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Authors(s)	Drew, Breanna, Matthews, James
Publication date	2018-05-03
Publication information	Drew, Breanna, and James Matthews. "The Prevalence of Depressive and Anxiety Symptoms in Student-Athletes and the Relationship with Resilience and Help-Seeking Behavior." Human Kinetics, May 3, 2018. https://doi.org/10.1123/jcsp.2017-0043 .
Publisher	Human Kinetics
Item record/more information	http://hdl.handle.net/10197/9596
Publisher's version (DOI)	10.1123/jcsp.2017-0043

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Section: Original Research

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Journal: *Journal of Clinical Sport Psychology*

Acceptance Date: March 26, 2018

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DOI: <https://doi.org/10.1123/jcsp.2017-0043>

The Prevalence of Depressive and Anxiety Symptoms in Student-Athletes and the
Relationship with Resilience and Help-Seeking Behavior

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Abstract

The purpose of this study was to investigate the prevalence of depressive and anxiety symptoms within student-athletes and to examine protective factors which may act as a buffer against mental ill-health. A cross-sectional design was employed. A sample of 185 student-athletes ($M=20.77$; $SD= .50$; 35% female) agreed to take part. Participants completed measures of depression, anxiety, psychological resilience and formal and informal help-seeking behavior. Thirty one percent of student-athletes reported moderate to severe symptoms of depression and/or anxiety. Student-athletes who reported requiring professional help for problems were more likely to record moderate to severe symptoms of depression and anxiety. Student-athletes who did not seek informal support were more likely to report symptom levels for depression outside the normal range. Higher resilience scores were associated with lower symptom reporting for both depression and anxiety. Practical implications for supporting student-athletes' mental health across institutional, interpersonal and intrapersonal levels are discussed.

Keywords: Mental health, Student-athletes, Depression, Resilience, Help-seeking

Introduction

Mental health issues are a leading cause of health related burden for college students globally (Eisenberg, Hunt, & Speer, 2013; Patel, Boyce, Collins, Saxena, & Horton, 2011). Despite the educational and life opportunities that students can enjoy during their time at university, they experience mental ill-health at a level at least comparable to young adults in the general population (Larcombe et al., 2016). Indeed, the American College Health Association (2014) has reported that 37.4% of college students in the United States felt overwhelming anxiety within a 12 month period, while approximately one-third reported feeling so depressed that it was difficult to function. Within this collegiate cohort, student-athletes represent somewhat of a unique population who may be at increased risk of mental ill-health (Moreland, Coxe, & Yang, 2017). While the mental health of student-athletes is receiving increased international attention, there is a need to better understand student-athletes' mental health and importantly, what factors may act as a buffer to mental ill-health in this particular cohort.

Traditionally, it was believed that athletes were less likely to experience mental ill-health than the general population as participating in sport provided a protective effect, bestowing benefits such as boosting self-esteem and facilitating social connectedness (Matta Mello Portugal et al., 2013). However in recent years, this view has been challenged anecdotally and empirically suggesting that athletes are no less likely to experience mental ill-health than the general population (Gulliver, Griffiths, Mackinnon, Batterham, & Stanimirovic, 2015; Rice, Purcell, De Silva, Mawren, McGorry, & Parker, 2016). Athletes can experience numerous stressors within the sport setting such as, overtraining, coach pressure, expectations of peers and family, organisational demands, the fear of failure or the loss of athletic identity through injury or retirement (Fletcher & Hanton, 2003; Hammond, Gialloredo, Kubas, & Davis, 2013; Purvis, Gonsalves, & Deuster, 2010; Putukian, 2016; Rao & Hong, 2016; Stambulova,

Alfermann, Statler, & Cote, 2009; Weigand, Cohen, & Merenstein, 2013). Student-athletes not only face these stressors but also are expected to manage schedules which combine demanding academic workloads with training and competition schedules and have to navigate potential financial and social constraints (Brand, Wolff, & Hoyer, 2013; Sudano, Collins, & Miles, 2017). This combination of trying to perform on the playing field and in the classroom can put student-athletes under considerable additional pressure and increase their risk to mental ill-health (Moreland et al., 2017).

