling behaviours [23]. The NORC (National Organisation for Research, University of Chicago) Diagnostic Screen for Gambling Problems [58] was used to identify problem gambling, with a reported prevalence of 23.6% (95% CI 17.5 to 31.1) in male current players, 2.3% (95% CI 0.5 to 6.9) in female current players and 32.5% (95% CI 23.0 to 42.2) in male former players. Injury in the previous six months was associated with problem gambling (OR 2.28; 95% CI 1.03 to 5.02) among the active male players. Further studies of footballers in other jurisdictions are required to determine if the levels of problem gambling among footballers in Australia are elevated by the fact that the country has for some time been the largest spending nation per capita on gambling products [59].

Discussion

In summary, among active footballers, female players reported symptoms of common mental disorders more frequently than males, while retired footballers reported symptoms more frequently than current players. The combined depression/anxiety data yielded via the GHQ-12 suggest a higher burden among footballers than previously seen in general populations and among other athletes, but caution is required when attempting to compare studies using different screening measures. Major life events, low social support, career dissatisfaction and severe injuries were associated with depression/anxiety among current footballers, with life events also demonstrating an association among retired players.

Within the studies that examined depression individually, prevalence rates among current players were largely in keeping with the reported general population norms. Factors including lower age, lower total number of appearances and current injury demonstrated associations with low mood.

The results for anxiety varied, with one study [19] showing significantly reduced GAD-7 scores compared to the general population (with the difference wholly accounted for by the study's male players), another describing a frequency of anxiety symptoms consistent with the general female population [21] and another reporting slightly

increased GAD-7 scores among male and female footballers [23]. Interestingly, one study described a correlation between premenstrual syndrome (PMS) and anxiety levels in female footballers, highlighting the need to understand female hormonal health and its potential impact on athlete mental health and performance [25].

Although prevalence rates were not routinely compared to general populations or other athlete groups, footballers reported high levels of distress, disordered eating, and sleep disturbance. The screening tool most commonly used to investigate disordered eating was particularly brief and future studies of this area would benefit from the implementation of more comprehensive questionnaires, such as the Eating Attitudes Test (EAT-26) [60]. The rates of both adverse alcohol use and substance misuse reported were perhaps higher than expected given the importance of peak athletic fitness in the modern game, the frequency of drug testing and the lengthy suspensions typically associated with positive test results.

Two studies reported associations between footballers' playing positions and symptoms of either depression or anxiety. Increased CES-D scores were observed in attackers in one study [19] and in both goalkeepers and attackers in another [20], while both defenders and attackers demonstrated increased GAD-7 scores in the first study [19]. It was suggested that the results could be explained by the additional pressure experienced by players more likely to be the focus of public and coach scrutiny [20]. Goalkeepers and forwards typically fall into this category, due to a general perception that their performances are more likely to decisively influence games. It was therefore intriguing to note that midfielders, often the furthest removed from the expectation to score or prevent goals, were the only main playing position not to demonstrate an association with increased mental health symptoms, indeed they reported the lowest depression scores in one study [19].

Disappointingly, footballers described a lack of availability of psychotherapeutic support, particularly during their playing careers. In one study, nearly 40% of players wanted or needed psychotherapeutic support during their careers, with only a quarter of those (10% of all players) receiving it [20]. In retirement, 24% of players wanted or needed psychological support, with almost 90% of those (20% of all players) successfully obtaining it. In another study, only a third of 45 players (15.7% of all players) who currently wanted or needed psychotherapeutic support received it [21]. The figures compare poorly to those reported in a recent study of elite athletes in Australia, where 62.7% of active female athletes attended a psychologist and 5.9% a psychiatrist [61]. With only 10% of those footballers needing psychological support successfully receiving this while still playing (compared to 90% of those post-retirement), one must consider the possibility that stigma within the

footballing environment may have prevented players actively seeking help during their careers [20]. Another potential explanation may be that, within football teams, the roles of psychiatrists and psychologists are perceived as less important than in other sports.

Reviews of previous studies of athlete groups have identified key transition points, chiefly injury and retirement, as vulnerable periods for the development of psychological morbidity [61, 62]. The observation of increased depressive symptoms among the second highest and second lowest ranked groups of players [20], female second league [21] and male U-21 players [19], is reflective of this, with these players acutely pursuing promotion to a higher level of competition (or battling relegation to the converse). The studies reviewed suggest that injury may be associated with an increased risk of footballers reporting depression and anxiety symptoms, but the data is somewhat equivocal, with some studies failing to show any correlation. A number of studies did, however, demonstrate associations between injury and distress, disordered eating, sleep, alcohol and gambling. Retired footballers reported higher prevalence rates than their active counterparts for all the common mental disorders studied. Future research should therefore aim to determine how best to deliver educational sessions and preventive strategies to footballers approaching the end of their careers [23].

Strengths and limitations

The review's main strength is that it is the first review article to comprehensively examine the prevalence of (and potential risk factors for) common mental disorders among professional footballers while simultaneously critically analysing the included studies. A thorough literature search was conducted and the inclusion and exclusion criteria were independently applied by all authors in order to minimise selection bias. It is, however, possible that some studies may have evaded inclusion due to the non-systematic nature of the literature search, particularly the manual searching of reference lists. With relation to the study data reviewed, the universal use of self-report questionnaires risked the effect of responder bias on any findings. The majority of studies were cross-sectional and therefore unable to demonstrate causality for any observed associations. The self-report questionnaires provided data relating only to the presence of mental health symptoms, rather than clinical diagnoses of psychiatric illnesses or disorders. The use of different screening tools makes it difficult to compare findings between many of the studies, while the distinct ethnography of some study populations casts some doubt on the generalisability of findings to the wider population of professional footballers as a whole. The GHQ-12's inability to discriminate between depression and anxiety has

already been noted, while several of the screening tools used were not validated for the particular study populations, for example the use of translated (non-English) versions of the eating disorder screening questions [15] and the use of the BEDA-Q among male players [23]. Although the literature search included schizophrenia, bipolar disorder, obsessive-compulsive disorder and personality disorders, unfortunately none of these were examined in the publications identified for review.

