Journal of Science and Medicine in Sport 23 (2020) 329–335

Contents lists available at ScienceDirect

Journal of Science and Medicine in Sport

journal homepage: www.elsevier.com/locate/jsams

Original research

The prevalence of mental health problems in elite athletes

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ARTICLE INFO

Article history:
Received 8 May 2019
Received in revised form 18 October 2019
Accepted 26 October 2019
Available online 2 November 2019

Keywords:
Psychiatric disorders
Help-seeking
Onset
Measurement

ABSTRACT

Objectives: The first aim was to examine mental health problems (MHP) in elite athletes addressing prevalence, sex-differences, onset, recurrent episodes, help-seeking, symptoms of specific disorders and previous psychiatric diagnoses. The second aim was to investigate if sport-specific instruments could indicate clinical levels of psychiatric symptoms.
Design: Cross-sectional survey.
Methods: Elite athletes representing different Swedish national teams and applying for a university scholarship (n = 333) answered a web-based survey. Females represented 58.9%. Mean age was 24.6(±3.1) years and 77.2% were individual- and 22.8% team-sport athletes.
Results: Lifetime prevalence of MHP was 51.7% (females 58.2%, males 42.3%). Point prevalence was 11.7% (females 13.8%, males 8.8%). Onset of first MHP episode peaked at age 19 with 50% of onsets between ages 17–21. Recurrent episodes were common, and females sought help more than males (females 37.8%, males 16.8%). Overall 19.5% reached the clinical cut-offs for symptoms of anxiety and/or depression (females 26.0%, males 10.2%). Previous psychiatric diagnoses existed among 8.1% (females 10.7%, males 4.4%). A depressive disorder, an eating disorder or a trauma and stress related disorder (self-reported as burnout) were most common. Finally, most sport-specific instruments (80%) demonstrated a fair diagnostic accuracy compared to clinically validated instruments.
Conclusions: Lifetime prevalence of MHP was reported by more than half of the athletes. Symptoms manifested in young age and recurrent episodes were common. Sport-specific instruments indicating when symptoms reach clinical levels are potentially useful for data summary purposes on a group level, but without sufficiently high sensitivity and specificity to be recommend for applied work with athletes.

Practical implications

- Many elite athletes suffer from mental health problems (MHP) and recurrent episodes are common. MHP are defined as psychiatric disorders and symptoms of psychological distress with a substantial impact on quality of life, causing functional impairment in work, social activities and other important areas of life for two weeks or longer. This is important knowledge for all stakeholders working in elite sport.
- Around 19 years of age; just after completing high school and moving from junior to senior competitions, seems to be a particularly vulnerable age for onset of MHP in elite athletes. Resources should be directed to detect early signs of MHP in this age group.
- Elite athletes seem to seek help for their MHP problems outside the medical teams of their national teams or clubs. This is important information, if elite athletes do not come to the medical team regarding their MHP; this does not naturally mean that these problems are not present.
- Sport specific burnout and competitive anxiety instruments could be helpful to indicate prevalence of clinical symptoms on a group level, but show insufficient sensitivity to be applied as a screening tool at the individual level.

1. Introduction

Athletes in elite sport face a unique mix of challenges. Overtraining, athlete burnout, injuries, and body weight focus are some risk factors for poor mental health.[1] However, traditional sport psychology is focused on optimizing performance in a presumably healthy population. Recently, mental health problems in elite sport

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https://doi.org/10.1016/j.jsams.2019.10.022
1440-2440/

have received increased attention, revealing the need for a broader mental health continuum.[1]

Different definitions of poor mental health exist. We define 'mental health problems' (MHP) to include both psychiatric disorders and symptoms of psychological distress having a substantial impact on quality of life, causing functional impairment in work, social activities and other important areas of life for two weeks or longer. However, the MHP may not be sufficiently specific or severe to fulfill a specific diagnostic criterion. The criteria of two weeks is required for many of the most common psychiatric diagnoses.[2] Defining an elite athlete is debated.[3] We include still active team or individual athletes with a history of national team representation during the last 3 years (senior or junior) from 63 different sports who also had applied for a university scholarship.

