

PUBLISHED PAPERS

Physical and Mental Health in Male Professional Golfers Participating in the 2024 Hero Dubai Desert Classic on the DP World Tour: A Cross-Sectional Study of Injury, Illness and Mental Health Complaints

William Wynter Bee, M.D.^{1,2,3}, Georgios Machtsiras, Ph.D.^{3,4}, Astrid Junge, Ph.D.⁵, Margo Mountjoy, M.D. Ph.D.^{6,7}, Andrew Murray, M.D. Ph.D.^{3,4,8}, Debbie Palmer, Ph.D.^{3,4,9}, David Prossor, M.D.¹⁰, Stephen West, Ph.D.^{3,11,12}

¹ Institute for Sport, PE and Health Sciences, Moray House School of Education and Sport, University of Edinburgh, ² Oxford University Hospitals NHS Trust, ³ UK Collaborating Centre on Injury and Illness Prevention in Sport (UKCCIIS), University of Edinburgh and University of Bath, United Kingdom, ⁴ Institute for Sport, PE and Health Sciences, University of Edinburgh, ⁵ MSH Medical School Hamburg – University of Applied Sciences and Medical University, ⁶ Family medicine, McMaster University, ⁷ International Golf Federation (IGF), Lausanne, Switzerland, ⁸ Medical and Scientific Department, The R&A, St Andrews, United Kingdom, ⁹ Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Calgary, AB, Canada, ¹⁰ Cognacity, 22 Welbeck St, London W1G 8EF, London, United Kingdom, ¹¹ Sport Injury Prevention Research Centre, University of Calgary, ¹² Centre for Health, and Injury and Illness Prevention in Sport, University of Bath

Keywords: Injury, illness, golf, mental health, elite athletes.

<https://doi.org/10.64852/001c.156272>

International Journal of Golf Science

Vol. 14, Issue 1, 2026

This cross-sectional study surveyed 55 male professional golfers at the Hero Dubai Desert Classic to assess the injury, illness and mental health complaints, alongside training and competition environments. In the preceding four-weeks, 74.6% reported injury complaints, most prevalent were lumbar spine (25.5%), wrist (20.0%) and thoracic spine (20.0%), 44.9% reported illness complaints and 43.1% mental health complaints, most prevalent were anxiety (25.5%) and performance anxiety (21.6%). Injury was significantly ($\chi^2 = 5.9$, $P=0.015$) associated with greater need for psychotherapeutic support and the study suggests a link between injury and mental health problems and a need for enhanced mental health support.

INTRODUCTION

Golf is played by over 80 million players, in over two-thirds of countries (The R&A, 2024). It can provide moderate intensity physical activity, reduce sedentary time, improve physical and mental health (Luscombe et al., 2017; A. D. Murray et al., 2017) and help individuals meet World Health Organisation physical activity guidelines (WHO, 2020). However, injury and illness can occur (Williamson et al., 2024), so focusing on effective prevention and management is key to support health and optimise performance (Rogge, 2009).

Golfers are at moderate risk for injury and illness compared to other sports (A. D. Murray et al., 2017). A meta-analysis of golfers' injuries (Williamson et al., 2024) showed a 56.6% lifetime prevalence in amateurs and 73.5% in professionals, compared to a cohort of 368 Olympic athletes, which showed an average lifetime prevalence of 56.6% (Cooper et al., 2021). Professional golfers can compete for over 30 years, and the most common injuries are the hand and wrist (51.5%) followed by the lower back (40.9%) - both significantly more prevalent than in amateurs whose most common injury is the elbow (20.5%) (Williamson et al., 2024). A meta-analysis of professionals,

amateurs and golfers with a disability found an injury incidence of 2.5 injuries per 1000 athlete exposures (18 holes of golf) (Kuitunen & Ponkilainen, 2024). This high prevalence with low incidence may be related to the high number of hours golfers practice and compete (Williamson et al., 2024). Unfortunately, there is substantial heterogeneity in definitions and data collection methods (Williamson et al., 2024) however, the recent consensus statement on recording and reporting of injury and illnesses in golf should improve consistency (A. Murray et al., 2020).

Injury and illness research is limited in professional golfers, however at the 2022-World Amateur Teams Championship (WATC2022) four-week prevalence of injury and illness in 162 elite female amateur golfers was studied (Mountjoy, Schamasch, et al., 2024). This found 101 golfers (63.1%) experienced 186 injury complaints, most commonly in the lumbar spine/lower back, wrist and shoulders and the prevalence of illness and mental health complaints was 37.4% and 32.5%, respectively. A further study on 63 male touring professional golfers demonstrated a two-week prevalence of symptoms of psychological distress (52%), obsessive and compulsive disorder (28%), depression (10%), and anxiety (9%) with the majority (67%) not seeking psychological support (Hopley et al., 2022). Risk factors for professional golfers' poor mental health are loneliness, social isolation, and reduced social support (Fry & Bloyce, 2017). This finding is intuitive as the major male professional tours (Asian Tour, DP World Tour (DPWT), LIV Golf, and PGA Tour) require players to travel worldwide for many months, often away from friends and family. Furthermore, there appears to be a link between mental and physical health with studies in elite athletes highlighting musculoskeletal injury as a risk factor for mental health problems (Gouttebauge et al., 2016, 2017; Junge & Feddermann-Demont, 2016; Kiliç et al., 2018; Li et al., 2017; Mountjoy, Adriaens, et al., 2024; Putukian, 2016; Reardon et al., 2019; Rice et al., 2019; Wiese-Bjornstal, 2010; Wolanin et al., 2015).

Given the need to understand player health in this context, this study's primary aim was to assess the injury, illness, mental health complaints, and training/tournament environments reported by elite male professional golfers. Secondary aims explored differences between golfers with and without injury complaints in relation to participation in injury prevention exercises, mental health complaints and requirements for psychotherapeutic interventions.

