



## Original research

## The mental health of Australian elite athletes



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## ABSTRACT

**Objectives:** Currently, little is known about the prevalence of mental disorders in athletes. This study aims to investigate Australian elite athletes' symptoms of general psychological distress and common mental disorders.

**Design:** A cross-sectional survey design was employed to assess self-reported symptom prevalence.

**Methods:** A total of 224 elite athletes (118 female, 106 male) from national sporting organisations in Australia were administered a self-report internet-based survey comprising measures of demographic status and mental health symptoms.

**Results:** Overall, 46.4% of athletes were experiencing symptoms of at least one of the mental health problems assessed. Percentages meeting criteria for mental disorders were similar to previous epidemiological studies of both international athlete and community samples: depression (27.2%), eating disorder (22.8%), general psychological distress (16.5%), social anxiety (14.7%), generalised anxiety disorder (7.1%), and panic disorder (4.5%). Injured athletes had higher levels of both symptoms of depression ( $t = 3.23$ ,  $p = .001$ ) and generalised anxiety disorder ( $t = 2.26$ ,  $p = .025$ ).

**Conclusions:** The level of symptoms of mental health problems reported by elite athletes appears similar to that observed in the community. However, caution must be exercised in interpreting the findings, as possible demographic differences between athletes and comparison population datasets may exist. Furthermore, self-selection of respondents in the present study may have reduced the representativeness of the sample and the validity of the comparisons. Athletes, particularly those currently injured, should be well-supported to seek help for mental disorders through access to mental health professionals.

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## 1. Introduction

The prevalence of mental disorders is greatest among younger people, with one-quarter of 16–34 year-olds meeting clinical criteria for one or more disorders.<sup>1</sup> These disorders include depression (characterised by low mood), generalised anxiety disorder (persistent worrying), social anxiety disorder (fear of social situations), panic disorder (presence and fear of panic attacks), and eating disorder (dysfunctional eating behaviours). However, despite most elite athletes falling within the younger age categories, and the potential for sport-related factors to influence vulnerability to mental health problems, little is known about the prevalence of symptoms of mental disorders within this group.<sup>2</sup> The limited data available suggests that elite athletes may experience

mental disorders such as depression, at a broadly similar rate to the general community. For example, a study of US college athletes ( $n = 257$ ) found that 19.2% of male and 25.6% of female athletes surveyed reported elevated symptoms of depression.<sup>3</sup> Community-based studies have yielded similar prevalence levels of 29.2% in a community sample of young people (18–25 years),<sup>4</sup> and 38.5% (male = 33.2%, female = 41.3%) in a college student sample (95% aged 18–25).<sup>5</sup> Moreover, research on French elite athletes found a 6-month prevalence rate of 6.0% (male = 5.2%, female = 7.5%) for generalised anxiety disorder (GAD) in athletes.<sup>6</sup>

Given their inherently high levels of physical activity and the putative link between exercise and positive mental health,<sup>7</sup> it is possible that athletes have lower rates of certain mental disorders such as depression than general community members. However, currently there is insufficient evidence to support this hypothesis,<sup>8</sup> and the prevalence of mental disorders remains under debate.<sup>9</sup> Conversely, it is plausible that a number of factors specific to elite athletes could increase their susceptibility to certain mental

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disorders. These include relocating for sport (especially for younger elite athletes),<sup>10</sup> exposure to sport-related stress,<sup>11</sup> and injury. Injuries in particular have been found to be associated with depression in athletes.<sup>12–14</sup> There is also evidence suggesting that athletes may have a higher prevalence rate for eating disorders compared to age and sex matched non-athletes,<sup>15</sup> and that those involved in aesthetic (e.g., gymnastics) and weight-dependent sports (boxing, wrestling) may be more at risk for these disorders than other sport types.<sup>15,16</sup> Studies have indicated that elite athletes may also be at a heightened risk for suicide, citing possible risk factors such as injury, pressure to win, substance abuse, and a comparatively early retirement from their professional career.<sup>17</sup> Whilst one recent study has documented the 6-month prevalence of anxiety disorders at 8.6% and depression at 3.6% for French elite athletes from a variety of sports,<sup>6</sup> further investigation of the prevalence of common mental disorders in elite athletes is required to enable a clearer understanding on the mental health needs of this group.

Therefore, the aim of this study was to investigate symptom levels of common mental disorders (depression, GAD, social anxiety disorder, panic disorder, eating disorder) and general psychological distress in an elite Australian athlete population. As symptom levels vary by gender, males and females were also examined separately. An additional aim was to examine injury and relocating for sport, two of the proposed risk factors listed above, as predictors for each disorder. Based on previous research it was expected that injured athletes would be more likely to experience depressive symptoms. All other investigations were exploratory.