Various definitions and outcome measurements complicate comparisons between studies. Elite athletes seem to mirror the general population regarding prevalence of MHP.[4] Comorbidity is common[5] and females are in general at higher risk.[2] In France, where psychiatric evaluations and diagnostic interviews in elite athletes are mandatory by law, 17% experienced a psychiatric disorder within the last 6 months (females: 20.2%, males: 15.1%).[6] Most other studies are self-reported questionnaire data. In Australian elite athletes, 46.6% experienced symptoms of a psychiatric disorder within the last weeks (females: 53.4%, males: 38.7%).[7] In the United Kingdom (4 week prevalence) 47.8% meet the cut-off criteria for symptoms of a depression and/or an anxiety disorder (females: 54.1%, males: 42.9%).[8] The age span of peak performance also corresponds to the time many psychiatric disorders manifest.[9] In Sweden, 52% of the individuals in the general population aged between 16–29 year old report anxiety related problems. This was a 10% increase in this age group from 2006 to 2018.[10] To our knowledge, no studies exist on recurring episodes of MHP or age of onset in elite sport.

A risk for mistaking depression as athlete burnout and vice versa has been highlighted.[11] Athlete burnout is defined by physical and emotional exhaustion (EXH), sport devaluation (DEV) and a reduced sense of accomplishment (RA).[12] Furthermore, the distinction between depression and athlete burnout is described as conceptually fragile and unclear.[5,13] Women are typically overrepresented with respect to diagnoses of depression, while athlete burnout scores tend to be comparable between sexes.[14] Overtraining syndrome (OTS) is described as a precursor to athlete burnout, characterized by under-performance for two weeks or longer that is best explained by hard training in combination with insufficient recovery.[15] A review on MHP in sport noted that anxiety research mainly focus on performance with limited attention to clinical aspects.[4]

Attention Deficit Hyperactivity Disorder (ADHD) in athletes is highlighted in the media, but the prevalence in sport is unknown.[1] Outside sport a systematic review found a pooled prevalence of 2.5% with more males affected and symptoms decreasing with older age.[16] Elite sport also contains stress and pressure to perform. Stress relates to the degree that challenges are perceived as unpredictable, uncontrollable, and overloading.[17] Harmful alcohol consumption could also affect mental health in elite sport, and may be higher in athletes compared to controls.[18] Athletes might also not seek help for MHP due to stigma and male athletes with masculine ideas seem particularly reluctant.[19]

Instruments in clinical psychology typically have defined cut-offs. Instruments in sport science such as the Athlete Burnout Questionnaire (ABQ) or the Competitive State Anxiety Inventory-2 (CSAI-2) lack validated cut-off criteria, and it is unclear if these instruments can measure symptoms indicating a psychiatric disorder.[20,21] A recent study addressing if ABQ could detect clinically relevant burnout symptoms compared to the Shirom-Melamed Burnout Questionnaire found it had insufficient diagnostic accuracy as a screening tool.[22]

The first aim of the present study is to investigate MHP in Swedish elite athletes addressing prevalence, symptoms of specific disorders and sex differences. Further, the study aims to address age of onset, number of recurrent episodes, help-seeking behavior and previous psychiatric diagnoses. A final aim is to investigate if sport specific instruments can indicate clinical levels of psychiatric symptoms.

2. Methods

Elite athletes representing the Swedish national team and applying for a university scholarship grant the years 2016–2017 or 2017–2018 answered a web-based questionnaire. Two rounds of applications were chosen to ensure power. Currently active individuals with national team representation (junior or senior within the last 3 years) and older than 18 years were eligible. Informed consent was obtained. In total 584 athletes were invited to participate, reaching around 19 % off the total population of elite athletes on a national team level in Sweden. They did not receive any compensation. The response rate was 60% and athletes no longer active (n = 19) were removed from further analyses, resulting in a final sample size of (n = 333) athletes. Data collection were between 5th of September and 18th of October 2017. The Regional Ethical Review Board, Stockholm, Sweden, approved the study (file-number: 2017/270-31/4). For questionnaire information including original references with validation and cut off scores, see Table 1. Swedish versions of these questionnaires previously translated for research and clinical work were used. Only two dimensions of CSAI-2 were used (som-A; cog-A) to reduce survey length. In Sweden, burnout related terms are commonly used in health care although they are not represented in the Diagnostic and Statistical Manual of mental disorders (DSM-5) or the International Statistical Classification of Diseases and Related Health Problems (ICD-10). The connotation of the term burnout is similar to symptom manifestation of adjustment disorder in DSM-5.[2,23] If athletes reported a prior psychiatric disorder related to burnout, they were clustered under trauma and stress related disorders (where adjustment disorder is included in DSM-5) with (burnout) in brackets to separate them from other disorders under the same classification such as Posttraumatic Stress Disorder (PTSD).[2] Information on questions regarding point- and lifetime prevalence of MHP, age of onset and number of recurrent episodes are found in Table 1.