METHODS

The Hero Dubai Desert Classic (HDDC) took place on 18–21 January 2024 in Dubai, United Arab Emirates (UAE). One hundred and twenty-six professional golfers on the DPWT participated. During the event week golfers were asked to review participant information, provide consent, and complete an anonymous online questionnaire. All 126 participants competing in the event were eligible and were invited to complete the questionnaire via a poster

with a QR code based primarily at the registration, but also further posters were positioned at various locations e.g. the café, player lounge and health and performance service areas to remind golfers to fill in the questionnaire.

The questionnaire (appendix 1) was based on the international consensus on recording and reporting injuries and illnesses in golf (A. Murray et al., 2020) and informed by the International Olympic Committee consensus for the surveillance of athlete mental health symptoms and disorders (Mountjoy et al., 2023), and was previously implemented at the WATC2022 (Mountjoy, Schamasch, et al., 2024). This method was selected as it was based on internationally recognised consensus statements, including best practice from the International Olympic Committee and facilitates comparison with other golf cohorts, and sports using the same methodology.

The questionnaire included baseline demographics, annual competition load, availability of support staff and presence and characteristics of musculoskeletal complaints or injury (referred to as “injury complaints”), other physical complaints or illnesses (referred to as “illness complaints” and mental health problems (referred to as “mental health [MH] complaints”) in the four-weeks before the event. To reduce questionnaire burden golfers were asked to just report their three worst injury complaints from a list of 22 in terms of location, if they were new, recurrent or chronic, if they were golf-related and how frequently they engaged in injury prevention exercises. For illness and MH complaints, a list of 9 and 25 symptoms or symptoms clusters, respectively was provided and golfers were asked to report all they had experienced. For MH complaints they were also asked to report any contributory factors and if they currently or previously required psychotherapeutic support. Participants were included in analysis if they completed the questionnaire sufficiently, as determined by if they completed the injury complaint questions.

Data was collected using Qualtrics (Seattle, USA) software with ethical approval from McMaster (HiREB#17114) and Edinburgh (WWBEE27032024) Universities. All data was processed using STATA (version SE 18.5) (StataCorp LLC, USA). Results are reported in accordance with the Strengthening Reporting of Observational Studies in Epidemiology (STROBE) guidelines and described using means with standard deviations/ranges or frequencies with percentage and data was assessed using histograms for normality of distribution.

Differences were analysed between golfers with and without injury complaints in relation to (a) the frequency of performing injury prevention exercises, (b) the presence of MH complaints, and (c) the need for psychotherapeutic intervention using Mann-Whitney U or χ^2 tests. An a-priori alpha value of $p \leq 0.05$ was deemed statistically significant.

Table 1. Golfer demographics

Demographic	Mean	
Age (n= 55)	32.0 years (SD = 5.5, range: 22-49).	
No. tournaments in last year (n = 54)	27.7 (SD = 5.5; range 9 – 41)	
CONTINENT / COUNTRY (n = 55)	Country of representation % (n)	Country living/training in % (n)
EUROPE	78.2% (43)	65.5% (36)
UK	29.1% (16)	21.8% (12)
France	9.1% (5)	5.5% (3)
Spain	10.9% (6)	7.3% (4)
Sweden	5.5% (3)	5.5% (3)
Germany	3.6% (2)	3.6% (2)
Denmark	3.6% (2)	3.6% (2)
Austria	5.5% (3)	3.6% (2)
Italy	5.5% (3)	3.6% (2)
Portugal	1.8% (1)	3.6% (2)
The Netherlands	1.8% (1)	1.8% (1)
Norway	1.8% (1)	1.8% (1)
Andora	0.0% (0)	1.8% (1)
Czech Republic	0.0% (0)	1.8% (1)
AFRICA	10.9% (6)	7.3% (4)
South Africa	10.9% (6)	7.3% (4)
NORTH AMERICA	5.5% (3)	16.4% (9)
USA	5.5% (3)	16.4% (9)
ASIA	3.6% (2)	9.1% (5)
China	1.8% (1)	1.8% (1)
United Arab Emirates	0.0% (0)	5.5% (3)
India	1.8% (1)	1.8% (1)
OCEANIA	1.8% (1)	1.8% (1)
New Zealand	1.8% (1)	1.8% (1)

n, number, %, percentage

RESULTS

Of the 126 golfers, 82 started the questionnaire with 55 completing the questionnaire sufficiently ie. answering the key injury complaint questions (response rate: 43.7%). The demographics ([Table1](#)) demonstrate a global field with players from five continents, with Europe being the most common (78.2%). Around one fifth (21.8%) live in countries different to their nationality, with the USA (n=6) being the most common country golfers moved to live/train followed by the UAE (n=3).

Injury complaints and illness complaints

Of the 55 golfers who responded, 41 golfers report at least one injury complaint, giving a prevalence of 74.6%. A total of 74 injury complaints were reported across all the golfers who responded, meaning a mean average of 1.3 (range: 0-3) injury complaints per golfer, noting the maximum number

of injury complaints they could report was three. The injury location with the highest prevalence was the lumbar spine/lower back (25.5%) followed by the wrist (20.0%) and thoracic spine (20.0%) ([Table 2](#)). Most (83.1%) were reported as being golf-related and 27.4% (n=20) as new onset, 49.3% (n=36) as recurrent after full recovery and 23.3% (n=17) as chronic. Most golfers reported engaging in injury prevention exercises very often (49.1%) or often (29.1%) as part of daily training, and only three (5.5%) stated they never engaged in injury prevention exercises. There was no significant difference between golfers with and without injury complaints in the frequency of performing injury prevention exercises (Mann-Whitney U, Z = -0.4, P-value = 0.7).

Of the golfers who responded (n=49), 44.9% (n=22) reported an illness complaint in the four-weeks prior to the tournament. In total, 26 were reported ([Table 2](#)), with the most prevalent being flu, sinusitis, cold, cough (20.4%) followed by allergy/hay fever (10.2%) and headache/migraine (8.2%).

Mental Health Complaints

Of the golfers who responded (n=51), 43.1% (n=22) reported MH complaints. In total, 60 MH complaints were reported ([Table 2](#)), corresponding to an average of 1.2 (range: 0-9) MH complaints per golfer. The most common was feeling anxious, nervous or on edge (25.5%, n=13) followed by performance anxiety (21.6%, n=11), sleeping problems (15.7%, n=8), feeling down, depressed or hopeless (13.7%, n=7) or unable to stop/control worry (13.7%, n=7). Of the 22 golfers reporting MH complaints, 50.0% (n=11) reported receiving no treatment, one saw a physician, and 50.0% (n=11) a psychologist or psychotherapist.