In recent years, there have been a small number of studies examining the symptoms of mental ill-health in student-athletes (Armstrong & Oomen-Early, 2009; Li, Moreland, Peek-Asa, & Yang, 2017; Proctor & Boan-Lenzo, 2010; Storch, Storch, Killiany, & Roberti, 2005; Wolanin, Hong, Marks, Panchoo, & Gross, 2016; Yang, Peek-Asa, Corlette, Cheng, Foster, & Albright, 2007). However, there has been inconsistency in study findings (Newman, Howells, & Fletcher, 2016) with some studies reporting similar rates of depression in student-athletes as compared to the general college population (Storch et al., 2005; Wolanin et al., 2016, Yang et al., 2007) whereas other have suggested that student-athletes have lower levels of depression than non-athletes (Armstrong et al., 2009, Proctor & Boan-Lenzo, 2010). Indeed for anxiety, a small number of studies also suggest that student-athletes report lower levels of anxiety than typical college students (Li et al., 2017; Yang et al., 2007). These variations in study findings may be due in part to a lack of consistency in the methodologies used or a poor understanding of the chosen screening tool (Rao & Hong, 2016). However, studies do typically highlight how female student-athletes are more likely to report elevated symptoms of mental ill-health than their male counterparts (Wolinan et al., 2016; Yang et al., 2007). Furthermore, Wolinan et al. (2016) highlighted how sport type may also influence the prevalence of clinically relevant symptoms of mental ill-health, with student-athletes competing in individual sports such as track and field at increased risk. Studies that have reported lower rates of mental ill-health in

student-athletes have posited social support as a reason for this finding, as a supportive interpersonal interaction might be more readily accessible within a team sport environment and thus may act as a protective factor (Armstrong et al., 2009; Proctor & Boan-Lenzo, 2010). Due to these inconsistent findings there is a requirement to further explore the prevalence rates of depression and anxiety within student-athletes. Alongside this inconsistency in findings, few studies have sought to examine the prevalence of symptoms of mental ill-health and the protective factors which might act as a buffer to psychological distress in the same student-athlete cohort.

Psychosocial factors can help to protect young adults from mental ill-health (Patel, Flisher, Hetrick, & McGorry, 2007). One such factor is psychological resilience which can be defined as, “the role of mental processes and behaviors in promoting personal assets and protecting an individual from the potential negative effect of stressors” (Fletcher & Sarkar, 2012, p. 675). Using this definitional lens, resilience can be viewed as interacting with and influencing the stress process, from stressor appraisal and the meta-cognitive awareness of resulting emotions to the selection of coping strategies (Fletcher & Sarkar, 2013). Typically, research on resilience has tended to focus on specific qualities that enable individuals to function effectively in challenging circumstances. Consequently, there has been an increasing interest in resilience in the sport domain, ranging from identifying the factors that might predict resilience in this cohort, to how to make athletes more resilient to the stressors they face (Galli & Gonzalez, 2015). Although researchers have posited that resilience is inversely related to mental ill-health in athletes (Schall et al., 2011), there have been limited empirical studies examining this relationship (Hosseini & Besharat, 2010; Gucciardi, Jackson, Coulter, & Mallett, 2011). Furthermore, while college students with higher levels of resilience appear to perform better academically and have reduced mental health issues (Gerber et al., 2013; Hartley, 2011), the resilience of student-athletes who encounter both sporting and academic

demands has yet to be fully explored. Thus, there is a need to better understand the psychological resilience of student-athletes and the role it plays in protecting these athletes from mental ill-health.

Alongside resilience, a willingness and ability to engage in help-seeking is an important self-care behavior which can help to protect young adults from the negative effects of mental illness (Fallow & Bowles, 2001; Rickwood, Deane, Wilson, & Ciarrochi, 2005). This is an important consideration as the longer the duration of untreated illness, the poorer the outcomes of treatment tend to be for people with mental ill-health (Jorm, 2012). Unfortunately, few young people in and outside of tertiary education seek professional help for mental health issues (Rickwood et al., 2005; Salzar, Wick, & Rogers, 2008). Worryingly, there is evidence to suggest that student-athletes are even less likely to seek professional help than their non-athlete counterparts (Watson, 2005). Reasons for this reticence include not wanting to admit experiencing symptoms of mental ill-health, masculine gender norms, and the stigma associated with seeking help (Lopez & Levy, 2007; Moreland et al., 2017). Although, there are low levels of professional help-seeking, research in the wider student population has highlighted high levels of informal help-seeking behavior from friends and family which can act as buffer from mental health issues (Reavely, McCann, & Jorm, 2012). However, the concept of informal help-seeking behavior in student-athletes has yet to be explored. This is an importance consideration as there is a potential opportunity for teammates and coaches to be additional avenues for informal help-seeking for student -athletes who may be experiencing mental ill-health.

