



The prevalence of common mental health problems and associated psychosocial issues in elite swimmers

Harrison Howarth¹, Guy Evans², Pieter Kruger³, Evie Dilkes³, Gary Bell³, and Courtney Kipps⁴

¹Camden and Islington NHS Foundation Trust, St Pancras Hospital, London, United Kingdom

²Sports Science and Medicine Team, British Swimming, Loughborough, United Kingdom

³Cognacity, London, United Kingdom

⁴The Institute of Sport Exercise and Health and University College London, London, United Kingdom

Abstract: *Introduction:* The mental health of elite athletes has been recognised as of great importance. There have been relatively few studies examining the prevalence of mental health problems in swimmers. None have commented on the range of psychosocial problems associated with mental ill-health. The aim of this study was to identify the prevalence of common mental health problems and psychosocial problems in elite swimmers. *Methods:* The study was conducted on a national swimming squad competing at the international level. All athletes (n=55) were invited to participate. The response rate was 63.3% (n=36). The study was cross-sectional in design. Data was collected using a battery of psychometric tests yielding information on distress (The Distress Screener), anxiety and depression (PHQ-9, K10), sleep disturbance (PROMIS scale), alcohol consumption (AUDIT-C), smoking behaviour, adverse nutrition behaviour, career satisfaction (Career Satisfaction Scale) and mental toughness (Mental Toughness Index). *Results:* The prevalence of depression was 14% (n=5). Six percent (n=2) reported suicidal ideation in the last 2 weeks. Fourteen percent met criteria for distress. There were positive correlations between depression and sleep disturbance ($r=.343, p<.05$), between anxiety/depression and distress ($r=.380, p<.05$), and between depression and distress ($r=.531, p<.01$). Career dissatisfaction was identified in 46% of participants and was inversely correlated with mental toughness ($r=-.485, p<.01$). Low mental toughness and adverse alcohol use were identified in 37% and 23% of participants, respectively. *Conclusions:* Elite swimmers experience common mental illnesses and associated psychosocial problems. There is a relationship between career dissatisfaction and low mental toughness. Sport governing bodies should assess their own athlete populations and implement programmes to support mental health.

Keywords: mental health, elite swimmers, mental toughness, career satisfaction

Introduction

The mental health and wellbeing of elite athletes has been recognised as being of utmost importance [1]. The UK government has set the goal of achieving a 'psychologically underpinned environment which enables all to thrive at work' across all elite sporting teams by 2024 [2]. In order to develop a framework and structure to support elite athletes to maximise their mental wellbeing, sporting organisations must understand the extent of mental health problems within their specific sporting populations.

In the past decade, several studies have described a high prevalence of mental health symptoms among elite athletes [3–8]. Gulliver et al. found that 46% of elite Australian athletes experienced at least one mental health problem [8]. Similarly, Gouttebauge et al. found that 45% of current

and former elite Dutch athletes reported clinically significant symptoms of depression [4].

Much of the research into mental health in elite athletes is focussed on sporting populations competing in varying disciplines, yet data from one sport may not be applicable to others [9]. Sabiston et al. demonstrated a positive correlation between the number of years in team sport participation and lower depressive symptoms [10]. However, this positive correlation may not apply to individual sport participation. Swimming is, by its nature, primarily an individual sport. As such swimmers may be at higher risk of developing mental health problems than their team sport counterparts [11].

Despite this, few studies have explored the prevalence of mental health conditions in swimmers. In a study of Canadian swimmers competing to represent their country internationally, Hammond et al. found that the prevalence

of depression in the top 25% most elite swimmers was double that of the overall population of swimmers in the study [12]. A recent study by Mountjoy et al. found that a quarter of 2019 FINA World Championship aquatic athletes were classified as depressed [13].

Common mental illnesses are associated with broadly defined ‘psychosocial problems’, including alcohol misuse, poor nutrition, smoking and sleep disturbance, all of which could be detrimental to a swimmer’s performance [14–16]. To the best of our knowledge, no study has examined the prevalence of these associated problems in swimmers.

The aim of our study was to identify the prevalence of common mental health problems including distress, anxiety, depression and associated psychosocial problems in elite swimmers.