Of the 21 golfers who reported reasons for mental health complaints ([Table 3](#)), sports performance (e.g., perceived failure, pressures) was most frequent (81%, n=17), while injury (9.5%, n=2), illness (9.5%, n=2) and chronic pain (4.8%, n=1) were less frequent. MH complaints were more common in those with injury complaints with 19 (86.4%) of the 22 players reporting MH complaints also reporting injury complaints compared to only 18 (62.1%) of the 29 players without MH complaints, although this difference was not statistically significant (χ^2 - 3.7, P=0.054). Over half of golfers expressed the need for psychotherapeutic support, either previously 30.9% (n=17) or currently 25.5% (n=14). Significantly (χ^2 - 5.9, P=0.015) more golfers with injury complaints reported a need for current or previous psychotherapeutic support than golfers without injury complaints.

Competition Load and Training Environment

Most golfers rated their daily training environment (e.g. facilities/support staff) as very good (27.3%, n=15) or good (41.8%, n=23), a quarter as sufficient (25.5%, n=14), and 5.5% (n=3) as poor. Similarly at tournaments most rated it as very good (30.9%, n=17) or good (60.0%, n=33) with the rest rating it as sufficient (7.3%, n=4) or poor (1.8%, n=1).

Table 2. Prevalence of injury, illness and mental health complaints reported for the four weeks prior to participation

Injury complaints		Illness complaints		Mental health complaints	
Body Part	Prevalence (n = 55) % (n)	Type	Prevalence (n = 49) % (n)	Type	Prevalence (n = 51) % (n)
Overall	74.6% (41)	Overall	44.9 % (22)	Overall	43.1% (22)
Lumbar spine / lower back	25.5% (14)	Flu, influenza, sinusitis, cold, cough	20.4% (10)	Feeling anxious, nervous or on edge	25.5% (13)
Thoracic spine / upper back	20.0% (11)	Allergy / hay fever	10.2% (5)	Performance anxiety	21.6% (11)
Wrist	20.0% (11)	Headache/ migraine	8.2% (4)	Sleeping problems	15.7% (8)
Neck/ cervical spine	16.4% (9)	Fatigue/ lack of energy	6.1% (3)	Feeling down, depressed, or hopeless	13.7% (7)
Hip / groin	16.4% (9)	Other	4.1% (2)	Not able to stop or control worries	13.7% (7)
Shoulder (incl. clavicle)	14.5% (8)	Diarrhoea, nausea, vomiting	2.0 % (1)	Difficulties concentrating	5.9% (3)
Foot / toes	5.5% (3)	Asthma	2.0% (1)	Mood swings	5.9% (3)
Ankle	3.6% (2)			Little interest or pleasure in doing things	3.9% (2)
Hand	3.6% (2)			Irritability, anger, or tension with people	3.9% (2)
Chest / ribs	1.8% (1)			Phobia, i.e., excessive fear of an object or situation (e.g., flying)	2.0% (1)
Forearm	1.8% (1)			Panic attacks	2.0% (1)
Finger / thumb	1.8% (1)			Eating problems	2.0% (1)
Knee	1.8% (1)			Alcohol or drug misuse	2.0% (1)
Other	1.8% (1)			Social withdrawal	2.0% (1)
				Others	2.0% (1)

n, number, %, percentage

Table 3. Reported contributors to mental health complaints (n = 21)

Reason	Proportion of reported reasons % (n)
Sport performance (e.g., perceived failure, pressures)	81.0% (17)
Dissatisfaction with your sport career	28.6% (6)
Life outside of sport (e.g., problems in family/partnership, loss of a close person, finances)	23.8% (5)
Loneliness, isolation, low social support	14.2% (3)
Other aspects related to your sports environment (e.g., risk of injury, poor sport-life-balance)	14.2% (3)
Musculoskeletal Injury	9.5% (2)
Illness	9.5% (2)
Social media, or other media comments (e.g., harassment, bullying)	9.5% (2)
Chronic pain	4.8% (1)
Body weight, body shape or body image	4.8% (1)
Transitioning, or retiring from sport	4.8% (1)
Don't know	4.8% (1)

n, number, %, percentage

The reported availability of support staff ([Table 4](#)) showed consistent access to coaches, physiotherapists, masseuses and doctors in both the daily training environment and at tournaments. With regards to specialised physical trainers and mental health/psychologists, they were both less

Table 4. Availability of support staff in the daily training environments and during tournaments

Support Staff	Not available in daily training environment (n=55) % (n)	Not available at tournaments n=52 % (n)
Coach	3.6% (2)	5.7% (3)
Physiotherapist	7.3% (4)	3.9% (2)
Specialised trainer	9.1% (5)	26.9% (14)
Masseuse	12.7% (7)	11.5% (6)
Mental coach / psychologist	12.7% (7)	19.2% (10)
Physician / doctor	16.4% (9)	15.4% (8)
Nutritionist	40.0% (22)	40.4% (21)
Sports scientist	54.6% (31)	51.9% (27)

n, number, %, percentage

available at tournaments than in the daily training environment. Nutritionists and sports scientists were less available in both the daily training environment and at tournaments.

DISCUSSION

This novel study of top level, professional male golfers shows a significant burden of injuries, illness, and MH complaints and highlights the important potential relationship between physical and mental health.