Conclusion

All the studies identified for review were published within the past decade, illustrating that the mental health of professional footballers has only recently become the focus of academic research. Further longitudinal epidemiological studies are undoubtedly required in order to more accurately determine the prevalence of common mental disorders within the professional footballer population and to identify the disorders' potential predictors. Ideally, studies would employ diagnostic clinical interviews, but these may prove impractical in terms of their logistical scheduling and the time required for assessments, while potential participants may also fear a loss of privacy compared to the completion of anonymous questionnaires. Future studies might consider examining the effect of the time of year during which data is collected, with the suggestion that the close season may be a particularly stressful period within which players may find themselves out of contract and without a club to employ them [16]. Researchers may also wish to explore footballers in countries that have thus far been under-represented, most notably England and the rest of the UK. In keeping with other sports, there remains a dearth of information relating to psychotropic prescribing in professional football and a thorough examination of this would be of great value to sports physicians and psychiatrists.

In line with examinations of other elite athletes, which identified stigma and a lack of information about mental illness as barriers to help-seeking [63], several studies indicated the need for raised awareness of common mental disorders among both footballers and their coaches. It is suggested that players experiencing stressors such as life events, injury or surgery should be closely monitored, in the expectation that these may predict the subsequent development of psychological morbidity [14, 15, 16]. The recent development of the International Olympic Committee's Sport Mental Health Assessment Tool 1 (SMHAT-1) [64] may provide within elite sport a timely uniform screening tool to enable the early detection of mental health symptoms and, where required, referral to specialist services. As recognised in several studies, it is vital that psychological

therapy and psychiatric treatment are readily accessible when it is identified that these are indicated.

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Dr Gary Woods

School of Medicine, Dentistry and Biomedical Sciences
Queen's University Belfast
97 Lisburn Road
Belfast
BT9 7BL
United Kingdom
gary.woods@setrust.hscni.net



Role of suboptimal psychiatric evaluation in the development of first episode psychosis in an athlete

A case report

Kenneth Oforeh¹, Stanley Nkemjika^{1,2}, Olaniyi Olayinka³, and Shiraz Azim¹

¹ Department of Psychiatry, Interfaith Medical Center, Brooklyn, NY, USA

² Department of Population Health Sciences, School of Public Health, Georgia State University, Atlanta, GA, USA

³ Department of Psychiatry, Yale School of Medicine, New Haven, CT, USA

Introduction

In sports, the role of a sports psychiatrist is underestimated, their functions with that of sports psychologists are essential and synergistic to the welfare of athletes. However, to date, it appears to have remained uneasy as there has been vice versa condescending tolerance and patronizing among both specialties [1]. Considering that the sports psychologist utilizes the psychosocial angle to cater to athletes [2], the sports psychiatrists are equally important as they use the biological mechanisms to cater to athletes [3, 4]. So far, most sports teams accommodate only sports psychologists [5], but not sports psychiatrists whose roles are very different within the group. Sports psychologists who are more predominant in most professional team setups, could be assumed not to be helpful in accommodating and motivating the essential role of sports psychiatrists in the healthy balance of athletes [1, 6]. Thus, they cater to the psychological and psychiatric needs of athletes, which poses the risk of suboptimal therapeutic management for psychiatric disorders. This suboptimal psychiatric treatment stems from mismanagements and misdiagnosis of athletes [7, 8], which ultimately leads to further decompensation into much acute organic mental disorder and likely loss of career among potential elite athletes [9].

Based on the evidence in literature, the effectiveness of psychological treatments on psychotic disorders has been explored in controlled trials over the last 15 years, which led to the conclusion that they are an important adjunct to antipsychotic medication [10]. However, these studies had mainly been carried out on individuals with chronic

treatment-resistant psychosis, where participants had already been stabilized on antipsychotic medication [11, 12]. Thus, there remains little literature on patients with first episode of psychosis. Similarly, there is a gap in sports psychiatry literature on the sequential impact of poor or suboptimal psychological evaluation and assessment based on a team's psychologist or sole expertise of non-sports psychiatrists among professional and collegiate athletes globally. Hence, we present a case of a young male athlete whose suboptimal evaluation of initial psychiatric symptoms led to subsequent substance use disorder and comorbid first psychotic break and depressed mood.

Case report

A 24-year-old African American male, single, unemployed, college graduate with unclear past psychiatric history and cannabis use disorder, was escorted by his outpatient psychiatrist to the psychiatric emergency department for evaluation. Per report, the patient presented for his monthly psychiatry outpatient appointment but was observed to be acutely psychotic as he exhibited disorganized behavior in the form of paranoid delusions and endorsed auditory hallucinations.

Per collateral and patient report, his symptoms started four years ago in college where he won a scholarship after playing basketball in a community college for a year. The patient suffered a groin injury but played through the season without seeking medical attention as he was a "key" player

in his team. Following chronic aggravation of the injury which sidelined him from playing basketball, he reported feeling “depressed” which he described as low mood, lack of concentration, and low motivation. Subsequently, he developed auditory hallucinations which he described as hearing voices of multiple people simultaneously. He reported seeking treatment from the school’s sports psychologist and his primary care physician, which gave partial therapeutic effect at the time, however, his continued absence from the basketball court led to a cascade of worsening of depressive symptoms, social withdrawal, compensatory cannabis use, increased severity of auditory hallucination, and suicidal ideations but without specific plans or intent to act. After the semester, he reported feeling isolated because he could not travel back home to visit his family due to lack of financial support. Consequently, he stopped eating and started using other illicit substances, one of which he thinks was “intravenous heroin”. Eventually, he was able to return home to his family. While at home, he was repeatedly psychiatrically cleared after three mental health screening consultation visits with his primary care provider within two years. However, six months after the last screen, he reported sleeplessness, increased energy, grandiose delusions evidenced by thinking he had unique and magical powers, thoughts of superiority and auditory hallucinations, which led to his first inpatient psychiatric admission that lasted twelve days. During this admission, he was prescribed valproate and olanzapine. However, valproate was discontinued due to benign neutropenia, and it was substituted for risperidone. After discharge, he was not adherent to his medications due to fainting spells which he described as allergies. Subsequently, his primary care provider referred him to an outpatient psychiatrist who instituted aripiprazole and discontinued risperidone and olanzapine. He maintained adherence to aripiprazole until his second and current inpatient hospitalization.