The data are presented using descriptive statistical summary measures, including percentages and means. Chi-square (χ^2) tests were used for differences in distribution and t-tests and/or Mann-Whitney U tests for continuous variables to analyze sex differences. No missing data existed. Cronbach Alfa was used to evaluate internal consistency. Non-parametric receiver operating characteristics (ROC) curves were used to analyze if sport specific instruments could detect clinical symptoms. Sensitivity and specificity for all possible cut-off thresholds in CSAI-2 (som-A, cog-A) versus GAD-7 (cut-off $\geq$ = 10), and the three athlete burnout dimensions in ABQ versus PHQ-9 (cut-off $\geq$ = 10) were calculated. The area under the curve (AUC) was calculated to measure diagnostic accuracy using the clinically validated cut-off score as the gold standard diagnostic test. A perfect diagnostic test has an AUC of 1.0 and previously suggested thresholds for diagnostic accuracy categorize AUCs as; <0.70 poor, $\geq$0.70 fair, $\geq$0.80 good and $\geq$0.90 excellent. The Youden index was used to determine an empirical cut point estimate to maximize the AUC.[29] P-values <0.05 were considered statistically significant. Analyses were performed using Stata 14; StataCorp. 2015 and SPSS 24.0; IBM Corp. 2016.

Table 1
Questionnaire information and questions used to evaluate overall prevalence of MHP.

Measure	Items	Scoring (range)	Cut-off score	Internal consistency	Sensitivity
Generalized anxiety disorder 7-item scale GAD-7[24]	7	0–21	5 ≥ Mild 10 ≥ Moderate 15 ≥ Severe	0.92	89%
Competitive State Anxiety Inventory-2 CSAI-2[20]	9 cog-A 9 som-A	9–36	None None	0.79–0.83	–
Patient Health Questionnaire PHQ-9[25]	9	0–27	5 ≥ Mild 10 ≥ Moderate 15 ≥ Moderate/Severe 20 ≥ Severe	0.86–0.89	88%
Perceived Stress Scale 4 PSS-4[26]	4	0–16	None	0.77	–
Overtraining syndrome[15]	6	Yes–No	–	–	–
Athlete burnout questionnaire ABQ[21]	5 RA 5 EXH 5 DEV	5–25 5–25 5–25	None	0.70–0.91	–
Adult ADHD Self-Report Scale ASRS (Part A)[27]	6	0–24	17 ≥ likely ADHD 24 ≥ very likely ADHD	0.63–0.72	69–39%
Alcohol Use Disorders Identification Test (Short version) AUDIT-C[28]	3	0–12	Men: 5 ≥ at risk Women: 4 ≥ at risk	0.80	89%
Point prevalence of MHP	1	Yes–No	"Are you experiencing psychological suffering right now (daily for at least the last two weeks) so severe that you have obvious difficulties to function as usual in everyday life and/or in sports?		
Lifetime prevalence of MHP	1	Yes–No	Have you ever experienced psychological suffering (daily for at least two weeks) so severe that you had significant difficulties functioning as usual in everyday life and/or in sports?		
Age of onset	1	Age in years	If the participant answered "YES" on lifetime prevalence of MHP, they answered the following question: How old were you the first time you experienced an episode like that?		
Number of previous episodes	1	1, 2, more than 2	If the participant answered "YES" on lifetime prevalence of MHP, they answered the following question: How many times have you experienced episodes of MHP (daily for at least two weeks)?		