In summary, young people are disproportionately affected by mental health issues, with one in every four-to-five young people aged between 16-24 experiencing a mental disorder (Cannon et al., 2013; Kessler et al., 2007). Despite most student-athletes falling within this at-risk age category, and the potential for sport and academic factors to influence vulnerability to

mental ill-health, there is inconsistency within the literature as to the prevalence of symptoms within this cohort and a lack of knowledge of the protective factors which may act as a buffer to this psychological distress. Therefore, the aim of this study was twofold. First, to examine the symptoms of mental ill-health in a population of student-athletes from a single university and two, to examine the association with resilience and formal and informal help-seeking behaviors within that same cohort.

Method

Study Setting, Design and Ethics

The study was undertaken in 2016 at a large university in Ireland, listed in the top 200 universities globally (Quacquarelli Symonds, 2016; Times Higher Education, 2016). There were over 27,800 students located on the main campus where the study took place. Of these, 53% were female students, 25% were international students and 8% of the undergraduate student population were classified socio-economically disadvantaged (as defined by the Government’s Central Statistics Office). With respect to sport, the university’s sports teams typically compete in the highest division of national competitions (and in some sports may compete in international competition as well). There is also an elite athlete academy as part of the university, which caters for student-athletes who are already competing at or who aim to compete at the highest level in their respective sports, for example, representing their country at the Olympic Games to playing professional rugby union. The study employed a cross-sectional design to assess self-reported symptom prevalence, resilience and help-seeking behavior. The study received ethical approval from the Human Research Ethics Committee of a university (LS-16-03-Matthews).

Participants

Participants were recruited through the university sport department and the elite athlete academy programme. Male and female student-athletes from a range of sports, who were over 18 years of age were invited to take part in the study. The sports represented in the study were the main sports that the university competed in. These included soccer, men’s Gaelic football and hurling, women’s Gaelic football and camogie,¹ rugby (men’s team only); hockey; basketball (men’s team only), track and field and swimming. A small number of male and female student-athletes from minority sports (e.g., golf, triathlon, canoeing, and equestrian) were also invited to part in the study via the university’s elite athlete academy programme. Of the 331 student-athletes who were approached to take part, 185 (M = 20.77 years of age; SD = 2.50; 35% female) met the criteria, agreed to participate and completed study measures, leading to a participation rate of 55.9%. Participants were classified into two categories based on the level of competition they competed at. The first category was, competitive student-athletes, those competing at national level competitions in their respective sports. The second category was elite student-athletes, those students who represented the university and who were also members of regional, state or national squads in their respective sports, at either elite development or elite senior level (see Table 1). Student athletes were not asked to report further characteristics such as the type of sport they engaged in. This was to encourage participation in the study and reduce fears regarding anonymity. For example, the reporting of sport type (e.g., track and field) and the level competed at (e.g., member of senior national squad) may have made some student-athletes identifiable and reduced participation in the study or

¹ Gaelic football is a team-based, contact field sport in which players carry, kick and hand pass a spherical ball. Hurling and camogie are team-based field sports which are played with a stick and ball. These sports are primarily played in Ireland.

increased impression management by the athletes in their responses to the study measures (Gross, Wolanin, Pess, & Hong, 2017).

Measures

Depression, anxiety and stress scale (DASS-21). This measure asks individuals to self-report the frequency and severity of the symptoms of depression, anxiety, and stress over the previous week (Lovibond & Lovibond, 1995). It comprises 21 items, seven for each of these three sub-scales. For this study, only the depression and anxiety subscales of the measure were used. Each item is scored on a 4-point Likert scale, from 0 (“*did not apply to me at all*”) to 3 (“*applied to me very much, or most of the time*”). Sample items include, “I couldn’t seem to experience any positive feeling at all” (depression) and “I felt I was close to panic” (anxiety). Using recommended cut-off scores, individuals are classified as displaying normal or elevated (i.e., outside the normal range) symptoms of depression or anxiety which can be further categorized into mild, moderate, severe, or very severe symptoms. These categories are not clinical classifications, and only provide an indication of the severity of symptoms for depression or anxiety. However, results in moderate to severe categories suggest that an individual is likely to be experiencing difficulties in daily functioning (Wong, Cheung, Chan, Ma, & Wa Tang, 2006). The reliability and validity of the measure has been demonstrated in adult populations (Henry & Crawford, 2005; Osman, Wong, Bagge, Freedenthal, Gutierrez, & Lozano, 2012) and also with student-athletes (Goodman, Kashdan, Mallard, & Schumann, 2014). In the present study both the depression ($\alpha = 0.87$) and the anxiety ($\alpha = 0.75$) subscales demonstrated adequate reliability.