Methods

Participants and study design

All members of a national swimming squad were invited to participate in the cross-sectional study. The squad consisted of 55 swimmers, both male and female, ranging in age from 16 to 30. The ratio of males to females in the squad was approximately 50:50. The Chief Medical Officer explained the purpose and format of the study during a routine mental health workshop which all squad members were required to attend. After the event, attendees were emailed a link to an online psychometric test battery. Responses were collected anonymously via online survey with a generic link after informed consent was obtained. No identifiable data on participants was collected. Participants were able to opt-out of the study, and researchers had no way of identifying those who chose not to take part. Data was collected prior to the start of the COVID-19 pandemic, in winter when training is typically high aerobic volume with little competition or racing. Ethical approval was granted by University College London’s Research and Ethics Committee.

The anonymous nature of the responses prevented participants in distress from being identified by the researchers. As such, rigorous mental health reviews were conducted by the Chief Medical Officer in parallel, the outcomes of which are not part of this or any study. The psychometric battery also included practical advice for seeking help in crisis, and details of how to discuss mental health problems with the Chief Medical Officer in confidence.

Psychometric tests

We used a battery of psychometric tests selected for their validity, use in comparable studies, and ability to detect a range of symptoms and behaviours.

- The Distress Screener (three items on a three-point scale) is based on the Four-Dimensional Symptom Questionnaire [17], [18]. It was used to identify early signs of non-specific distress which are distinct from anxiety and depression. Possible scores range from 0–6, where a score of ≥ 4 indicates a threshold for distress met.
- The PHQ-9 (nine items on a four-point scale) is based on the DSM-IV diagnostic criteria for depression and asks about the participant’s experience in the last 2 weeks. Responses range from “0 – not at all” to “3 – nearly every day”. Possible scores range from 0–27, where a score of 8 indicates the threshold for Major Depressive Episode (MDE) is met. In the case that a respondent’s score was < 8 but answered ≥ 1 on question 9 (expression of suicide ideation) they automatically met the threshold for MDE.
- The K10 (ten items on a five-point scale) yields global measures of distress based on questions about anxiety and depression. Responses range from “0 – none of the time” to “4 – all of the time”. Possible scores range from 0–40, where a score of ≥ 20 indicates the threshold for anxiety/depression is met.
- Sleep disturbance was measured using the Patient Reported Outcomes Measurement Information System (PROMIS) scale. It consists of four items on a five-point scale. Participants are asked to rate their sleep quality according to four statements. Responses range from “0 – not at all” to “4 – very much”. Possible scores range from 0–20, where a score of 13, 16 and 20 indicates mild, moderate or severely disturbed sleep.
- Current alcohol consumption was determined using AUDIT-C (3 items on a five-point scale). Possible scores range from 0–12, where a score of ≥ 3 indicates a positive screen for alcohol misuse. Higher scores indicate a greater severity of alcohol misuse.
- To determine smoking behaviour a single question was asked “Do you smoke? Yes/No”.
- Adverse nutrition behaviour was assessed against 4 statements. The intent was to identify unhealthy eating patterns, as opposed to the presence of an eating disorder. Participants were asked to rate each statement from 0–7 indicating how many days of the week their behaviour matched the statement. Possible scores ranged from 0–28, where *consuming healthy meals* < 5 days per week, *eating regularly throughout the day* < 3 days per week, *having breakfast before 10:30* < 3 days per week and *having a final meal before 20:30* < 3 days per week collectively indicates the presence of adverse nutrition behaviour.
- Satisfaction with swimming as a career was assessed using the Career Satisfaction Scale (five items on a five-point scale). Participants rated their satisfaction against statements from “5 – strongly disagree” to “1 – strongly agree”. Possible scores range from 0–25, where scores of ≥ 10 indicates career dissatisfaction.

- Mental toughness can be thought of as a psychological reserve, allowing athletes to maintain high performance in the face of stresses which vary in frequency and severity [19]. The Mental Toughness Index is comprised of eight statements relating to mental toughness in sport [20]. It is scored from “0 – strongly disagree” to “4 – strongly agree”. Possible scores range from 0 to 32, where scores of ≤ 16 indicate low mental toughness.

Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25. Spearman’s rho was used to determine correlations between outcome measures. Statistical significance was set to $p < .05$ with 95% confidence intervals.