3. Results

Overall, 63 different sports were represented. The 13 most common sports made up 52.5% of the cohort and were athletics, cross-country skiing, handball, canoe, orienteering, alpine skiing, gymnastics, basketball, equestrian, power lifting, swimming, golf and sailing. The final cohort consisted of 22.8% team athletes (n = 76) and 77.2% individual athletes (n = 257) (see Supplementary Appendix 1).

Point prevalence of MHP was 11.7% (n = 39, females: 13.8%, males: 8.8%, $p_{\chi 2} = 0.22$), whereas the lifetime prevalence was 51.7% (n = 172, females: 58.2%, males: 42.3%, $p_{\chi 2} = 0.006$).

Mean age of onset was 19.2 years (median: 19, IQR: 17–21, range: 12–30). No sex difference was found (males: 19.1 years, females: 19.5 years, $p = 0.41$). In athletes with a history of MHP 24.4% reported 1 episode, 27.9% 2 episodes and 47.7% ≥3 episodes. In females (n = 114), 21.1% reported 1 episode, 28.1% 2 episodes and 50.9% ≥3 episodes, and in males (n = 58) 31.0%, 27.6% and 41.4% for 1, 2 and ≥3 episodes, respectively. This sex difference was not statistically significant $p = 0.15$.

Overall, 12.6% reached the cut-off for moderate symptoms of anxiety (GAD-7) and 4.2% reported severe symptoms (females: 16.8% and 5.6%, males: 6.6% and 2.2%, $p = 0.00$). Reaching the cut-off for moderate depressive symptoms (PHQ-9) were reported in 14.7% whereas 3.6% reported severe symptoms (females: 20.4% and 5.6%, males: 6.6% and 0.7%, $p < 0.001$) and 19.5% reached the moderate clinical cut-offs for symptoms of anxiety and/or depression (females: 26.0%, males: 10.2%) (Fig. 1). Comorbidity in terms of anxiety and depressive symptoms was present in 7.8% of the athletes. (Fig. 1).

Symptoms of ADHD (ASRS-v1.1) was 5.4% (females: 5.1%, males: 5.8%, $p_{\chi 2} = 0.96$). Hazardous drinking (AUDIT-C) was found in 25.8% (females: 24.5%, males: 27.7%, $p_{\chi 2} = 0.59$). Overall, 8.7% reported OTS (females: 8.2%, males: 9.5%, $p_{\chi 2} = 0.82$). The mean value, M, of athlete burnout (ABQ) in RA was 12.78(±4.30) (females: M = 13.26 (±4.40), males: M = 12.10 (±4.08)). The mean EXH scores was 12.05 (±4.11) overall, (females: M = 12.69 (±4.03), males: M = 11.14 (±4.06)). There was a significant sex difference in both these dimensions ($p \leq 0.01$). Regarding DEV the overall mean was 10.83 (±4.46) and no significant difference was observed between men and women (females: M = 11.02 (±4.35), males: M = 10.57 (±4.60)), $p = 0.36$) (Fig. 1).

Mean value in cognitive anxiety (cog-A) was 19.80 (±6.85) (females: M = 21.21 (±7.09), males: M = 17.77 (±5.94)). The somatic anxiety (som-A) mean was 18.20 (±5.66) (females: M = 18.99 (±5.77), males: M = 17.07 (±5.31). Both sex differences were statistically significant ($p \leq 0.01$). In perceived stress (PSS-4) the mean was M = 5.90(±2.93) and significantly different by sex (females: M = 6.26 (±3.06), males: M = 5.39 (±2.66)), $p = 0.01$) (Fig. 1).

Overall, 29.1% reported seeking help (females: 37.8%, males: 16.8%, $p_{\chi 2} = 0.00$). Most common was to contact a licensed psychologist/psychotherapist, a sport psychologist or a health care center. Athletes stating "other" mostly went to a school counselor or friends/family (Fig. 2a). A psychiatric diagnosis given by a licensed caregiver was self-reported in 8.1% (females: 10.7%, males: 4.4%, $p_{\chi 2} = 0.06$). Most common were depressive disorders, eating disorders or trauma and stress related disorders (burnout) (Fig. 2b). Among athletes who reported a previous or current diagnosis, 29.6% had received more than one.