Injury Complaints

For the four-weeks prior to the HDDC, 74.6% of golfers reported at least one injury complaint, which is slightly higher than the WATC2022 study in elite female amateurs (63.1%) (Mountjoy, Schamasch, et al., 2024). This could in part be related to a higher load reflected in the larger average number of tournaments (27.7 Vs. 15.9) played over the last year. Furthermore, this study's cohort were older with an average age of 32.0 compared to 20.0, which could contribute to a higher injury risk with longer exposure to repetitive sport activity (Robinson et al., 2024). This greater prevalence also aligns with research (Williamson et al., 2024) suggesting a higher lifetime injury prevalence in professional golfers (73.5%) compared to amateurs (56.6%). This research also cited hand and wrist and lower back injuries to be the most prevalent injuries in professionals with them being three times as likely to sustain injuries in these areas compared to amateurs. The high prevalence of lumbar spine/lower back injury is reflected in the current study with lumbar spine/lower back being the most prevalent injury and previous studies (Cabri et al., 2009; Gosheger et al., 2003; McHardy et al., 2007; Mountjoy, Adriaens, et al., 2024; Williamson et al., 2024)) have also suggested a relatively high prevalence of lower back injury.

This high prevalence is likely multifactorial but may be related to repeated biomechanical loading experienced during the golf swing (Cole & Grimshaw, 2016), associated with cumulative loading (Lindsay & Vandervoort, 2014). Other factors include the 'X-factor' (change in separation between hip and

shoulders at the top of the golf swing) and lateral flexion which is commonly seen in elite golfers and creates increased torque in the swing and may contribute to the higher levels of lower back injury in elite golfers (Cole & Grimshaw, 2009; Walker et al., 2018). A study of 3357 retired Olympians found a higher prevalence of lumbar spine pain in comparison to the general population (19.3% vs 12.3%; $p < 0.001$) suggesting that although lumbar spine/lower back pain is common in non-athletes, being an athlete may provide additional risk (Palmer et al., 2022).

The wrist was the second most prevalent (20.0%) injury and if combined with hand ($n=2$) and finger ($n=1$) injuries, it would have been as prevalent as lumbar spine/lower back injury (25.5%), which is consistent with research citing hand and wrist as the most prevalent injury in professional golfers with a lifetime prevalence of 51.5% (Williamson et al., 2024). It is not entirely clear why wrist injuries are so common in professional golfers however the engagement of forearm muscles and impact of the club on the ground during the swing to create a divot appears greater in professional golfers (Creighton et al., 2022; Farber et al., 2009) and may be a contributory factor alongside the repetitive nature and high volume of balls hit.

Most golfers reported either engaging in injury prevention exercises very often (49.1%) or often (29.1%) in contrast to the WATC2022 study that demonstrated half of golfers were performing injury prevention exercises “always” or “often” (Mountjoy, et al., 2024). Similarly to the WATC2022 study, there was no significant difference between golfers with and without injury complaints in the frequency of performing injury prevention exercises. There are multiple potential reasons for this finding including perhaps injured golfers being more likely to engage in prevention exercises and/or the chosen exercises being ineffective. It is worth noting the high training load in professional golfers may mean basic exercises don’t provide sufficient stimulus to prevent injury (A. Murray et al., 2023). There is limited golf-specific evidence to identify which exercises are efficacious in preventing injury, but it is suggested a focus on flexibility, strength, power, and swing training are important (Gladdines et al., 2022; Meira & Brumitt, 2010) and in non-golf specific research appropriate strength and conditioning has been shown to reduce injury risk in athletes (Lauersen et al., 2014, 2018). Interestingly specialised physical trainers at tournaments were reported as less commonly available and enhancing this may help provide appropriate strength and conditioning advice to support injury prevention.

Illness Complaints

Prevalence of illness complaints was higher than in the WATC2022 study (44.9% vs. 37.2%) (Mountjoy, Schamasch, et al., 2024). This may be partly explained by the higher prevalence (20.4% vs. 3.7%) reported for flu, sinusitis, cold, cough. This could reflect the timing of the events (January-HDDC vs. August-WATC2022), with most golfers coming from the northern hemisphere (i.e., winter), which has a greater burden of cold/flu viruses. Allergy/hay fever were frequently reported in this study and in the

WATC2022 cohort with prevalence rates of 10.2% and 10.5% respectively (Mountjoy, Schamasch, et al., 2024), which may reflect the outdoor nature of golf and consequent exposure to circulating environmental pollens.

Mental Health Complaints

MH complaints were common with a prevalence of 43.1%, with 25.5% of golfers feeling anxious, nervous, or on edge followed by 21.6% reporting performance anxiety, which is not surprising, given data was collected during preparation for a high stakes sporting competition. Sleep problems were reported by 15.7%, which could be attributed to the extensive travel schedule and frequent time zone crossings experienced in professional golf. For context, the DPWT annual tournament schedule includes 44 events, in 25 countries, on 5 continents. The prevalence of MH complaints was slightly higher in comparison to the WATC2022 cohort (32.5%) (Mountjoy, Schamasch, et al., 2024), with both studies most commonly reporting anxiety, low mood, and sleep disturbance (Hopley et al., 2022; Mountjoy, Schamasch, et al., 2024). This finding is also consistent with other athletic and non-athletic populations that cite anxiety and depression as the most prevalent mental health problems (Gouttebauge et al., 2019). Risk factors for poor mental health in professional golfers include loneliness, social isolation, and reduced social support (Fry & Bloyce, 2017). These risk factors are more likely greater in this study compared to the WATC2022 due to the larger number of competitions reportedly played in the last year (27.7(HDDC) vs. 15.9(WATC2022)) and consequent greater periods of time away on tour.

About a quarter of golfers (25.5%) in the present study reported a current need for psychotherapeutic support. This is higher than in other populations, including the elite female amateurs at the WATC2022 (17.9%) (Mountjoy, Schamasch, et al., 2024), elite aquatic athletes (15.9%) (Mountjoy et al., 2022) and elite female footballers (15.7%, 16.0%) (Junge & Prinz, 2019; Perry et al., 2022). Interestingly, golfers reporting injury complaints were significantly more likely to report the need for psychotherapeutic support, highlighting a possible association between MH and injury complaints. In fact, those with injury complaints often reported MH complaints with 19 (86.4%) of the 22 golfers identifying MH complaints also reporting at least one injury complaint, although this difference did not reach statistical significance. The association between injury and MH complaints is reported in the literature (Gouttebauge et al., 2016, 2017; Junge & Feddermann-Demont, 2016; Kiliç et al., 2018; Li et al., 2017; Mountjoy, Schamasch, et al., 2024; Putukian, 2016; Reardon et al., 2019; Rice et al., 2019; Wiese-Bjornstal, 2010; Wolanin et al., 2015 in other athlete populations.