Resilience. The Connor-Division Resilience Scale (CD-RISC; Campbell-Sills & Stein, 2007) measures participants’ self-reported ability to cope with adversity. The 10-item unidimensional version of the CD-RISC which was developed from the original scale

consisting of 25-items (Campbell-Sills & Stein, 2007) was used in the present study. Sample items include, “I think of myself as a strong person when dealing with life’s challenges or difficulties” and “I am able to adapt when change occurs”. These items are answered using a five-point Likert-type scale, ranging from 0 “*not true at all*” to 4 “*true nearly all of the time.*” This 10-item version of the measure has been shown to be reliable and valid with university students (Notario-Pacheco, Solera-Martínez, Serrano-Parra, Bartolomé-Gutiérrez, García-Campayo, & Martínez-Vizcaíno, 2011) and also with an athlete population (Gucciardi, Jackson, Coulter, & Mallett, 2011). The Cronbach alpha coefficient for this study was $\alpha = 0.85$.

Help-seeking behavior. Both formal and informal help-seeking behavior was assessed using measures from previous studies that have shown acceptable reliability (Dooley and Fitzgerald, 2014; Saunders, Resnick, Hoberman, & Blum, 1994). Formal help-seeking behavior was measured by asking participants, “Have you had any serious problems in the past year? For example, personal, emotional, behavioral problems that caused you considerable stress and you felt you would have benefited from professional help?” Participants were provided with four responses options, 1. ‘I have had few or no problems’; 2. ‘I have had some problems but I did not feel I needed professional help’; 3. ‘I have had some problems but I did not seek professional help although I thought I needed it’; and finally, 4. ‘I have had some problems and I did seek professional help’. In line with previous research, the analysis of this measure for the present study focused on participants who selected a response that indicated they had experienced a serious problem in the last year (i.e., second, third or fourth responses; Saunders et al., 1994). Informal help-seeking behavior was assessed by asking two questions, “when you have problems of a personal nature, do you talk about them with anyone”; and if the participant answered, yes, they then answered “if yes, who would you talk to, family member, friend, coach, team mate, or other person?”

Procedure

Following ethical approval, information letters were distributed to student-athletes from a range of university sports teams and from within the elite athlete academy during the second semester of the academic year. If student-athletes expressed an interest in taking part in the study and provided their consent, they were given the option of completing the questionnaire pack via an anonymous online survey tool or a hard copy version at a time convenient to them. If participants chose the hard copy version of the questionnaire pack, it was completed and placed in a sealed, addressed envelope to be collected by one of the study researchers. The questionnaire pack took approximately 15 minutes to complete.

Data analysis

Data analysis was performed using IBM SPSS V20. The data was initially screened for normality, and missing data. Any missing cases on the DASS sub-scales or resilience scale was imputed with the mean item response on the relevant scale for the participant. No cases were missing more than one item and the total number of cases with missing items was eight (4.3% of the total sample) (Downey & King, 1998). χ^2 analysis was conducted to examine any differences between participants meeting the category cut-offs for elevated symptoms (i.e., outside the normal range) of depression (≥ 10) and anxiety (≥ 8) and also for moderate to severe symptoms of depression (≥ 14) and anxiety (≥ 10). In addition, χ^2 analysis was used to determine differences in both formal and informal help-seeking behavior. Odds ratios were calculated to compare significant differences between groups. Finally, linear regression was used to determine if resilience was a predictor of the symptoms of anxiety and depression. Statistical significant was set at $p \leq 0.05$ for all analyses.