On presentation in the psychiatric emergency unit, the patient seemed to be responding to internal stimuli as he appeared to be interacting with himself. Paranoia was also elicited as evidenced by how he gazed at people suspiciously. He repeatedly interrogated the treatment team, asking what they wanted from him and if they worked for the government or were sent by them. He refused search protocol, began pacing the unit and demanded discharge. Upon further questioning, he refused to answer any questions and grew increasingly agitated and aggressive. He was irritable, uncooperative and not compliant with the unit limit setting. He could not be verbally redirected. To ensure safety, he was given intramuscular Haloperidol 5 mg once and Diazepam 2 mg once for agitation after declining oral regimen and was then admitted. Laboratory investigations on presentation were all unremarkable and within normal limit, except for urine toxicology screen which was positive

for cannabinoids. His echocardiogram, chest radiograph, computed tomography of the head and SARS-COV2-19 serology all returned negative findings.

The inpatient psychiatry team continued his outpatient aripiprazole daily for psychosis, but up titrated during his admission to ensure therapeutic effect. The patient’s presenting features resolved following treatment regimen and he was discharged back to the community. He appeared motivated to continue with his mental health care as an outpatient.

Discussion

Sports psychiatry remains an emerging specialty both for the public and the sports audience [13]. Despite the documented evidence of the benefits of an integrated approach in the management of several health problems and mental health disorders, the role and services of a sports psychiatrist remains low in the mental health balance of athletes [14]. This was evident in our patient based on the presented case report. Following initial psychiatric decompensation, a sports psychiatrist who possesses the background knowledge of sports-specific stressors and pharmacotherapy specific for athletes could have promptly identified, evaluated, diagnosed, and treated the presenting complaint. Instead, the patient consulted a psychologist for an obvious mental health illness. Our patient had symptoms of sports injury-related mood and psychotic disorder which could have been resolved through an adequately integrated approach of care from psychosocial and biological management modalities. Additionally, not recognizing the prodromal symptoms of psychosis in our patient following consultation from non-sports specialized psychologists and psychiatrists further enhances the significance of a sports psychiatrist. An opportunity to provide psychoeducation to the patient and monitor the patient for possible progression to a psychotic disorder was missed. This supports the importance of the role of sports psychiatrists in the management of athletes. Despite this evidence, there remains a lack in the literature.

Following this dearth, we reviewed the literature on the EMBASE, PSYCHINFO, SPORTDiscus, and PubMed databases regarding the integrated management approach of both the sports psychologist and psychiatrist. Additionally, we searched the database for evidence of sub-optimal clinical assessment of athletes, which resulted to further mental health decompensation. The search results suggest a gap in the literature on these topics as we found no studies. Rather, evidence from the literature shows that psychological evaluations and treatment management assists the athletes to live a balanced healthy life and depict the roles

and importance of sports psychology. There remains a lack of biological treatments by sports psychiatrists for most sports-related mental health problems in the literature [15]. Our case portrays and bolsters the relevance of sports psychiatry as an essential field.

Conclusion

Sports psychiatrists perspectives on common mental health disorders management are lacking in literature and still needs more research. For the case presented here, we achieved an insight into the importance of the professional evaluations of a sports psychiatrist. Hence, an assessment from a sports psychiatrist may have stopped the spiral decline in our patient's mental health. Currently, the role of sports psychiatrist is suboptimal or non-existent in both amateur and professional sports. We recommend a more inclusive approach by sports outfits and establishments towards the mental health welfare of their staff by acquiring the services of sports psychiatrists. Finally, national sports bodies should consider requiring more team sports to have a designated or an on-staff sports psychiatrist who caters for the team.

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Kenneth Oforeh, MD

Interfaith Medical Center
1545 Atlantic Avenue
Brooklyn, NY 11213
USA
kenneth.oforeh@gmail.com

Abstracts

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Session 1: Sports Psychiatry at the Olympic and Paralympic Games

A1

Integration of sports psychiatry services with team Canada at the Tokyo Olympics

Carla Edwards

*Department of Psychiatry & Behavioural Neurosciences,
McMaster University, Hamilton, Canada
Correspondence to Carla Edwards;
edwardcd@mcmaster.ca*

Mental Health services for the Team Canada core Health Services Team at the Olympic and Paralympic Games have historically been organized and provided exclusively by Psychologists and Mental Performance Consultants, with a psychiatrist available at home for crisis calls when necessary. Following the 2016 Rio Olympic Games, Swimming Canada recognized the importance of having specialized mental health care available for its athletes and funded a position for a “High Performance Mental Health Advisor,” to be filled by a Sports Psychiatrist. This role filled a gap in the Integrated Support Team (IST), bridging the expertise of sports medicine, mental health, and performance, and assisted the program in developing a system in which a standard of mental health screening, support, and treatment could be delivered.

Existing quotas for professional categories at Major Games, as well as current funding and service models, create challenges to find a space for Sports Psychiatry to exist. Most “core medical” spaces are allotted to primary care Sports Medicine Physicians, Orthopedic Surgeons, Plastic Surgeons and other medical specialists, and “mental health and performance” spaces are allotted for psychologists and Mental Performance Consultants.

Sports Psychiatry was present with Team Canada at the Tokyo Games because the role was prioritized by the National Sport Organization (Swimming Canada). In advance of the Games, regular collaboration occurred with the network of Mental Performance Consultants who

supported the various other National Team squads who competed at the Games. Specifically for Swimming Canada, a series of educational sessions occurred with athletes and staff around resilience, mental health and wellbeing, and navigating through travel and competition with the multitude of Covid-19 protocols. Appropriate planning for athletes’ psychopharmacological needs and documentation was coordinated with the Sports Medicine team. At the Games, Sports Psychiatry services were made available to any other team, staff, or individual with Team Canada who needed it on site. Specifically for Team Canada Swimmers and staff, regular education, mental preparation, lifestyle management, general coping and resilience strategies were shared, and individual treatment was provided to athletes via psychotherapy and medication management as necessary. Additional support was provided in an advisory role to the High Performance management team, and Safe Sport mechanisms were enforced.

Conclusions

- (i) On site Sports Psychiatry services were essential for the management of day to day elements that had the potential to negatively impact athlete mental health and performance.
- (ii) Regular collaboration with the Integrated Support Team and coaching staff is essential for optimal athlete support.
- (iii) Sports Psychiatry provides an important bridge between medicine, mental health, performance, and sports science.
- (iv) On site Sports Psychiatry can effectively provide rapid and safe assessment of mental health challenges in elite athletes without compromising performance.
- (v) Current funding and service models do not include Sports Psychiatry in core team health services, and most National Sport Organizations do not prioritize Sports Psychiatry for travel to international competitions or Major Games.
- (vi) With increasing attention and awareness of athlete mental health, a Sports Psychiatrist can be a valuable member of the Integrated Support Team and can provide essential support to athletes and staff at a Major Games event.