The area under the ROC curve (AUC) for the cog-A and som-A dimensions of CSAI-2 with GAD-7(≥ = 10) as reference variable were 0.752(95% CI: 0.672–0.831) and 0.723(95% CI: 0.638–0.808) with no significant difference in diagnostic accuracy $p = 0.39$. An empirical cut point estimation to maximize the AUC showed an optimal cut-off of 19(J: 0.347) for som-A (with a sensitivity = 0.67 and specificity = 0.68, respectively) and 22(J: 0.416) for cog-A (sensitivity = 0.67 and specificity = 0.75). The AUC for ABQ dimensions with PHQ-9(≥ = 10) as reference were 0.772(95% CI: 0.697–0.848)

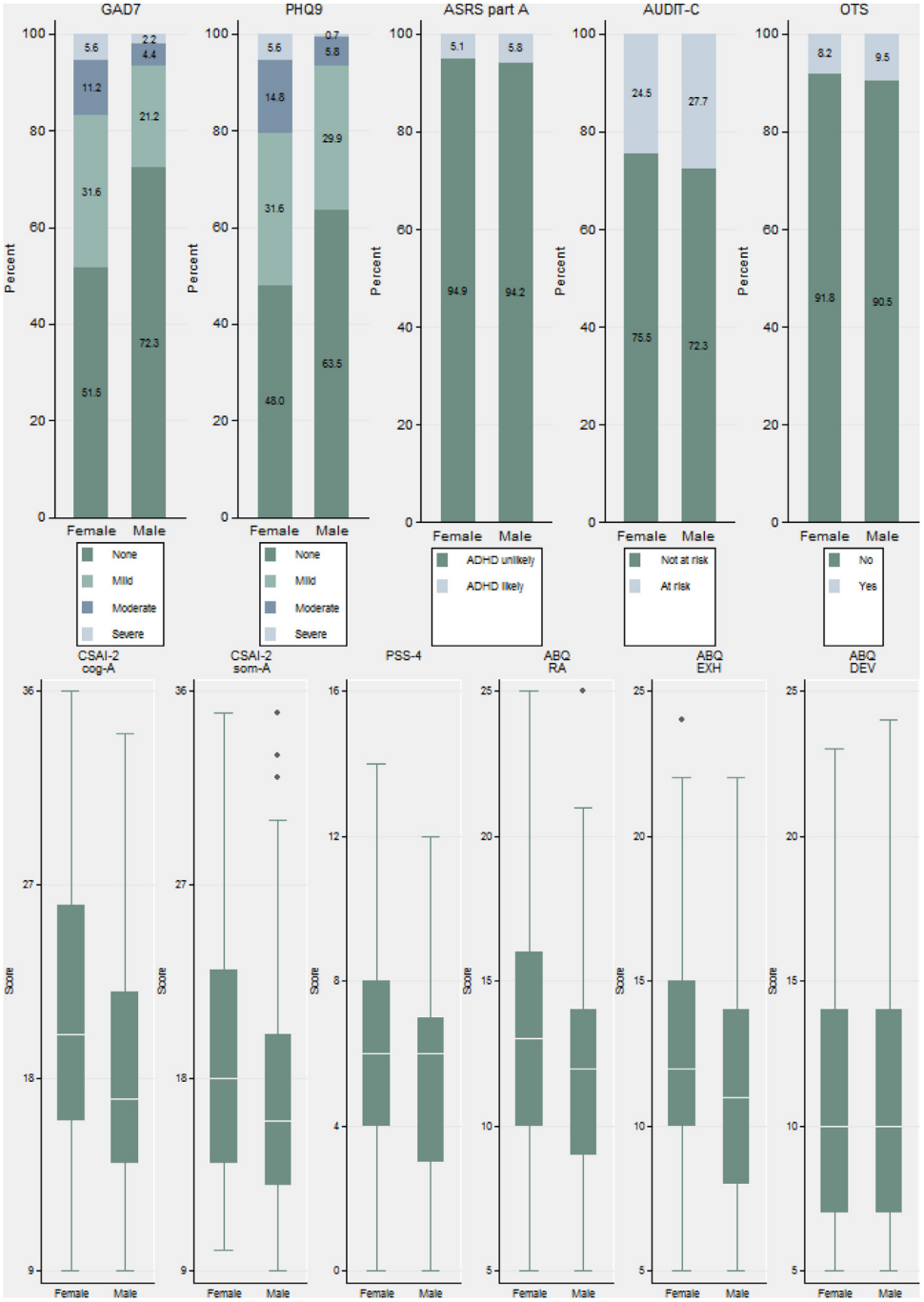

Fig. 1. Prevalence of symptoms of specific disorders and mean values of sport specific measures of MHP. GAD-7: anxiety symptoms, PHQ-9: depressive symptoms, ASRS part A: ADHD symptoms, AUDIT-C: drinking behavior, OTS: overtraining syndrome, CSAI-2: cognitive-anxiety, somatic-anxiety, ABQ; RA: reduced sense of accomplishment, EXH: emotional/physical exhaustion, DEV: sport devaluation.