While it is possible that injuries cause mental health problems, it is also feasible that having MH complaints makes athletes more likely to experience an injury and evolving literature does suggest a bidirectional relationship between injury and mental health (Andersen & Williams, 1988; Rogers et al., 2024).

The literature suggests symptoms of depression and anxiety can create a dysfunctional psychophysiological process. This can lead to alterations in arousal and muscle tension resulting in the loss of the normal physiological response to a competitive environment and reducing natural protective measures (Rogers et al., 2024). In addition, negative MH symptoms in athletes may also result in poor risk management skills and decision making, due to insufficient apprehension of a potential risk (Rogers et al., 2024). Furthermore, MH problems could result in communication breakdown between the golfer and their support network / coaching staff. This may disrupt prepared routines and shared decision-making that might usually help reduce injury risk and stop the golfer from pushing through an evolving problem.

It is therefore interesting to consider that strategies to prevent and reduce MH complaints might also reduce injury complaints and vice versa. This is supported by the literature with some studies suggesting that psychological interventions may reduce injury risk (Ericksen et al., 2022). This premise further highlights the need for a holistic approach to injury prevention and management, and re-iterates the importance of readily available psychotherapeutic support.

Interestingly, less than 10% (9.5%) of those reporting MH complaints reported musculoskeletal injury to be a contributory factor. This finding could indicate that golfers do not recognize MH complaints as a risk factor for injury, indicating an important knowledge gap to address with golfers and support staff to ensure attention is given to mental health alongside injury management. Other risk factors for MH complaints include reduced performance (Hammond et al., 2013; Prinz et al., 2016; Reardon et al., 2019; Wolanin et al., 2015), harassment/abuse (Mountjoy, Adriaens, et al., 2024) and transition from sport (e.g. retirement) (Grove et al., 1997; Reardon et al., 2019; Stephan et al., 2003; Wippert & Wippert, 2008, 2010; Wolanin et al., 2015). It is especially important at these times to implement mental health surveillance and ensure access to appropriate mental health support. Mental health surveillance through longitudinal monitoring strategies are integral to a robust athlete mental health support framework (Mountjoy et al., 2023) and proactive career planning for life after sport may also be beneficial (Prinz et al., 2016).

The daily training and tournament environment

Reassuringly, most golfers rated their daily training and tournament environments as 'good' or 'very good'. However, this study identified a significant prevalence of MH complaints, with mental coaches/psychologists being less commonly available at tournaments and over half of golfers expressing a need for psychotherapeutic support, which suggests the need for greater mental health support.

In elite sport, there are barriers to help-seeking (Gulliver et al., 2012; Hilliard et al., 2019; Wood et al., 2017) including, stigma, poor mental health literacy, lack of access, and busy schedules. Therefore, carefully curated

safe and supportive environments that are free from harassment/abuse, with clear pathways to access mental health support and education on developing mental resiliency skills, enhancing healthy lifestyle factors and early identification of mental health problems are key.

This study has informed service improvements on the DPWT including an increased focus on mental health literacy education, mental fitness areas at key tournaments, and improved access to mental health experts, including sports psychiatry and clinical psychology. Evaluation of the efficacy of these interventions is required.

Strengths and limitations

With a lack of research in elite professional golfers, this study provides important and novel insights, however the response rate of 43.7% could predispose to selection bias. The small sample size ($n=55$) could constrain the precision and generalisability of the results. A robust questionnaire was adapted from prior studies on golfers (Mountjoy, Schamasch, et al., 2024) and other athletes (Mountjoy et al., 2021, 2022; Prien et al., 2017), however, as with all questionnaires, there is potential for bias including recall bias, response bias, and social desirability bias. Furthermore, the questionnaire recorded complaints/symptoms rather than clinical diagnoses, which require clinical assessment. As data collection was during a tournament, severely injured or ill players may not have attended, so there may be an underestimation of health problems. Noting that this was a high-level tournament, which introduced a bespoke and novel mental health recovery zone, it is possible that these factors may have influenced player reporting of their mental health symptoms. Furthermore, the statistical analyses of injury and MH complaints, injury prevention exercises, and psychotherapeutic needs were univariate, therefore potential confounders were not accounted for.

CONCLUSIONS

This novel study highlights the significant prevalence of injury (74.5%), illness (44.9%) and MH (43.1%) complaints in this elite male professional golfer cohort alongside assessing the quality of their training/tournament environments. It also highlights an association between injury and mental health, and the need to continue to develop prevention and intervention strategies to reduce and manage injuries holistically, alongside enhancing mental health through educational initiatives, creating safe and supportive environments with clear pathways to access mental health support.

.....

Ethical approval

The study had ethical approval from McMaster University—Hamilton Integrated Research Ethics Board, Canada for data collection and The University of Edinburgh for data analysis

Corresponding Author:

Dr William Wynter Bee, MBChB, University of Edinburgh, Moray House School of Education and Sport The University of Edinburgh Holyrood Campus, Edinburgh EH8 8AQ. w.j.wynter-bee@sms.ed.ac.uk

Acknowledgements

The authors appreciate cooperation of all the athletes participating in the Hero Dubai Desert Classic in completing the questionnaire as well as the DP World Tour for facilitating the data collection at the event and prioritising player health and wellbeing.

Conflicts of Interest and Source of Funding

WWB, AM, MM have paid and unpaid roles supporting the care of professional and amateur golfers including with the DP World Tour, the International Golf Federation, The R&A and the Ladies European Tour. SW is a member of the DP World Tour medical and scientific advisory board, and DPr is part of the DP World Tour mental health and well-being team. GM, DPa and AJ report no conflicts of interest. This study was funded with support from The R&A, The DP World Tour and Ladies European Tour

Funding

This study was funded with support from The R&A, The DP World Tour and Ladies European Tour

All authors approve of the publication of this article and agree to be accountable for all aspects of the work.

Submitted: September 29, 2025 GMT. Accepted: January 23, 2026 GMT. Published: February 06, 2026 GMT.