A2**Development and implementation of mental health programming and services for the United States Olympic and Paralympic Committee and the Tokyo Games**

Todd Stull

Department of Psychiatry and Neuroscience,
School of Medicine, University of California Riverside,
Riverside, CA, USA

Correspondence to Todd Stull; todd.stull@ucr.edu

Mental health is an essential component in the life of elite athletes. As a result, the United States Olympic and Paralympic Committee (USOPC) decided to hire Mental Health Officers (MHOs) to provide mental health services and develop a mental health program beginning in 2019. Collaboration with sports medicine at the USOPC was a part of the process. In the early phases of development, an internal and external mental health task force was formed to provide guidance. As a result, a Mental Health Strategic Plan for the USOPC was developed. The MHOs, Sports Medicine, and the task force hired a Director of Mental Health and three Assistant Directors of Mental Health prior to the 2021 Tokyo Games. Their role was to provide mental health services to Team USA athletes while helping to expand services.

The work of the external task force included training, drafting, and approving an emergency action plan, implementing telehealth services, and advocating for mental health services. The internal task force worked on implementing and training the emergency action plan, developing a plan for elite athlete health insurance, creating a mental health assistance fund, building a registry of mental health providers in the US, and mental health services for transition out of sports. In addition, the internal group crafted a plan to educate coaches on mental health.

The IOC Sports Mental Health Assessment Tool (SMHAT) was used to screen athletes before going to Tokyo, and data started to be collected. While in Tokyo, the MHOs provided crisis management and mental health and substance use treatment to the entire US delegation. In addition, each morning, the MHOs were involved in a sports medicine meeting to discuss medical and mental health issues. Evaluation and treatment included any members who were in quarantine from SARS-CoV-2.

A3**Sports psychiatry service for the Tokyo Olympics and Paralympics, 2020: Australian perspectives**Ranjit Menon^{1*}, Adam Martin²

¹Mentallogue – Sports & Exercise Psychiatry Clinic,
Hawthorn, Australia

²The Stadium Sports Medicine Clinic, Sydney, Australia

*Correspondence to Ranjit Menon;
mentallogueclinic@gmail.com

These events held in September 2021 were delayed from their original date in 2020 due to the outbreak of the Covid 19 pandemic. The significant disruption to the schedule meant significant difficulties including psychological distress and the risk of developing a psychiatric disorder by athletes as well as the support members who accompanied the athletes.

The Australian contingent at the Olympic Games were supported for the first time by creating a new on call sports psychiatry position which was shared between 2 sports psychiatrists. This was funded by the Australian Institute of Sport. The 2 sports psychiatrists were rostered week on week off due to the long period of availability. The sports medicine doctors and the psychologists who accompanied the contingent performed the screening tools and identified those requiring clinical intervention. Those athletes with pre-existing disorders were identified for targeted prevention. The structure of clinical input was broadly divided into 4 categories: 1. Pre event; 2. During the event; 3. Post event quarantine; 4. Reintegration into usual routine.

Detailed planning was conducted prior to the event to ensure adequate supply of prescribed medicines, psycho-education to athletes around the biosecurity measures, completion of requisite documentation and permits, establishment of referral pathways for quick access to specialised input and risk mitigation measures.

Outcomes

- (i) The integration of sports psychiatry into major sporting events is vital to ensure appropriate mental health care to athletes and support staff.
- (ii) A multidisciplinary approach is ideal and necessary to ensure best outcomes.
- (iii) The availability of specialist sports psychiatrists was well accepted and appreciated by other clinicians and reduced stigma. It provided support and instilled confidence in athletes and supporting clinicians.
- (iv) The individual health information of the athletes was treated with strict privacy and confidentiality and

informed consent was always considered and taken prior to referral and clinical input.

The model that was developed is expected to be put in place for future events to ensure effective and safe clinical care of athletes.

Session 2: Short presentations

A4

Acupuncture role in sport psychiatry: Improving mental health, performance and resilience in elite sport by acupuncture

Agata Zborowska

Medicine, Uppsala University, Uppsala, Sweden

Correspondence to Agata Zborowska;

agata.malgorzata.zborowska@gmail.com

Introduction

Metabolism shifts and homeostasis in elite athletes elevate the risk of mental health conditions, while pain, discipline and injuries may negatively impact resilience in coaching and achievements. Current studies, next to general efficacy of acupuncture in mental health improvement, present a

positive impact on anxiety level, oxygen management, heart rate, blood lactic acid ratio control and reduction of inflammatory processes, all contributing to the successful resilience process.

Material and methods

There was database search performed in Medline (82 results), Ovid (0 results) and NCBI (30 results), and identified and qualified papers cited referenced with Web of Science (3 qualified) in period 09.2021–11.2021 using key-words (attachment: sport, athlete, acupuncture, resilience) and qualified by Cochrane Collaboration's risk-of-bias tool.

Results

There were in total nine papers identified. One of them is awaiting further data collection from the authors and three had been rejected, two due to language exclusion criteria and second due to high bias risk score. Three of the papers are of low bias risk, and two moderate.

Discussion

There is a limited amount of data in direct vicinity to sport psychiatry accessible in available literature. The experiment's designs require quality improvement and variability with comparison currently used by psychiatrists and psychologists clinical methods in the perspective of randomised controlled trials. The cohorts are small and the variety of sports is poor, without ability to formulate sport-specific conclusions and applied methods. All qualified papers report promising outcomes and objectively evidence

Study, year	Random sequence generation	Allocation concealment	Blinding of participants and personnel*	Blinding of outcome assessment*	Incomplete outcome data	Selective reporting	Anything else, ideally prespecified	Risk bias
Khojastefar, 2021	+	+	+/-	+	N/A	N/A	N/A	Low
Tsai, 2021	+	+	+	Awaiting for data	Awaiting for data	Awaiting for data	training for >1 year participants may be compared with >10 years of training	Status awaiting
Zarei, 2017	+	+	+	+	N/A	N/A	N/A	Low
Garlanger, 2016	-	-	-	-	N/A		5 days, no follow up	High
Shayestehfar, 2015	+	+	+/-	+	N/A	N/A	Exercise interventions	Low
Ma, 2015	+	+	-	-	N/A	N/A	Possible impact of changed diet two days before trial.	Moderate
Lin, 2011	+	+	-	-	N/A	N/A	Impact of chosen exercise. Self-determination of the exercise ends.	Moderate

Figure 1. Methods of selection.

that acupuncture may be a candidate to instantaneously improve resilience and performance, but awaits its enshrined position in sport psychiatry and scrutiny of the longitudinal effect of that treatment. Two resources utilised auricular acupuncture, one body acupuncture and one included mixed approach. In all intervention, the treatment duration time was 30 min. In four included cases acupuncture needles were used and in one magnetic patches were applied. The most common points of insertion in the body are (stomach) ST36, (pericardium) PC6, (heart) HT7 and in the Auricular Acupuncture: Shen Men and Relaxation.