Results

A link to the psychometric test battery was sent by email to all 55 swimmers in the squad. 36 participants responded to the survey. Thirty-five respondents answered all questions, whilst one declined to participate. The total response rate was 63.3%.

Table 1 summarises the results of the psychometric screening tools. Whilst relatively few swimmers met criteria for depression (14%) and distress (14%), higher proportions reported low mental toughness (37%) and career dissatisfaction (46%).

Correlation coefficients (Spearman’s Rho) between mental health outcomes are shown in Table 2. A weak positive correlation was identified between sleep disturbance and depression ($r = .343, p < .05$), and between anxiety/depression and distress ($r = .380, p < .05$). A moderate positive correlation was identified between depression and distress ($r = .531, p < .01$). A weak negative correlation was identified between mental toughness and career satisfaction ($r = -.485, p < .01$). No other statistically significant correlations were identified between the outcomes measured.

Discussion

Anxiety and depression

The prevalence of anxiety and depression in the general population is estimated at 17-18% [21]. The prevalence of anxiety and depression in elite swimmers in this study ranged from 11% for anxiety/depression to 14% for depression. It appears that the elite swimmers in our

Table 1. Prevalence of psychological measures

Psychological measure	Frequency	Percent
PHQ-9		
MDE threshold met	5	14.3%
MDE threshold not met	30	85.7%
Suicidal ideation		
Suicidal ideation expressed	2	5.7%
No suicidal ideation	33	94.3%
Distress Screener		
Distress reaching threshold	5	14.3%
Distress not reaching threshold	30	85.7%
Career Satisfaction Scale		
Career dissatisfaction identified	16	45.7%
Career dissatisfaction not identified	19	54.3%
Mental Toughness Index		
Low mental toughness threshold met	13	37.1%
Low mental toughness threshold not met	22	54.3%
K10		
Anxiety/depression threshold met	4	11.4%
Anxiety/depression threshold not met	31	88.6%
Audit-C		
Adverse alcohol use present	8	22.9%
Adverse alcohol use absent	27	77.1%
PROMIS		
Disturbed sleep identified	4	11.4%
Disturbed sleep not identified	31	88.6%
Smoking behaviour		
Smoker	0	0%
Non-smoker	35	100%
Adverse nutrition behaviour		
Adverse nutrition behaviour present	0	0%
Adverse nutrition behaviour absent	35	100%

study had a moderately reduced risk of anxiety and depression compared with the general population.

Other studies examining elite swimmers have found higher rates of depression. Mountjoy et al. reported that 25% of aquatics athletes at the FINA world championships were classified as depressed [13]. A study of Canadian varsity swimmers, 68% met criteria for depression pre-competition, compared with 34% post-competition [12]. Both these studies were conducted in periods of intense competition, suggesting swimmers may be at higher risk of depressive symptoms during peak competition periods.

The prevalence of anxiety/depression in our study was also lower than that found in other elite sports groups. A cross-sectional study of professional footballers a 26% prevalence of anxiety/depression [22], whilst a study of US collegiate athletes found the prevalence of depression was 21% [23]. A study of Australian elite athletes across multiple sports found the prevalence of depression was 27% [8].

Table 2. Correlations between mental health outcomes

Variables	Sleep Disturbance	Alcohol Risk	Distress	Career Satisfaction	Anxiety/Depression	Depression
1. Sleep Disturbance	–					
2. Alcohol Risk	–.202	–				
3. Distress	.343*	.028	–			
4. Career Satisfaction	.271	.199	.090	–		
5. Anxiety/Depression	.307	.199	.380*	.083	–	
6. Depression	.335	.341	.531**	.130	.464**	–
7. Mental Toughness	–.222	–.127	–.274	–.485**	–.324	–.256

Notes. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Pluhar et al., in a cross-sectional study of child and adolescent athletes participating in a range of sports, concluded that individuals participating in team sports had lower rates of depression and anxiety than those in individual sports, but that both had lower rates than the general population [11]. However, it is not clear that these conclusions would apply to elite sporting populations. In their narrative systematic review, Rice et al. emphasised the need for further high quality research into the mental health of elite athletes [9].