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

References

- Andersen, M. B., & Williams, J. M. (1988). A Model of Stress and Athletic Injury: Prediction and Prevention. *Journal of Sport and Exercise Psychology*, 10(3), 294–306. <https://doi.org/10.1123/jsep.10.3.294>
- Cabri, J., Sousa, J. P., Kots, M., & Barreiros, J. (2009). Golf-related injuries: A systematic review. *European Journal of Sport Science*, 9(6), 353–366. <https://doi.org/10.1080/17461390903009141>
- Cole, M. H., & Grimshaw, P. N. (2009). The X-Factor and Its Relationship to Golfing Performance. *Journal of Quantitative Analysis in Sports*, 5(1). <https://doi.org/10.2202/1559-0410.1134>
- Cole, M. H., & Grimshaw, P. N. (2016). The Biomechanics of the Modern Golf Swing: Implications for Lower Back Injuries. *Sports Medicine*, 46(3), 339–351. <https://doi.org/10.1007/s40279-015-0429-1>
- Cooper, D. J., Batt, M. E., O'Hanlon, M. S., & Palmer, D. (2021). A Cross-Sectional Study of Retired Great British Olympians (Berlin 1936–Sochi 2014): Olympic Career Injuries, Joint Health in Later Life, and Reasons for Retirement from Olympic Sport. *Sports Medicine - Open*, 7(1). <https://doi.org/10.1186/s40798-021-00339-1>
- Creighton, A., Cheng, J., & Press, J. (2022). Upper Body Injuries in Golfers. *Current Reviews in Musculoskeletal Medicine*, 15(6), 483–499. <https://doi.org/10.1007/s12178-022-09787-y>
- Ericksen, S., Dover, G., & DeMont, R. (2022). Psychological Interventions Can Reduce Injury Risk in Athletes: A Critically Appraised Topic. *Journal of Sport Rehabilitation*, 31(2), 224–229. <https://doi.org/10.1123/jsr.2020-0315>
- Farber, A. J., Smith, J. S., Kvitne, R. S., Mohr, K. J., & Shin, S. S. (2009). Electromyographic analysis of forearm muscles in professional and amateur golfers. *American Journal of Sports Medicine*, 37(2), 396–401. <https://doi.org/10.1177/0363546508325154>
- Fry, J., & Bloyce, D. (2017). “Life in the travelling circus”: A study of loneliness, work stress, and money issues in touring professional golf. *Sociology of Sport Journal*, 34(2), 148–195. <https://doi.org/10.1123/ssj.2017-0002>
- Gladdines, S., von Gerhardt, A. L., Verhagen, E., Beumer, A., & Eygendaal, D. (2022). The effectiveness of a golf injury prevention program (GRIPP intervention) compared to the usual warm-up in Dutch golfers: protocol design of a randomized controlled trial. *BMC Sports Science, Medicine and Rehabilitation*, 14(1). <https://doi.org/10.1186/s13102-022-00511-4>
- Gosheger, G., Liem, D., Ludwig, K., Greshake, O., & Winkelmann, W. (2003). Injuries and Overuse Syndromes in Golf. *American Journal of Sports Medicine*, 31(3), 438–443. <https://doi.org/10.1177/03635465030310031901>
- Gouttebauge, V., Aoki, H., Ekstrand, J., Verhagen, E. A. L. M., & Kerkhoffs, G. M. M. J. (2016). Are severe musculoskeletal injuries associated with symptoms of common mental disorders among male European professional footballers? *Knee Surgery, Sports Traumatology, Arthroscopy*, 24(12), 3934–3942. <https://doi.org/10.1007/s00167-015-3729-y>
- Gouttebauge, V., Castaldelli-Maia, J. M., Gorczynski, P., Hainline, B., Hitchcock, M. E., Kerkhoffs, G. M., Rice, S. M., & Reardon, C. L. (2019). Occurrence of mental health symptoms and disorders in current and former elite athletes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(11), 700–706. <https://doi.org/10.1136/bjsports-2019-100671>
- Gouttebauge, V., Jonkers, R., Moen, M., Verhagen, E., Wylleman, P., & Kerkhoffs, G. (2017). A prospective cohort study on symptoms of common mental disorders among Dutch elite athletes. *Physician and Sportsmedicine*, 45(4), 426–432. <https://doi.org/10.1080/00913847.2017.1370987>