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A5

A survey of the mental health of UK Olympic and Paralympic sport athletes

Amit D. Mistry

Nightingale Hospital, London, United Kingdom

Correspondence to Amit D. Mistry; doctor@wellathletic.com

Introduction

The prevalence of mental health symptoms and disorders within elite athletes is an increasing concern, as indicated by a growing scientific literature and high-profile media reports [1,2]. Limited studies have compared the mental health of both Olympic and Paralympic athletes [3].

Material and methods

A cross-sectional study between October 2018 and June 2019 was performed on 394 athletes from 29 British Olympic & Paralympic, summer and winter sports to explore the prevalence and predictors of psychological distress and wellbeing. This included the use of validated screening tools such as the Kessler Psychological Distress Scale (K10) and the World Health Organisation Well-Being Index (WHO-5).

Results

High or very high levels of psychological distress were reported in 23.7% of athletes and 18.8% reported poor subjective well-being. Psychological distress and poor wellbeing were associated with female gender (OR 2.03, distress; OR 2.00), being injured or ill (OR 1.87; OR 1.93) and retirement planning (OR 4.74, OR 8.10). Paralympic athletes demonstrated greater levels of psychological distress than Olympic athletes ($p=0.040$). Also, winter sport athletes possessed higher levels of psychological distress than those competing in summer sports ($p=0.044$).

Psychological distress mean scores (17.9, SD 6.5) were higher than comparable population norms where as wellbeing scores were similar to UK age-matched population norms. Of note, 10% (34) of athletes with mental ill health still reported high wellbeing levels and 5% (18) with no reported mental ill health possessed low wellbeing.

Discussion

Our results identified higher mean psychological distress within athletes, with certain cohorts reporting higher distress levels. Reports of no mental ill health did not automatically equate to high wellbeing levels, reiterating that athletes must have access to robust mental health support plans that not only screen but can provide clinical support for those experiencing high psychological distress and poor mental wellbeing

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A6

Mental disorders in South African club rugby

James W. Burger^{1*}, Lena S. Andersen², John A. Joska¹¹HIV Mental Health Research Unit, Division of Neuropsychiatry, Department of Psychiatry and Mental Health, University of Cape Town, Cape Town, South Africa²Global Health Section, Department of Public Health, University of Copenhagen, Copenhagen, Denmark

*Correspondence to James W. Burger;

drjameswburger@gmail.com

Introduction

Elite athletes have similar prevalence rates of mental disorders to the general population [1,2], although these studies have generally used self-report tools to estimate the prevalence of mood and anxiety disorders. The majority of these studies utilised self-report measures, rather than clinician-administered tools [1,3]. Less is known about non-elite and sub-elite athletes, with little data from low- and middle-income countries (LMIC) [3]. Research is needed to describe the prevalence of mental disorders for South African club rugby using clinician-administered tools.

Material and methods

We conducted a preliminary cross-sectional, observational study at two clubs in the Western Province Super League A in Cape Town, South Africa. Male rugby union players (n=71) completed preseason mental health screenings, 68 of whom were interviewed using the Mini International Neuropsychiatric Interview (MINI) 7.0.2. Players also completed the Sport Concussion Assessment Tool 5-Symptom Evaluation, Athlete Psychological Strain Questionnaire, Baron Depression Screener for Athletes, Generalised Anxiety Disorder-7, and Center for Epidemiologic Studies-Depression scale.

Results

MINI-defined disorders were identified in 33.8% (23/68; 95%CI 22.79 to 46.17%), with a current disorder identified in 10.29% (7/68; 95%CI 4.24% to 20.07%). Only 4.3% (3/70) of the sample reported being diagnosed with a mental disorder previously. A quarter of the sample met criteria for major depressive disorder (17/68), with 2.94% (2/68) having a current episode. Bipolar disorder was identified in 1.47% (1/68). Generalised anxiety disorder was the most common current disorder (8.82%; 6/68).

Discussion

These results add to the limited prevalence data on mental disorders in South African rugby using clinician-adminis-

tered tools. Depressive and anxiety disorders were found to be common, supporting previous studies that mental disorders are at least as common in athletes [1,2]. Current anxiety symptoms may be particularly high during the COVID-19 pandemic, via both the environmental implications and direct viral effects [4]. Club players may also have their own particular stressors, as over 40% of this sample was students, and 17% were employed part-time or unemployed. The treatment gap that was demonstrated suggests that implementing mental health screening would be beneficial in South African club rugby, supporting the drive for its inclusion in pre-season screenings [5,6].

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A7

Development of sports psychiatry in the United States and internationally

Ira Glick^{1*}, Todd Stull², Alan Currie³¹Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, Stanford, CA, USA²Department of Psychiatry and Neuroscience, School of Medicine, University of California Riverside, Riverside, CA, USA³Wolfson Research Centre, Regional Affective Disorders Service, Campus for Ageing and Vitality, Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust, Newcastle, United Kingdom

*Correspondence to Ira Glick; iraglick@stanford.edu

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Interpersonal violence against athletes

What we know, what we need to know, and what we should do

Ralph E. Schmidt^{1,2}, Andres Ricardo Schneeberger^{2,3}, and Malte Christian Claussen^{2,4,5}

¹ Department of Psychology, University of Geneva, Geneva, Switzerland

² Department of Psychiatry, Psychotherapy, and Psychosomatics, Psychiatric University Hospital Zurich, University of Zurich, Switzerland

³ Department of Psychiatry, University of California, San Diego, CA, USA

⁴ Adult Psychiatry, Psychiatric Services Grisons, Chur, Switzerland

⁵ Private Clinic Wyss AG, Münchenbuchsee, Switzerland

Abstract: The mediatization of several high-profile cases of sexual abuse in sports has sensitized a larger public for the problem of interpersonal violence against athletes. This article provides an overview of what is already known on the prevalence of different forms of interpersonal violence in sports, associated personal, organizational and cultural risk factors, and the psychopathological consequences of interpersonal violence. Throughout the article, areas where more research is needed are highlighted. It is concluded that evidence-based psychiatric and psychotherapeutic prevention, intervention and care programs that are tailored to the specific needs of athletes are needed to safeguard mental health in sports.