Results

The prevalence of student-athletes reporting elevated symptoms levels for depression and anxiety was, 27% ($n = 50$) and 34.1% ($n = 63$) respectively. More specifically, the percentage of students reporting moderate to severe levels of depressive symptoms was 16.2% ($n = 30$) and anxiety symptoms was 25.4% ($n = 47$) (see Table 2). The mean DASS -21 scores were 6.78 ($SD = 7.80$) for depression and 6.35 ($SD = 6.35$) for anxiety (see Table 3). There were no differences in symptom levels reported by student-athletes based on whether they completed a hard copy or an online version of the questionnaire pack (depression: $\chi^2(1) = 1.77$, $p = 0.18$; anxiety: $\chi^2(1) = 0.47$, $p = 0.83$). There were no significant differences between male and female student-athletes in the reporting of symptoms of either depression, (elevated symptom levels: $\chi^2(1) = 0.16$, $p = 0.69$; moderate to severe levels: $\chi^2(1) = 1.89$, $p = 0.17$) or anxiety, (elevated symptom levels: $\chi^2(1) = 0.24$, $p = 0.63$; moderate to severe levels: $\chi^2(1) = 0.61$, $p = 0.43$). However, trends indicated the female student-athletes reported higher levels of moderate to severe symptoms than male student-athletes (see Table 2 & Table 3). Elite student-athletes reported significantly higher levels of depressive symptoms than competitive student-athletes (elevated symptom levels: $\chi^2(1) = 7.76$, $p = 0.00$; moderate to severe symptom levels: $\chi^2(1) = 8.15$, $p = 0.00$). Elite student-athletes were 3.09 times (95% CI; 1.39 to 6.89) more likely to report moderate to severe symptoms of depression than competitive student-athletes. There were no differences between elite and competitive student-athletes for anxiety symptoms, (elevated symptom levels: $\chi^2(1) = 1.28$, $p = 0.26$); moderate to severe symptom levels: $\chi^2(1) = 1.15$, $p = 0.28$).

Twenty one percent of student-athletes ($n = 39$) reported that they needed professional health for serious problems in the past year. There were significant differences in the reporting of depression (elevated symptom levels: $\chi^2(1) = 9.64$, $p = 0.02$; moderate to severe symptom levels: $\chi^2(1) = 11.24$, $p = 0.00$) and anxiety related symptoms (elevated symptom levels: $\chi^2(1)$

= 2.05, $p = 0.15$; moderate to severe symptom levels: $\chi^2(1) = 6.33$, $p = 0.01$) between student-athletes who believed they needed professional help and student-athletes ($n = 70$) who had some problems but who believed they did not require professional help (see Table 3). Student-athletes who believed they needed professional help were 4.72 times (95% CIs: 1.83 to 12.16) more likely to report moderate to severe symptoms of depression and 2.89 times (95% CIs: 1.25 to 6.71) more likely to report moderate to severe symptoms of anxiety than student-athletes who believed they did not need professional help. Sixty-two percent ($n = 24$) of the student athletes who required professional help, did not seek this formal support. The reasons why these student-athletes did not obtain this professional help were not recorded.

Seventy eight percent of student-athletes ($n = 143$) reported speaking about their personal problems with someone. This informal help-seeking behavior led to some significant differences in the reporting of depressive symptoms (elevated symptom level: $\chi^2(1) = 5.44$, $p = 0.02$; moderate to severe levels, $\chi^2(1) = 1.23$, $p = 0.27$), with student-athletes who refrained from speaking about personal problems reporting elevated symptoms of depression. For anxiety related symptoms, there were no significant differences (elevated symptom level: $\chi^2(1) = 0.13$, $p = 0.72$; moderate to severe levels: $\chi^2(1) = 0.05$, $p = 0.83$). Students-athletes who did discuss their personal problems reported primarily speaking to a friend (44.8%, $n = 64$), a family member (35.7%, $n = 51$), a teammate (8.4%, $n = 12$), a coach (1.4%, $n = 2$) or another unspecified person (9.8%, $n = 14$). Male student-athletes were 6.86 times (95% CIs: 2.32 to 20.32) less likely to talk about their personal problems with someone than female athletes ($\chi^2(1) = 14.98$, $p = 0.00$).

For psychological resilience, there were gender differences with male student-athletes reporting higher levels of resilience than female student-athletes ($t(180) = 2.18$, $p = 0.03$). There were no significant differences in resilience levels between competitive and elite student-athletes ($t(183) = -0.75$, $p = 0.45$) and between student-athletes who reported requiring

professional help and student-athletes who did not require professional help ($t(58.29) = 1.72$, $p = 0.09$) (see Table 3). Finally, separate linear regression demonstrated that resilience was a significant predictor of both depression and anxiety symptoms, accounting for 8% and 12% of the variance in symptom scores respectively (see Table 4).