- Grove, J. R., Lavalley, D., & Gordon, S. (1997). Coping with retirement from sport: The influence of athletic identity. *Journal of Applied Sport Psychology*, 9(2), 191–203. <https://doi.org/10.1080/10413209708406481>
- Gulliver, A., Griffiths, K. M., & Christensen, H. (2012). Barriers and facilitators to mental health help-seeking for young elite athletes: a qualitative study. *BMC Psychiatry*, 12. <https://doi.org/10.1186/1471-244X-12-157>
- Hammond, T., Gialloreti, C., Kubas, H., & Hap Davis, H. (2013). The prevalence of failure-based depression among elite athletes. *Clinical Journal of Sport Medicine*, 23(4), 273–277. <https://doi.org/10.1097/JSM.0B013E318287B870>
- Hilliard, R. C., Redmond, L. A., & Watson, J. C. (2019). Differences in Stigma and Attitudes Toward Counseling Between College Student-Athletes and Nonathletes. *Journal of College Student Psychotherapy*, 33(4), 332–339. <https://doi.org/10.1080/87568225.2018.1504639>
- Hopley, G., Murray, A., & Macpherson, A. (2022). The Prevalence of Symptoms of Common Mental Disorders Among Professional Golfers. *International Journal of Golf Science*, 11. <https://www.golfsciencejournal.org/article/38141-the-prevalence-of-symptoms-of-common-mental-disorders-among-professional-golfers>
- Junge, A., & Feddermann-Demont, N. (2016). Prevalence of depression and anxiety in top-level male and female football players. *BMJ Open Sport & Exercise Medicine*, 2(1), e000087. <https://doi.org/10.1136/bmjsem-2015>
- Junge, A., & Prinz, B. (2019). Depression and anxiety symptoms in 17 teams of female football players including 10 German first league teams. *British Journal of Sports Medicine*, 53(8), 471–477. <https://doi.org/10.1136/bjsports-2017-098033>
- Kiliç, Aoki, H., Goedhart, E., Hägglund, M., Kerkhoffs, G. M. M. J., Kuijer, P. P. F. M., Waldén, M., & Gouttebarge, V. (2018). Severe musculoskeletal time-loss injuries and symptoms of common mental disorders in professional soccer: a longitudinal analysis of 12-month follow-up data. *Knee Surgery, Sports Traumatology, Arthroscopy*, 26(3), 946–954. <https://doi.org/10.1007/s00167-017-4644-1>
- Kuitunen, I., & Ponkilainen, V. T. (2024). Injury incidence in golf—a systematic review and meta-analysis. *Irish Journal of Medical Science*, 193(6), 2803–2811. <https://doi.org/10.1007/s11845-024-03759-6>
- Lauersen, J. B., Andersen, T. E., & Andersen, L. B. (2018). Strength training as superior, dose-dependent and safe prevention of acute and overuse sports injuries: A systematic review, qualitative analysis and meta-analysis. *British Journal of Sports Medicine*, 52(24), 1557–1563. <https://doi.org/10.1136/bjsports-2018-099078>
- Lauersen, J. B., Bertelsen, D. M., & Andersen, L. B. (2014). The effectiveness of exercise interventions to prevent sports injuries: A systematic review and meta-analysis of randomised controlled trials. *British Journal of Sports Medicine*, 48(11), 871–877. <https://doi.org/10.1136/bjsports-2013-092538>
- Li, H., Moreland, J. J., Peek-Asa, C., & Yang, J. (2017). Preseason Anxiety and Depressive Symptoms and Prospective Injury Risk in Collegiate Athletes. *American Journal of Sports Medicine*, 45(9), 2148–2155. <https://doi.org/10.1177/0363546517702847>
- Lindsay, D. M., & Vandervoort, A. A. (2014). Golf-related low back pain: A review of causative factors and prevention strategies. *Asian Journal of Sports Medicine*, 5(4). <https://doi.org/10.5812/asjsm.24289>
- Luscombe, J., Murray, A. D., Jenkins, E., & Archibald, D. (2017). A rapid review to identify physical activity accrued while playing golf. *BMJ Open*, 7(11). <https://doi.org/10.1136/bmjopen-2017-018993>

- McHardy, A., Pollard, H., & Luo, K. (2007). One-year follow-up study on golf injuries in Australian amateur golfers. *American Journal of Sports Medicine*, 35(8), 1354–1360. <https://doi.org/10.1177/0363546507300188>
- Meira, E. P., & Brumitt, J. (2010). Minimizing injuries and enhancing performance in golf through training programs. *Sports Health*, 2(4), 337–344. <https://doi.org/10.1177/1941738110365129>
- Mountjoy, M., Adriaens, K., Junge, A., Verhelle, H., Laureys, F., Kirby, S., Dienstbach-Wech, L., Foster, J., & Vertommen, T. (2024). Association of self-reported health problems and interpersonal violence in sport: a cross-sectional study in world-level performing athletes. *British Journal of Sports Medicine*, 58(22), 1360–1368. <https://doi.org/10.1136/bjsports-2024-109022>
- Mountjoy, M., Junge, A., Bindra, A., Blauwet, C., Budgett, R., Currie, A., Engebretsen, L., Hainline, B., McDuff, D., Purcell, R., Putukian, M., Reardon, C. L., Soligard, T., & Gouttebarga, V. (2023). Surveillance of athlete mental health symptoms and disorders: A supplement to the International Olympic Committee's consensus statement on injury and illness surveillance. *British Journal of Sports Medicine*, 57(21), 1351–1360. <https://doi.org/10.1136/bjsports-2022-106687>
- Mountjoy, M., Junge, A., Magnusson, C., Shahpar, F. M., Ortiz Lizcano, E. I., Varvodic, J., Wang, X., Cherif, M. Y., Hill, L., & Miller, J. (2022). Beneath the Surface: Mental Health and Harassment and Abuse of Athletes Participating in the FINA (Aquatics) World Championships, 2019. *Clinical Journal of Sport Medicine*, 32(2), 95–102. <https://doi.org/10.1097/JSM.0000000000000971>
- Mountjoy, M., Junge, A., Slys, J., & Miller, J. (2021). An Uneven Playing Field: Athlete Injury, Illness, Load, and Daily Training Environment in the Year before the FINA (Aquatics) World Championships, 2017. *Clinical Journal of Sport Medicine*, 31(6), E425–E431. <https://doi.org/10.1097/JSM.0000000000000814>
- Mountjoy, M., Schamasch, P., Murray, A., Hawkes, R., Hospel, T., Thomas, B., Samson, E., & Junge, A. (2024). Inequities in the Training Environment and Health of Female Golfers Participating in the 2022 International Golf Federation World Amateur Team Championships. *Clinical Journal of Sport Medicine*, 34(2), 127–134. <https://doi.org/10.1097/JSM.0000000000001186>
- Murray, A. D., Daines, L., Archibald, D., Hawkes, R. A., Schiphorst, C., Kelly, P., Grant, L., & Mutrie, N. (2017). The relationships between golf and health: A scoping review. *British Journal of Sports Medicine*, 51(1), 12–19. <https://doi.org/10.1136/bjsports-2016-096625>
- Murray, A., Junge, A., Robinson, P. G., Bizzini, M., Bossert, A., Clarsen, B., Coughlan, D., Cunningham, C., Drobny, T., Gazzano, F., Gill, L., Hawkes, R., Hospel, T., Neal, R., Lavelle, J., Scanlon, A., Schamasch, P., Thomas, B., Voight, M., ... Dvorak, J. (2020). International consensus statement: Methods for recording and reporting of epidemiological data on injuries and illnesses in golf. *British Journal of Sports Medicine*, 54(19), 1136–1141. <https://doi.org/10.1136/bjsports-2020-102380>
- Murray, A., Junge, A., Robinson, P. G., Clarsen, B., Mountjoy, M. L., Drobny, T., Gill, L., Gazzano, F., Voight, M., & Dvorak, J. (2023). Cross-sectional study of characteristics and prevalence of musculoskeletal complaints in 1170 male golfers. *BMJ Open Sport and Exercise Medicine*, 9(1). <https://doi.org/10.1136/bmjsem-2022-001504>
- Palmer, D., Cooper, D., Whittaker, J. L., Emery, C., Batt, M. E., Engebretsen, L., Schamasch, P., Shroff, M., Soligard, T., Steffen, K., & Budgett, R. (2022). Prevalence of and factors associated with osteoarthritis and pain in retired Olympians compared with the general population: part 2 - the spine and upper limb. *British Journal of Sports Medicine*, 56(19), 1132–1140. <https://doi.org/10.1136/bjsports-2021-104978>