Alcohol behaviours

In our study, 23% of swimmers screened positive for alcohol misuse. Thirty two per cent of men and 26% of women between the ages of 16 and 24 in England drink at increasing and higher risk levels [21]. Despite heavy drinking rates lower than the age-matched general population, levels of alcohol misuse remain surprisingly high given the competitive environment of the sport, where small margins can mean the difference between winning and losing. One may assume that swimmers would be cautious not to engage in activities which may affect their performance. Higher than average rates of alcohol use have been found in other elite sporting populations [24, 25], where the increased prevalence has been attributed to bingeing outside of competition periods [9]. The harmful effects of binge-drinking are well documented [26], and sports organisations with high levels of alcohol misuse may focus interventions in this area.

Suicidal ideation

Suicide has been highlighted as a specific concern amongst elite sporting populations [27]. The prevalence of suicidal ideation in our study (6%) was similar to that found in a study of Japanese top league rugby players, but was much higher than that found in a large study of French athletes [28, 29]. These differences are likely explained by the small sample size in our study. Nevertheless, it remains a cause

for concern as suicide is the most common cause of death for men and women in the UK between the ages of 10 and 34 and all participants in this study fall between these age ranges [30]. We were not able to identify those participants reporting suicidal ideation, as the protocol and ethical approval for this study required responses to be anonymised, however rigorous mental health screening was undertaken by the Chief Medical Officer in parallel to identify those with concerns.

Smoking and adverse nutrition

No participant in our study reported smoking or adverse nutrition behaviour. This is unsurprising considering either would likely be incompatible with elite performance and recovery. It should be noted that elite athletes appear to suffer eating disorders at higher rates than general populations [31], however our study aimed to identify patterns of unhealthy eating as opposed to clinical eating disorders.

Career satisfaction and mental toughness

A high prevalence of career dissatisfaction was identified amongst the elite swimmers in our study (46%). This finding is concerning given Foskett et al. identified career dissatisfaction as a risk factor for developing mental illness in elite athletes [32]. In our study we found no correlation between career satisfaction and anxiety/depression. We did however identify a negative correlation between career satisfaction and mental toughness ($r = -.485$, $p < .01$), suggesting those who are poorly satisfied with their career may be less well equipped to manage the inherent stresses involved with elite athleticism. Preventative interventions against the future development of mental illness in elite athletes may focus on improving individuals' satisfaction with their chosen career, or their psychological resilience (mental toughness) to the inherent stresses of the sport. It is, however, important to note that this is unlikely a panacea, and that mental toughness alone does

not equate to resilience to a multifactorial disease such as depression [33].

Limitations

The main limitation of this study was that it was conducted on a single squad at a single timepoint. The results presented should be interpreted with caution given the small study population. Future work could focus on tracking mental health symptoms over time and in response to specific psychological interventions. Furthermore, the response rate of this study was less than 100%, and as such there may have been selection bias in respondents.

Ethical approval was obtained on the basis of anonymity and an inability to collect person-identifiable data. Whilst it may be expected that anonymous evaluation enabled more candid answer behaviour, the confines of the ethics approval limited our ability to comment on the impact of age or gender on the prevalence of common mental health problems. In addition, it prevented participants scoring highly on measures of mental ill-health to be identified. Rigorous parallel mental health evaluation was undertaken alongside this study to identify swimmers who were struggling.

Conclusions

This study has shown that elite swimmers suffer with anxiety, depression, and alcohol misuse, though at rates lower than the general population and many other swimming and non-swimming sports organisations. Further research into how these problems vary over time would help clarify where resources to improve mental health should be focussed. Suicidal ideation at any level is of major concern, and efforts should be focussed towards managing acute psychiatric risk in elite sporting cohorts. Sports organisations should assess their own populations and implement robust clinical assessment and treatment programmes for their athletes.

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ORCID

Harrison Howarth

 <https://orcid.org/0000-0002-2023-6788>

Pieter Kruger

 <https://orcid.org/0000-0002-0504-3347>

Evie Dilkes

 <https://orcid.org/0000-0002-8223-6433>

Courtney Kipps

 <https://orcid.org/0000-0002-5087-9602>

Dr Harrison Howarth, MRCPsych

Camden and Islington NHS Foundation Trust

St Pancras Hospital

4 St Pancras Way

London NW1 0PE

United Kingdom

harrison.howarth@nhs.net