Discussion

The study aim was to examine the prevalence of depressive and anxiety symptoms in a population of student-athletes and to explore the association with the protective factors of help-seeking and psychological resilience. Overall, 45% of student-athletes reported symptoms of depression and/or anxiety outside the normal range. Student-athletes who required professional help for serious problems were more likely to report moderate to severe symptoms levels of mental ill-health. Most student-athletes engaged in informal help-seeking from friends and family, however those who did not, were more likely to report elevated symptom levels for depression. Male student-athletes were less likely to discuss personal problems than female student-athletes. Higher resilience scores were associated with lower reporting of depressive and anxiety symptoms.

The Prevalence of Depressive and Anxiety Symptoms in Student-Athletes

Thirty one percent of student-athletes reported moderate to severe symptoms of depression and/or anxiety, suggesting that mental ill-health is common in student-athletes. For depression, the findings appear to align with previous research that depression while common in student-athletes may occur less frequently than in non-athlete college students (Armstrong & Oomen-Early, 2009) For example, Proctor & Boan-Lenzo, (2010), reported that 29.4% of non-student-athletes surveyed met the criterion for possible depression compared with 15.6% of student-athletes. For anxiety, although there is limited research, the current findings mirror a recent study whereby 28% of student-athletes reported heightened anxiety (Li et al, 2017).

regional, state or national squad), there is likely to be considerable additional demands which may off-set any positive gains from engaging in sport. These extra stressors may put this subgroup of student-athletes at increased risk of mental ill-health. Indeed, the findings from the present study support this, with elite student-athletes at increased risk of moderate to severe symptoms of depression as compared to other student-athletes. Finally, the role of stigma must be considered when analysing these results. Stigma is a key barrier which can prevent young athletes from reporting mental ill-health or engaging in help-seeking (Gulliver, Griffiths, & Christenson, 2012; Proctor & Boan-Lenzo, 2010). This is particularly evident in male athletes where perceived public and self-stigmatising can be common (Steinfeldt & Steinfeldt, 2012). This may lead male student-athletes to perceive the reporting of mental ill-health as a sign of weakness or incompatible with the masculine norms associated with sport. Consequently, these athletes may engage in some form of impression management, presenting themselves in a way that is aligned with these perceived norms, and can lead to an under-reporting of mental ill-health. This is a relevant consideration for the present study where 65% of the sample consisted of male student-athletes. Future research should consider examining social desirability when examining mental ill-health in male student-athletes (Gross et al., 2017).

Formal and Informal Help-seeking Behavior

Engaging in help-seeking behaviors has been linked to lower levels of mental ill-health in young people (Rickwood et al. 2005). In the present study, 21% of student-athletes reported requiring professional support for serious problems in the past year. However, nearly two-thirds of these athletes did not obtain this professional support. This highlights how student-athletes may be reluctant to seek formal help (Kelly, et al., 2017; Watson, 2005). Once more, public and self-stigma can be a considerable barrier to student-athletes seeking formal help (Moreland et al., 2017). However in the present study, it is unknown as to whether the lack of

formal help-seeking was due to stigma or a lack of knowledge as to the appropriate mental health services available to the student-athletes. Future research should ensure to examine the reasons why student-athletes did not seek formal help.

Informal help-seeking is an important self-care behavior for student-athletes. There were high levels of informal help-seeking reported in the present study, with student-athletes who discussed problems with friends and family less likely to report depressive symptoms outside the normal range. While there has been limited research exploring informal help-seeking behavior in student-athletes, the findings from the present study align with research in young adult populations (Eisenberg et al., 2012; Reavely et al., 2012). The high levels of informal help-seeking and its association with lower levels of depressive symptoms indicate its importance as a practical and likely acceptable self-care behavior for student-athletes. This illustrates the potential need to promote informal help-seeking to students and to educate other students as to how to provide appropriate support to peers who are experiencing mental ill-health. Although a low number of student-athletes reported speaking with teammates or coaches, there could be an important role for these groups in providing support and fostering an open, caring and non-stigmatizing environment. This may be particularly important for male student-athletes who were significantly less likely to report speaking about personal problems than female athletes.