Keywords: abuse, athlete, interpersonal violence, post-traumatic stress disorder, sports

Introduction

High-profile cases of sexual abuse in sports, for instance in US gymnastics, have recently attracted considerable public attention. Although the mediatization also sparked research activities across several countries, reliable data on the prevalence of sexual abuse in sports (especially among elite athletes) are still scarce [1]. Moreover, research has so far mainly focused on sexual abuse (for a review, see [2]) and partly neglected other forms of interpersonal violence, such as physical and emotional abuse, that may also entail serious sequelae for athlete health [1].

Against this backdrop, the International Olympic Committee [3] and several groups of scientists (e.g. [4]) launched a call for international prevalence studies that are a key requisite for the development of prevention and intervention programs. In this article, we review what is already known on (a) the prevalence of different forms of interpersonal violence in sports, (b) personal, organizational and cultural risk factors for interpersonal violence, and (c) the psychopathological consequences of interpersonal violence. In conclusion, we outline “what

we should do”: We describe psychiatric and psychotherapeutic prevention, intervention, and care programs that are urgently needed. Throughout this perspectives article, we also highlight “what we still need to know”, that is: Where more research is needed because prevention and intervention programs can only be efficacious if they are targeted and tailored to the specific conditions of interpersonal violence in sports.

Prevalence of athlete abuse

Early investigations into the prevalence of interpersonal violence in sports mainly focused on *sexual abuse* of female athletes by male coaches [1]. Due to differences in methodology (e.g., age groups; incidence or life-time prevalence; definitions of sexual violence; response rates), estimates of sexual violence and abuse varied widely between 2 and 50% [5]. In line with research into adverse childhood experiences (ACEs) outside of sports (e.g., [6]), other forms of interpersonal violence against athletes have more

recently been taken into account, namely physical abuse, psychological abuse, and neglect [4].

Physical abuse supposes physical contact with an athlete in the context of sports and comprises behaviors such as shaking, pushing, punching, hitting, choking, strangling, burning or stabbing an athlete [4]. *Psychological abuse* includes behaviors such as insulting, humiliating, ridiculing, rejecting, excluding, isolating, threatening to leave an athlete or threatening to hurt someone or something he/she likes [4]. *Neglect* may concern physical or psychological needs and is of particular importance for child athletes because coaches and other sports staff members often fulfill parental functions when taking care of them, especially during outdoor training or tournaments and competitions abroad [4, 7]. Physical neglect refers to a failure to supervise an athlete leading to physical problems or injuries, medical neglect refers to a failure to provide an athlete with necessary medical care, emotional neglect refers to a failure to supervise an athlete, thereby increasing the risk of physical, sexual or psychological violence, and educational neglect refers to a failure to adequately support the school or professional career of the athlete [4].

Three quantitative studies involving large samples have as yet investigated the prevalence of psychological, physical and sexual violence against athletes committed by peer athletes, coaches or other staff members. In a study conducted in the UK, more than 6,000 young athletes were surveyed about their experiences in organized sports before the age of 16 [8]. No fewer than 75% of the athletes reported incidents of emotional abuse, 24% physical abuse, 29% sexual harassment, and 3% sexual harm. In a study conducted in Belgium and the Netherlands, more than 4,000 adults were surveyed about their experiences in youth sports [9]. Results indicated that 44% of the adults had experienced at least one form of abuse, with 38% reporting incidents of psychological violence, 11% physical violence, and 14% sexual violence. In a more recent study conducted in the Netherlands, Belgium (Flanders), and Germany, 1,665 elite athletes were surveyed about their experiences in organized sports [1]. Results revealed a lifetime prevalence of 71.9% for psychological abuse, 24.8% for physical abuse, and 30.6% for sexual abuse. 13% of the respondents experienced all three types of interpersonal violence. As Ohlert and colleagues [1] pointed out, the prevalence rates for athlete abuse are higher than those found in representative population samples, especially the prevalence rate for psychological violence. In a recent investigation in Germany, for instance, 20% of the respondents reported psychological abuse in childhood, 13% physical abuse and 14% sexual abuse [10]. In accord with other studies [9], the findings of Ohlert and colleagues [1] suggest that the context of elite sports is particularly conducive to interpersonal violence.

Risk factors for interpersonal violence against athletes

In a perspective of targeted and tailored prevention and intervention, it is important to identify the personal, organizational-institutional, and cultural factors that heighten the risk of interpersonal violence in sports. Two complementary research approaches may be distinguished in this respect: One that seeks to identify the factors that increase the risk of being exposed to interpersonal violence (*victim-focused approach*), and another one that seeks to identify the factors that increase the risk of committing interpersonal violence against athletes (*perpetrator-focused approach*). In Table 1, the risk factors of being exposed to interpersonal violence (*victim-focused approach*) are summarized.

Within the *victim-focused approach*, research on *personal risk factors* suggests that *gender* plays a role: Male athletes seem to be more at risk of experiencing physical violence, whereas female athletes seem to be more at risk of experiencing sexual violence [1, 9]. However, several authors hypothesized that it might be taboo for male victims to disclose sexual violence in strongly gendered settings such as sports, which might result in underreporting of such incidents [11, 12, 13, 14]. In support of this hypothesis, a survey of 480 athletes who participated at the World Athletics under 20 World Championships has recently found a higher prevalence of sexual abuse in men (12%) when compared to women (7% [15]).

Apart from gender, belonging to a *minority group* also represents a personal risk factor for being abused in sports. For instance, a retrospective survey of 4,043 adults who had participated in organized sports before the age of 18 found significantly higher prevalence rates of physical and sexual violence among respondents who belonged to ethnic minorities or who were lesbian/gay/bisexual (LGB; 9). In the same survey, remarkably high prevalence rates for physical, sexual and also psychological violence were also found among respondents with physical or mental disabilities ("para athletes"; for a review, see [16]).