for RA, 0.712(95% CI: 0.623–0.801) for EXH and 0.667(95% CI: 0.585–0.749) for DEV. The RA and EXH dimensions classified as having a fair diagnostic accuracy according to established thresholds. For these dimensions the AUC was also statistically higher as compared to the DEV dimension ($p = 0.00$). The Youden index indicated an optimal cut-off of 14(J: 0.410) for RA (sensitivity = 0.65 and specificity=0.76) and 13(J: 0.371) for EXH (sensitivity = 0.65 and specificity = 0.72) (Fig. 2c).

Having OTS (yes/no) was associated with poor diagnostic accuracy (AUC = 0.581) and had sensitivity = 0.23 and specificity = 0.93 compared to PHQ-9($\geq$ = 10).

4. Discussion

A key finding was that 47.6% of athletes with a history of MHP reported three or more episodes, and that first onset peaked around 19 years of age (with 50% of onsets between ages 17–21). Further, elite athletes seem to primarily seek help for their MHP outside the medical support connected to their national teams. The point prevalence of MHP among Swedish elite athletes based on self-reported data was 11.7%. Moreover, the lifetime prevalence of MHP was just over 50%. These results are in line with previous research in other countries.[4] No significant sex difference emerged in point prevalence of MHP but did in clinical symptoms of anxiety and