- Perry, C., Chaunty, A. J., & Champ, F. M. (2022). Elite female footballers in England: an exploration of mental ill-health and help-seeking intentions. *Science and Medicine in Football*, 6(5), 650–659. <https://doi.org/10.1080/24733938.2022.2084149>
- Prien, A., Mountjoy, M., Miller, J., Boyd, K., Van Den Hoogenband, C., Gerrard, D., Cherif, M. Y., Lu, Y., Nanousis, K., Liscano, E. I. O., Shahpar, F. M., & Junge, A. (2017). Injury and illness in aquatic sport: How high is the risk? A comparison of results from three FINA World Championships. *British Journal of Sports Medicine*, 51(4), 278–283. <https://doi.org/10.1136/bjsports-2016-096075>
- Prinz, B., Dvorač, J., & Junge, A. (2016). Symptoms and risk factors of depression during and after the football career of elite female players. *BMJ Open Sport & Exercise Medicine*, 2(1). <https://doi.org/10.1136/BMJSEM-2016-000124>
- Putukian, M. (2016). The psychological response to injury in student athletes: A narrative review with a focus on mental health. *British Journal of Sports Medicine*, 50(3), 145–148. <https://doi.org/10.1136/bjsports-2015-095586>
- Reardon, C. L., Hainline, B., Aron, C. M., Baron, D., Baum, A. L., Bindra, A., Budgett, R., Campriani, N., Castaldelli-Maia, J. M., Currie, A., Derevensky, J. L., Glick, I. D., Gorczynski, P., Gouttebauge, V., Grandner, M. A., Han, D. H., McDuff, D., Mountjoy, M., Polat, A., ... Engebretsen, L. (2019). Mental health in elite athletes: International Olympic Committee consensus statement (2019). *British Journal of Sports Medicine*, 53(11), 667–699. <https://doi.org/10.1136/bjsports-2019-100715>
- Rice, S. M., Gwyther, K., Santesteban-Echarri, O., Baron, D., Gorczynski, P., Gouttebauge, V., Reardon, C. L., Hitchcock, M. E., Hainline, B., & Purcell, R. (2019). Determinants of anxiety in elite athletes: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(11), 722–730. <https://doi.org/10.1136/bjsports-2019-100620>
- Robinson, P. G., Clarsen, B., Murray, A., Junge, A., Mountjoy, M. L., Drobný, T., Gill, L., Gazzano, F., Voight, M., & Dvorak, J. (2024). A prospective study of injuries and illnesses among 910 amateur golfers during one season. *BMJ Open Sport & Exercise Medicine*, 10(3), e001844. <https://doi.org/10.1136/bmjsem-2023-001844>
- Rogers, D. L., Tanaka, M. J., Cosgarea, A. J., Ginsburg, R. D., & Dreher, G. M. (2024). How Mental Health Affects Injury Risk and Outcomes in Athletes. *Sports Health*, 16(2), 222–229. <https://doi.org/10.1177/19417381231179678>
- Rogge, J. (2009). An ounce of prevention? *British Journal of Sports Medicine*, 43(9), 627. <https://doi.org/10.1136/bjsem.2009.062802>
- Stephan, Y., Bilard, J., Ninot, G., & Delignières, D. (2003). Repercussions of Transition Out of Elite Sport on Subjective Well-Being: A One-Year Study. *Journal of Applied Sport Psychology*, 15(4), 354–371. <https://doi.org/10.1080/714044202>
- The R&A. (2024). *Golf Participation Continues to Grow*. <https://www.randa.org/en/articles/golf-participation-continues-to-enjoy-growth-globally>
- WHO. (2020). *WHO guidelines on physical activity and sedentary behaviour*. <https://iris.who.int/bitstream/handle/10665/336656/9789240015128-eng.pdf>
- Wiese-Bjornstal, D. M. (2010). Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: A consensus statement. *Scandinavian Journal of Medicine and Science in Sports*, 20(SUPPL. 2), 103–111. <https://doi.org/10.1111/j.1600-0838.2010.01195.x>
- Williamson, T. R., Kay, R. S., Robinson, P. G., Murray, A. D., & Clement, N. D. (2024). Epidemiology of musculoskeletal injury in professional and amateur golfers: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 58(11), 606–614. <https://doi.org/10.1136/bjsports-2023-107324>

- Wippert, P. M., & Wippert, J. (2008). Perceived Stress and Prevalence of Traumatic Stress Symptoms Following Athletic Career Termination. *Journal of Clinical Sport Psychology*, 2(1), 1–16. <https://doi.org/10.1123/JCSP.2.1.1>
- Wippert, P. M., & Wippert, J. (2010). The Effects of Involuntary Athletic Career Termination on Psychological Distress. *Journal of Clinical Sport Psychology*, 4(2), 133–149. <https://doi.org/10.1123/JCSP.4.2.133>
- Wolanin, A., Gross, M., & Hong, E. (2015). Depression in Athletes: Prevalence and Risk Factors. *Current Sports Medicine Reports*, 14(1), 56–60. <https://doi.org/10.1249/JSR.0000000000000123>
- Wood, S., Harrison, L. K., & Kucharska, J. (2017). Male professional footballers' experiences of mental health difficulties and help-seeking. *Physician and Sportsmedicine*, 45(2), 120–128. <https://doi.org/10.1080/00913847.2017.1283209>