Another personal risk factor relates to the *level of competition*. In the study of Vertommen and colleagues [9], for instance, respondents who had competed at an international level before the age of 18 reported a significantly higher prevalence of psychological, physical and sexual violence as compared with those who had engaged in sports as recreational activity. This finding is in line with previous studies on emotional and sexual abuse in sports [17, 18, 19]. Given that higher-level athletes spend more time with coaches and other staff members in training centers and at competitions far away from home, family and friends, it has been suggested these contextual factors increase the risk of being exposed to abusive behavior [2].

Table 1. Victim-focused approach: Personal, organizational-institutional, and cultural risk factors for interpersonal violence in sports

Personal risk factors	<div>Gender<ul style="list-style-type: none">• Male athletes: more at risk of physical violence• Female athletes: more at risk of sexual violence</div> <div>Minority groups<ul style="list-style-type: none">• Ethnic minorities• LGB athletes• Athletes with physical or mental disabilities (para-athletes)</div> <div>Level of competition<ul style="list-style-type: none">• International level before age of 18</div>
Organizational-institutional risk factors	<ul style="list-style-type: none">• Spatial, organizational, and communicative isolation of certain institutions• Power imbalance, e.g. between coaches, other staff members and athletes• Suspension of common social rules• Normalization of abusive behavior• Culture of silence• Lack of easily accessible reporting procedures and lack of violence and trauma-specific training of healthcare professionals
Cultural risk factors	<ul style="list-style-type: none">• National cultural factors• Sociological factors• Religious factors

As to *organizational-institutional risk factors*, the scientific literature suggests that several aspects of athletes' environment can play a role: The *spatial, organizational and communicative isolation of certain institutions* (e.g., training centers; [2, 12]); *power imbalance*, especially between coaches, other staff members and athletes [3, 20]; the *suspension of common social rules*, often legitimized by the search for peak performance [21, 22]; in a similar vein, the *normalization of abusive behavior* [23, 24]; and a widespread *culture of silence* [25]. A recent review suggests that the mentioned risk factors differentially impact the various forms of athlete abuse [26]: (i) Organizational tolerance and conformity with dominant values within sports enable psychological, physical and sexual violence; (ii) power imbalance enables psychological and sexual violence, the latter being also facilitated by isolation; and (iii) perceived instrumental effects within a performance-oriented training culture motivate psychological and physical violence. An additional organizational-institutional factor that facilitates abuse not only in the context of sports is the *lack of easily accessible reporting procedures and the lack of violence- and trauma-specific training of healthcare professionals* that leads to overlooking and underreporting actual cases of abuse [27].

Regarding *cultural risk factors*, preliminary empirical evidence suggests that the larger cultural context in which sport-related structures and activities are embedded may play a role in facilitating interpersonal violence against athletes. For instance, in one of the rare international studies on the prevalence of abuse in sports, Ohlert and colleagues [1] found that German athletes were more at risk of interpersonal violence than were their Dutch and

Flemish counterparts, except for severe sexual violence. As the authors point out, these results need to be interpreted with caution because methodological differences between the questionnaire studies (e.g., age of participants; time-frame of abuse) in the three mentioned cultural regions may at least in part account for the observed disparities in prevalence. Nevertheless, cultural differences in the prevalence of different forms of interpersonal violence may exist in the general population, as has recently been illustrated by surveys that show higher levels of psychological, physical and sexual abuse in Germany when compared with the Netherlands [10, 28]. In further support of this hypothesis, the earlier mentioned survey of 480 athletes who participated at the World Athletics under 20 World Championships found a higher prevalence of physical abuse among African and Asian respondents as well a higher prevalence of sexual abuse among Asian respondents [15]. As the authors of this study emphasize, more comparative international research is clearly warranted to gauge the impact of socio-economic, cultural and religious factors. More complete knowledge about these factors may inform the development prevention and intervention programs that are specifically tailored to regional habits and norms (e.g., educational practices in cultures with individualistic vs. collectivistic value orientation; [15]).

As mentioned at the beginning of this section, the victim-focused approach to risk factors for athlete abuse should be complemented a *perpetrator-focused approach*. Within the latter, research seeks to determine who (e.g., coaches, teammates, staff members) is statistically most prone to behave in abusive ways against athletes and which factors increase the risk of such behavior. As Vertommen and

colleagues [29] observed, remarkably little research has as yet been dedicated to perpetrator characteristics in sports and most early studies focused on sexual abuse of female athletes committed by male coaches, thereby neglecting other forms of interpersonal violence. In their pioneering study, these authors analyzed retrospective accounts of 1,785 adults in Belgium and the Netherlands on the experience of psychological, physical or sexual violence in sports before the age of 18. The key findings of this study were as follows: (i) The majority of respondents who had experienced psychological, physical or sexual violence reported more than one perpetrator (from 54% in physical violence to 70% in psychological violence); (ii) the majority of perpetrators were male (from 51% in psychological to 76% in sexual violence), with the exception of psychological violence directed against female athletes where the most common perpetrator profile was “several female athletes”; (iii) for all three types of interpersonal violence, the perpetrators were mainly peer athletes, a trend that had already been observed in earlier studies [8, 30, 31]; (iv) for all types of interpersonal violence, the severity of the reported incidents was rated as higher when more than one perpetrator was involved; and (v) while sexual violence and abuse was predominantly committed by “known others” (excluding coaches and peer athletes) in the sport organization, it was more severe if a coach was mentioned as perpetrator.

While research has moved beyond the initial focus on male coaches who sexually abuse female athletes and has taken into account other perpetrator profiles and forms of interpersonal violence, additional research is clearly needed, for example in-depth investigations into personality traits, offending strategies, and group dynamics [29]. Particular attention should be given to factors that create and maintain a culture of silence, which seems to be a central risk factor for sexual violence. As Hartill put it, “silence assists abusers [...] [i]t’s one of the things they require, they need silence” ([32], p. 32). There are several obstacles for disclosure of sexual violence, particularly for children, for example insecurity in the appraisal of what happened, feelings of guilt and shame, as well as fear of consequences for the sports career [2]. Systematic information of stakeholders (e.g., athletes, parents, coaching staff, board members) and integration of reporting and counselling structures in athletes’ environment are essential steps for “smashing the wall of silence” [4, 29]. However, prevention strategies that aim to encourage disclosure can only be effective if they can motivate victims of abuse to speak up. Independently of sports, a systematic review of recipients of disclosure of childhood sexual abuse has recently revealed that older children and adolescents preferentially turn to peers, keeping abuse largely hidden from adults [33]. If this finding can be replicated among child and adolescent athletes, prevention efforts should

pay particular attention to reaching out to those whom athletes trust most.