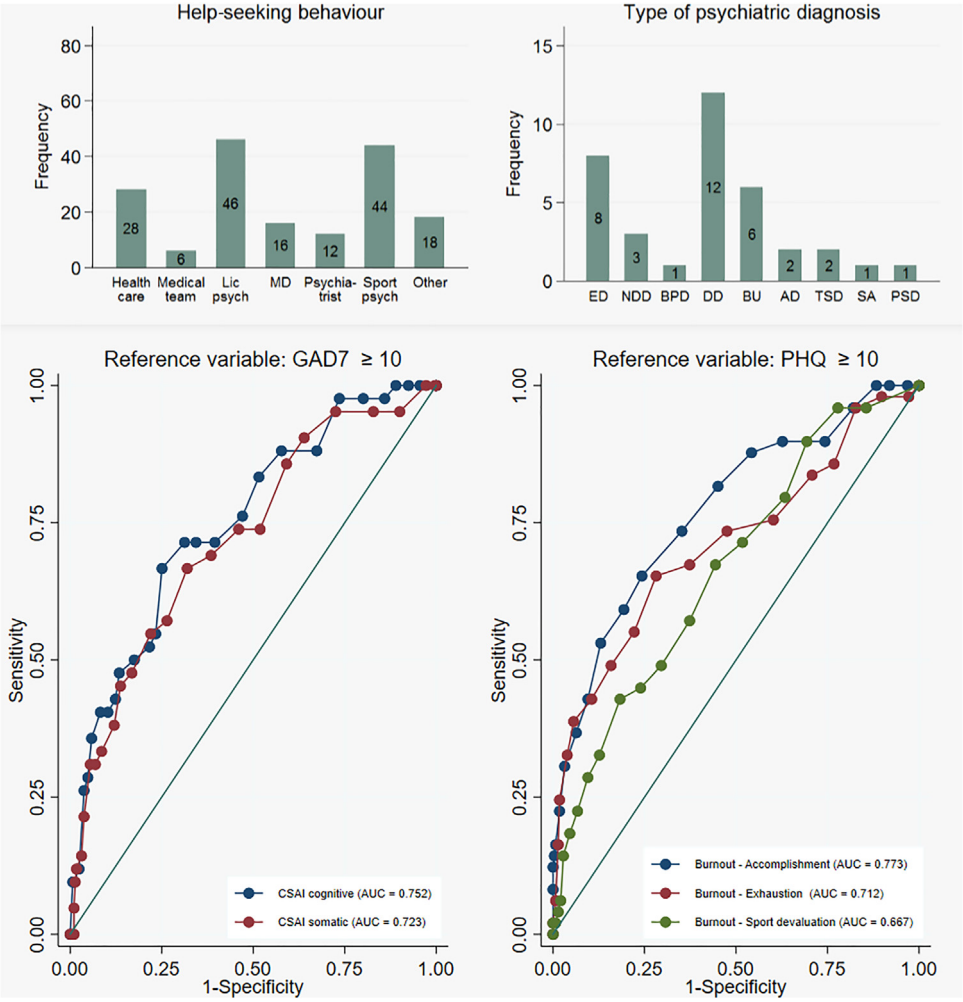

Fig. 2. (a) Help-seeking behavior; MD: medical doctor. (b) Type of prior diagnosis; ED: eating disorders, NDD: neurodevelopmental disorders, BPD: bipolar and related disorders, DD: depressive disorders, BU: burnout, AD: anxiety disorders, TSD: trauma and stress related disorders, SA: substance related and addictive disorders, PSD: psychosomatic diagnoses. (c) Non-parametric receiver operating characteristics (ROC) curves calculating the sensitivity/specificity pair for possible cut-off thresholds for the somatic and cognitive dimensions of CSAI-2 vs. GAD-7 (cut-off ≥10) and the burnout dimensions in ABQ vs. PHQ-9 (cut-off ≥ 10).

depression. The significant difference in lifetime prevalence of MHP between sexes could reflect a higher readiness among females to report prior episodes of MHP.[19] Direct comparisons with previous studies are difficult due to differences in type of prevalence, instruments and definitions of elite athletes.[1] It is therefore important to put previous research in context, and to be cautious in conclusions based on direct comparison. As an example, it is possible to mistake the lifetime prevalence of MHP in this study to be in agreement with previous studies from the United Kingdom and Australia, but these studies addressed point prevalence solely during the last few weeks and not lifetime prevalence.[7,8] Altogether, 50% of onsets occurred between the ages of 17–21 with a peak around 19 years. Consisting with at least two major life challenges (i.e., transitions), the end of high school and the end of junior competitions. This is important information for different stakeholders in sport. For example, better awareness among trainers who work close with their athletes could help them pay closer attention to signs and symptoms of MHP among their athletes during this vulnerable transition age. Moreover, relapses were common, 47.6% of athletes with a MHP history reported three or more episodes. This suggests that some athletes may be more vulnerable to MHP, but it also stresses the importance of prevention, efforts to facilitate help-seeking and early treatment, as well as a need to address these issues at every stage of an athlete's career. A limitation of the current study is that the length of recovery between the self-reported separate episodes of mental health problems was not specified. This prevented us from further investigating relapsing versus chronic episodes. The overall point prevalence of anxiety and/or depression was 19.5% (females: 26.0%, males: 10.2%). This was lower than the 34% reported in a recent meta-analysis based on 9 studies investigating anxiety and depression in currently active athletes from a variety of sports.[30] As previously noted, it is difficult to draw strong conclusions since different scales were used between studies.

Another observation is that the ADHD prevalence did not differ significantly by sex, contradicting studies in the general population.[16] Moreover, in line with previous research no sex difference emerged regarding harmful drinking.[18] However, the low internal consistency (0.539) of AUDIT-C in the present study calls for some caution.