## 2. Methods

Respondents were 224 elite athletes from the Australian Institute of Sport (AIS) and Australian sporting organisations funded by the Australian Sports Commission, who completed a self-report Internet-based survey comprising questions about a range of demographic variables and mental health symptoms. The survey took approximately 20–30 min to complete and was the first stage of a two-phase project involving a subsequent randomised controlled trial (see 18 for details). All online data collection was conducted using LimeSurvey ([www.limesurvey.org](http://www.limesurvey.org)), an open-source online survey application housed on a secure server at the Australian National University. Inclusion criteria were being aged 18 years or older and being an elite athlete, as defined by participants' level of competition (Olympic or Paralympic, professional, or state-, national-, or international-level athletes). An implicit inclusion criterion was that the respondents should be Internet and computer literate. Ethics approval for the study was granted by both the Australian Institute of Sport (AIS) ethics committee (20090808) and The Australian National University Human Research Ethics Committee (ANU HREC 2009/373).

Respondents were recruited through various means from November 2009 to February 2011. The primary methods were through recruitment emails distributed by the Director of the AIS to athletes aged 18 or older ( $n=407$ ) during March 2010 (recruitment wave 1) and by direct recruitment through elite sporting clubs (see 18 for further detail). In addition, one organisation arranged to send a text message to their athletes' mobile phones (January 2010) to indicate that they had been sent an All respondents were provided with a link to an anonymous online survey comprising the measures which they completed. The link to the survey took respondents to a web page where they were provided with information about the study (including that participation was voluntary) and where they were invited to provide consent by selecting a link "Yes, I would like to participate".

Of the 407 athletes aged 18 or more years and enrolled at the AIS at the time of recruitment, 104 elite athletes responded to the

invitation to participate in the survey (25.1% response rate from this sample). A further 124 athletes from other sports organisations completed the survey. Four respondents were excluded from the sample ( $n=228$ ): two indicated they were aged under 18 years, and two indicated that they were regional or recreational athletes. Therefore, the current study presents data collected from the remaining 224 elite athletes.

Demographic and characteristics data collected included age, relationship status, current injury status, whether the athlete had relocated for sport, highest level of education and whether the athlete was currently studying. Table 1 presents a description of the measures used, demonstrating adequate alpha levels, sensitivity and specificity for identifying cases of mental disorders for each measure. Full references for all measures and psychometric data are included in Supplementary Table 1.

Responses ( $K-10$  scores) from the athletes were compared with that of available data from young people in the general community from the 2011 to 12 Australian Health Survey.<sup>19</sup> The Australian Health Survey collected health information from stratified multistage area sample of private households from the Australian population during 2011–2012. Age-standardised estimates from the sample of young people aged 18–34 years from the 2011 to 12 Australian Health Survey (total  $N=20,500$ ) were used for comparison with the present study using  $z$  tests. Chi-square and  $t$ -tests were used to compare male and female respondents. In addition, linear regression was used to determine if injury (injured/non-injured) and relocating for sport (no relocation, relocated  $\leq 12$  months, relocated  $>12$  months) were predictors of symptoms of mental disorders, whilst controlling for age and gender.

## 3. Results

Table 2 presents the sample characteristics. Almost two-thirds (61.2%) of athletes were aged 18–25 years and only a small percentage (6.7%) were aged 35 years or older. Two-thirds (63.4%) of athletes were never married, 19.2% were de facto, 15.6% of athletes were married, and 1.8% were separated, widowed, or divorced. Overall, 40.2% of athletes did not have a postsecondary/tertiary education, 30.8% had a Bachelor's degree, 18.8% had an 'other certificate' or 'other' qualification, 4.0% had a higher degree, another 4.0% had an associate/undergraduate diploma, and 2.0% had a trade/apprenticeship.

Table 3 presents mean symptom levels, the percentages of those meeting the criteria (caseness) for each of the mental disorders, and prior help-seeking behaviour. Just under half of respondents met criteria for at least one mental health problem, and over half had sought help from a mental health professional for personal or emotional problems. Almost half of respondents had sought help from a psychologist with many fewer consulting general practitioners (GPs). General psychological distress ( $K-10$ ) scores for the present study were similar to the Australian Health Survey estimates except for females aged 18–24 years who had higher scores in the present study sample of elite athletes ( $z=2.50, p=.018$ ).

Linear regression models demonstrated that injured athletes had significantly higher symptoms of depression ( $t=3.23, p=.001$ ) and generalised anxiety ( $t=2.26, p=.025$ ) than non-injured athletes. Injury and relocation were not significantly associated with meeting criteria for any other disorder.

## 4. Discussion

The present study has demonstrated that just under half of respondents in this elite athlete sample met caseness for at least one mental health problem. Approximately one in five athletes in this group were experiencing significant levels of depressive

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