Psychiatric consequences

The consequences of interpersonal violence in humans can be devastating and vary in form, expression and severity. Based on the type of traumatic experience, different reactions can be expected. While traumatic events caused by humans carry a higher risk of entailing psychiatric sequelae, natural disasters are by comparison less likely to lead to a psychiatric disorder [34]. In sports, accidents happen and can lead to psychological disturbances and illnesses [35]. However, emotional, physical, and sexual abuse of athletes is very likely to have long-lasting and severe consequences on a physical and emotional level. An abundance of studies in the general population and in specific psychiatric populations have shown that traumatic experiences can lead to and increase a variety of somatic illnesses such as diabetes [36], hypertension [37], and cardiovascular disease [38]. The evidence appears to be even clearer when it comes to psychiatric disorders related to repeated traumatization. Single traumatic events are prone to cause acute stress disorders and posttraumatic stress disorders marked by the classical syndrome of intrusion, avoidance, negative alterations in cognitions and mood, and arousal and reactivity turbulence symptoms [39]. Chronic and complex traumatic events often lead to a different set of psychiatric sequelae, especially if they affect children and adolescents [40]. These ongoing and multiple traumas may entail complex posttraumatic stress disorder and other illnesses. Based on the ACE study, childhood abuse, neglect and household dysfunction have been connected to depressed mood, psychological distress, hallucinations, panic, and anxiety [41]. Despite a vast body of evidence indicating that mental health consequences of interpersonal violence are devastating and may lead to reduced performance and success, earlier retirement from sports, diminished self-esteem, body image disorders, disordered eating behaviors and eating disorders, substance use disorders, depression, anxiety, self-harm and suicide [42], there is still a lack of studies in the specific context of sports [43]. Considering that many athletes are children, adolescents or young adults, the immediate and long-term consequences of adverse and potentially traumatizing experiences are concerning. In particular, a well-known consequence, deregulation of impulse control, can lead to an increase in risky behavior, thereby significantly increasing the risk of injuries, such as traumatic brain injuries [44, 45]. A study examining ACE in top athletes showed that those with higher ACE scores were more prone to somatization and behavioral

disorders than those with lower scores [46]. Also, psychological abuse in childhood correlated with long-standing, complex post-traumatic and dissociative symptoms [42]. These developmental paths might explain why some athletes, after repeated (re-)traumatization in adolescence and adulthood, suffering from complex trauma-related disorders, often in combination with additional emotional problems, start exhibiting loss of performance and might even terminate their careers [47, 48].

Traumatization of athletes can also lead through different and more indirect pathways to a variety of other psychiatric disorders. A study with alpine skiers showed that athletes were more likely to develop anxiety disorders after having witnessed other team members' injuries [49]. In contrast to the general population, trauma-related mental illnesses in athletes often appear masked, with somatization and avoidance behavior being the main characteristics [50]. In most cases, injuries that are supposedly treatment resistant or caused by overtraining might be the expression of an underlying traumatization [51]. The phenomenon of dissociation is central as a psychological defense and is particularly common among athletes. Dissociation is a psychological mechanisms that excludes traumatic memories from conscious processing. It may be an adaptive, active mental skill that athletes can use to improve performance in high-stress situations [52]. However, it may also reach pathological dimensions and might sometimes explain the willingness to use psychotropic substances and doping [42].

The reality of interpersonal violence and traumatic experiences in sports and their severe and devastating consequences for physical and mental health call for significant improvements in early detection, diagnosis, intervention, and corresponding research focused on psychiatric illnesses in the context of sports.

Conclusion: What do we need to know, and what should we do?

In light of the reviewed literature, it becomes clear that despite recent scientific advances we still need to know more about (i) the *prevalence of different forms of interpersonal violence in sports*, especially underreported forms of violence such as sexual abuse of boys [13, 53], (ii) *personal, organizational, and cultural risk factors for interpersonal violence in sports* [15, 22, 26], and (iii) the *psychiatric consequences of interpersonal violence in sports* [43]. Prevention and intervention programs can only be efficacious if they are targeted and tailored to the specific conditions of the different forms of abuse in sports. Therefore, a broad transnational research initiative is warranted and should

include all stakeholders and professionals in sports. In this context, it is paramount that sports associations and clubs address the problem and allow a critical examination of their structures and processes.

There is an urgent need for *prevention and intervention programs* (e.g. [54]) that incorporate existing knowledge about interpersonal violence in and outside of sports. Current initiatives and programs should be critically evaluated to determine whether they integrate the available knowledge and adopt a comprehensive interdisciplinary and interprofessional approach. Only if these conditions are fulfilled can the highest level of protection be granted to athletes. Psychiatric and clinical psychological expertise in the field of psychotraumatology is an indispensable prerequisite for any such program.

The same applies to dealing with psychological issues and illnesses as a result of interpersonal violence. The serious psychiatric consequences of athlete abuse require *psychiatric and psychological care by qualified specialists in safe settings*.

Call for papers

In the first issue of Sports Psychiatry 2023, we would like to address this important issue with a special topic "Interpersonal Violence in Sports".

We invite submission of manuscripts for publication in the 1st issue of Sports Psychiatry – Journal of Sports and Exercise Psychiatry 2023 [Sports Psychiatry. 2023;2(1)] entitled:

"Interpersonal Violence in Sports"

We welcome conceptual or empirical manuscripts, in particular papers that adopt an international approach to the topic. Original articles, reviews, meta-analyses, consensus statements, brief reports, or letters to the editor and commentaries may be submitted. Further information for authors may be found at www.hgf.io/spp.

Approximate timeline for submissions: Authors are invited to submit a full manuscript by **October 15, 2022**. An optional letter of intent should be emailed to ralph.schmidt@pukzh.ch. We anticipate that the issue will be published in the 1st quarter of 2023.

We are looking forward to your submissions!

Carla Edwards, M.D., Guest Editor

Ralph E. Schmidt, Ph.D., Guest Editor

Malte Christian Claussen, M.D., Editor-in-Chief

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Ralph E. Schmidt, PhD

Psychiatric University Hospital Zurich
Lenggstrasse 31
8032 Zurich
Switzerland
ralph.schmidt@pukzh.ch