A previous or current psychiatric diagnosis was reported by 8.1% (females: 10.7%, males: 4.4%); this is in agreement with other studies in the general population showing that psychiatric disorders often manifest in young age.[2] The fact that depressive disorders, eating disorders and trauma and stress related disorders (burnout) stand out is also in line with previous research.[4] Eating disorders were prominent, and previous studies reported an overrepresentation of such problems in elite sport.[1] Few athletes reported an anxiety disorder, which is somewhat surprising since 16.8% of

females and 6.6% of males reached the moderate clinical cut-off for symptoms of anxiety (GAD-7). Anxiety is possibly normalized in elite sports even at clinical levels. Athletes typically seek help for performance anxiety from a less stigmatizing sport psychologist, that in Sweden mostly are specialized in optimal performance, with little clinical experience from psychiatric services. As a result symptoms of a general anxiety disorder may pass unrecognized.[19]

Almost one third of all athletes had sought help for MHP. Nevertheless, seeking help from a sport psychologist (who is usually not a licensed mental health provider in Sweden) was common. Few athletes approached the medical team of their club or national team, otherwise a common practice regarding physical injuries. Instead, elite athletes seem to seek help outside the sport context for MHP.[19] This is important information for all people supporting the health and wellbeing of athletes in elite sport. One explanation could be the stigma surrounding mental health problems in elite sport, especially in sports with a strong masculine norm.[19] A questionnaire cannot constitute a basis for a diagnostic assessment, without a clinical interview and the exclusion of differential diagnoses. However, we found it important to address the diagnostic accuracy of commonly used sport specific instruments, and to reflect on possible practical applications. In addition, cut-offs of sport specific instruments based on empirical data are lacking in research. Weighing sensitivity versus specificity for any instrument used as a screening tool requires careful consideration of the consequences of misclassification, i.e. false negatives and false positives. Based on clinical knowledge and discussion in the research team, we suggest that a clinically meaningful sensitivity required for a diagnostic test to be acceptable should be at least 90%. Our data did not support a cut-point that reached the required sensitivity without reducing specificity to less than 50%. Our findings are therefore in agreement with results from an earlier study suggesting that the determined cut-offs obtained through ROC analyses had insufficient diagnostic accuracy to be used as an individual-level screening tool for MHP among athletes.[22]

However, determining empirical cut-offs through maximizing the AUC could potentially be useful to provide a better basis for group summary measures in future studies. For example, if sport specific instruments are used to address prevalence, a calculated cut-off with a known fair AUC would be preferable to other methods with less of empirical ground e.g. to categorize a sample into three groups and stating the group with most elevated symptoms as the frequency of athlete burnout.[14] Lastly, there is a lack of studies addressing the usefulness of general psychiatric instruments of MHP in elite athletes. This combined with the lack of empirically based cut-offs in sport specific measures highlight an important area for further research on how to best assess and treat sport specific MHP.

Strengths of this study include the strict eligibility criteria, high response rate (60%) and the size of the cohort (n = 333). The broad scope of the study provides a first insight on questions previously not addressed in elite sport. The tradeoff with a broad, descriptive and hypothesis generating study is that more research is needed to confirm or dismiss the results.

Participating athletes were all active on elite level with a history of national team representation (junior or senior) during the last 3 years. However, only national team athletes who had applied for a scholarship in connection to university studies were included. The latter inclusion criteria introduces a selection mechanism that likely limits the generalizability of the study findings beyond countries in Scandinavia and Europe (and potentially North America) with similar athletic culture and socioeconomic possibilities. We believe that this is particularly important with regards to the point prevalence. However, with respect to the Swedish context, it is important to recognize that that almost 20% of the total population of national team athletes in the Swedish sport federation (RF) were invited to the study, and that the response rate was high (60%).

Another possible limitation is recall bias and lack of knowledge regarding previous diagnoses. These results were based on an open question in which the athletes were writing down their previous diagnoses, possibly resulting in an underreporting of these results. In addition, neither this nor earlier cross-sectional studies include any comparison group. The complexity of MHP is hard to address solely with quantitative methodology and contributions from qualitative research is helpful to increase a broader understanding. Future research should include aspects of injuries, training volume, socio-environmental and genetic factors.

5. Conclusion

Athletes suffer from MHP. In elite athletes 50% face MHP sometime during their career and onset peak around 19 years of age with 50% of onsets between ages 17–21. Recurrent episodes are common and 47.6% of athletes with a MHP history reported three or more episodes. Elite athletes typically seek help for their MHP outside their sport specific contexts. To the authors' knowledge, this is the first study to address age of onset of MHP and recurrent episodes in elite athletes.

Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.jsams.2019.10.022.

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