Psychological Resilience

Resilience consists of personal qualities that protect an individual from the negative effect of stressors and may prevent the onset of mental ill-health. The findings from the present study illustrate how psychological resilience appears to be associated with student-athlete mental health, with higher resilience scores related to lower reporting of depressive and anxiety symptoms. More specifically, psychological resilience predicted 8% and 11% of the variance

in depressive and anxiety symptoms respectively. These figures are similar to those obtained with adolescent populations (Hjemdal, Vogel, Solem, Hagen & Stiles, 2011). Although psychological resilience only predicts a small amount of variance in the symptoms of mental ill-health in student-athletes, it can be argued that this is still important as many of the personal qualities associated with psychological resilience are malleable, and can be learnt or developed overtime. As such, there is an increased need to develop ways and means for individuals to develop the personal qualities that promote resilience (Fletcher & Sarkar, 2012). Indeed, training programmes have been developed to do this in a range of different contexts such as the military, (Reivich, Seligman, & McBride, 2011); secondary education (Boniwell, & Ryan, 2012) and elite sport (Fletcher & Sarkar, 2016). These programmes typically focus on personal characteristics (e.g. optimism and self-regulation), a facilitative social environment (e.g. information rich feedback, encouragement of learning from mistakes) and adaptive cognitive processing (e.g., identifying negative thoughts and disputing or replacing). However, the efficacy of these programmes remains somewhat unknown and future research is required to evaluate these approaches using well- designed intervention studies.

Practical Implications

Overall, findings from the present study illustrate the need for university sport departments and student counselling services to increase the focus on mental health promotion for student-athletes. However, a unidimensional approach is unlikely to be an effective solution to mental ill-health in athletes (Fletcher & Sarkar, 2016). What is required is an ecologically based approach to mental health promotion which considers strategies across institutional, interpersonal and intrapersonal levels and how these strategies might interact (Sallis, Owen, & Fisher, 2008). At an institutional level, policies to support mental health screening for student-athletes could be introduced, with a particular focus on elite student-athletes. This might take

the form of “opt-out” mental health check-ups whereby student-athletes are automatically scheduled an appointment unless they actively “opt-out”, borrowing a concept from other health related behaviors such as organ donation (Eisenberg et al., 2012). At an interpersonal level, an appropriate strategy might to develop the mental health literacy of student-athletes’ coaches and teammates so they have the knowledge and skills to provide support and foster a caring environment. Indeed, there are promising mental health literacy interventions which have been developed and piloted in both collegiate and elite sport settings advocating the role of the teammates and coaches in mental health promotion (Gulliver et al., 2012; Sebbens, Hassmén, Crisp, & Wensley, 2016; Van Raalte, Cornelius, Andrews, Diehl & Brewer, 2015). Finally at an intrapersonal level, the development of training programmes to help strengthen student-athletes’ psychological resilience such as those described in the previous paragraph, would also be beneficial. Furthermore, an emphasis on building student-athletes’ knowledge of how to seek help and the practical aspects of this behavior (e.g., who to approach, how to make an appointment, what formal help might look like) should be an important part of any programme (Coyle, Gorczyński, & Gibson, 2017).

Study Limitations

There are study limitations which must be considered. First, a self-report measure was used to assess the symptoms of depression and anxiety in student-athletes, and only provides an indication of possible or likely mental ill-health. Therefore, future research should endeavour to use clinical interviews to assess the prevalence of mental ill-health in student-athletes (Gorczyński, Coyle, & Gibson, 2017). However, it must be noted that while the DASS-21 is not a diagnostic instrument, the rates of depression and anxiety symptoms of moderate severity or above are important to consider as symptom levels in this range are likely to lead to some impairment and may lead to student-athletes requiring attention from health-care

professionals (Wong et al., 2006). Second, the study took place in one university potentially limiting the generalizability of the results. Third, there were a limited number of female student-athletes (35%) who participated in the study and so, caution must be applied when considering the study findings in terms of female athletes. Furthermore, the classification of student-athletes must be considered. Although, all participants reported competing at least in national level competition in their respective sports, the standard of competition was likely to vary somewhat across sports. Fourth, the study was cross-sectional in nature and so causal relationships could not be established, future research should consider longitudinal studies. Finally, a number of participant characteristics were not captured in the present study, for example, ethnicity, the sport competed in, the year of undergraduate or postgraduate curriculum the student-athletes was engaged in, or the number of hours spent in educational- related activities. This was a pragmatic decision to try to ensure a high level of participation in the study and reduce fears regarding anonymity. The inclusion of some of these characteristics alongside age, gender, and the level competed at, may have made certain student-athletes identifiable and reduced study participation. However, it is acknowledged that this information would be very useful to obtain in some form in future studies, as it will help to further develop a profile of student-athletes who may be at increased risk of mental ill-health.

Conclusion

To the authors' knowledge, this is one of the few studies to capture the symptoms of mental ill-health, help-seeking behavior and psychological resilience in the same student-athlete cohort. Elevated symptom levels of depression and anxiety are common in student-athletes, with elite student-athletes at particular risk. Psychology resilience and help-seeking behavior are important psychosocial factors that buffer student-athletes from mental ill-health. A holistic approach to mental health promotion, of increased screening coupled with mental health

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Journal of Clinical Sport Psychology
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literacy programmes and resilience training may help student-athletes to manage the sporting and life stressors they face in a pro-active manner which facilitates mental well-being.

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Table 2 Prevalence of symptoms of depression and anxiety in student-athletes

	Elevated symptoms of depression DASS-D ≥ 10	Moderate to severe symptoms of depression DASS-D ≥ 14	Elevated symptoms of anxiety DASS-A ≥ 8	Moderate to severe symptoms of anxiety DASS-A ≥ 12	Odds ratio % moderate to severe symptoms of depression DASS-D ≥ 14 (95% CI)	Odds ratio % moderate to severe symptoms of anxiety DASS-A ≥ 12 (95% CI)
Overall (n=185)	27.0%	16.2%	34.1%	25.4%		
Gender						
Male (n=117) ^A	26.5%	13.7%	33.3%	23.9%		
Female (n=65)	29.2%	21.5%	36.9%	29.2%		
Competition level						
Competitive athlete (n=122)	20.5%	10.7%	36.9%	27.9%		
Elite athletes (n=63)	39.7%*	27.0%*	28.6%	20.6%	3.09 (1.39 to 6.89)	
Informal help-seeking behavior^B						
Does speak about personal problems (n=143)	23.0%	14.7%	33.6%	25.2%		
Does not speak about personal problems (n=41)	41.5%*	22.0%	36.6%	26.8%		
Formal help-seeking behavior^B						
Did not require professional help (n=70) ^C	24.3%	12.9%	37.1%	22.9%		
Required professional help (n=39)	53.8%*	41.0%*	51.3%	46.2%*	4.72 (1.83 to 12.16)	2.89 (1.25 to 6.71)
Required and sought professional help (n=15)	60.0%	46.7%	40.0%	40.0%		
Required professional help but did not seek it (n=24)	50.0%	37.5%	58.3%	50.0%		

Note: * $p \leq 0.05$; ^A Three participants reported their gender as “other” and therefore are included in the overall total category but excluded from the male and female categories; ^B The sum of numbers is unequal to overall sample size due to a missing value. ^C This refers to student-athletes who reported having some serious problems but who did not require professional help.

Table 3 Student-athletes’ mean scores for symptoms of depression, anxiety and resilience

	DASS – 21 Totals (SD)		Resilience Total (SD)
	Depression	Anxiety	
Overall (n= 185)	6.78 (7.80)	6.35 (6.55)	27.97 (6.21)
Competitive athletes (n=122)	5.95 (7.68)	6.46 (6.47)	28.21 (6.31)
Elite athletes (n= 63)	8.38 (7.85)*	6.14 (6.76)	27.49 (6.03)
Male athletes (n=117) ^A	6.33 (7.29)	6.16 (6.04)	28.73 (5.94)*
Female athletes (n=65)	7.72 (8.75)	6.78 (7.53)	26.66 (6.53)
Informal help-seeking behavior^B			
Does speak about personal problems (n=143)	6.06 (6.83)	6.22 (6.18)	28.34 (5.62)
Does not speak about personal problems (n= 41)	9.46 (10.09)*	6.95 (7.76)	26.38 (7.63)
Formal help-seeking behavior^B			
Did not require professional help (n=70) ^C	6.17 (6.46)	5.96 (4.98)	28.08 (5.35)
Required professional help (n=39)	12.26 (10.23)*	9.64 (9.39)*	25.67 (7.81)
Required professional help and sought it (n=15)	12.66 (8.23)	7.33 (7.12)	25.35 (8.33)
Required professional help but did not seek it (n=24)	12.00 (11.46)	11.09 (10.45)	25.88 (7.65)

Note: * $p \leq 0.05$; ^A Three participants reported their gender as “other” and therefore are included in the total but excluded from the male and female categories; ^B The sum of numbers is unequal to overall sample size due to a missing value. ^C This refers to student-athletes who reported having some serious problems but who did not require professional help.

Table 4 Summary of results with separate linear regression for the prediction of DASS-21 depression and anxiety by resilience

	DASS-21 Depression					DASS-21 Anxiety				
	F cha	R ²	β	t	p	F cha	R ²	β	t	p
Resilience (n=185)	15.78	0.08	-0.28	-3.97	0.00	23.81	0.12	-0.34	-4.88	0.00