

## **Mental Health in Professional Female Football Players: Effects on Performance**

In professional football, most of the scientific literature has been directed exclusively towards the physiological risks associated with participation (i.e. the prevalence, incidence, and prevention of injury)<sup>1,2</sup>, and the physical/physiological factors that can influence performance (i.e. anthropometric measures, agility and coordination, speed and endurance etc.<sup>3-5</sup>). However, despite it being widely cited that common mental disorders (CMD) (e.g. depression and anxiety) and symptoms of CMD are likely to influence performance decrements, decrease quality of life (QoL) and potentially cause an exit from sport<sup>1,10-12</sup>, research and support surrounding mental health (and the potential negative effects on performance) for this population remains somewhat lacking. This is surprising given the reported occurrence of CMD symptoms in football players in recent years<sup>6-9</sup>. To further add, women's football has been far less studied in comparison to their male counterparts<sup>13</sup>. The limited available research does suggest that female players have a higher reported prevalence of CMD than male players<sup>7</sup> which is similar to research across multiple sports<sup>14,15,19</sup>. As stated above, CMD/symptoms of CMD can have a negative impact on performance and QoL, and considering females have higher reported prevalence of mental health, alongside being generally understudied in comparison to males, further awareness/support for the female player population is required at the individual, environmental and organisational level.

### **1. Definition of CMD's and Symptoms**

CMD's are clinically diagnosed mental health conditions that are classified into categories such as depressive disorders (i.e. major depressive disorder), anxiety disorders (i.e. generalised anxiety disorder), eating disorders (i.e. bulimia nervosa and binge eating disorder) and sleep disturbances (i.e. insomnia disorder)<sup>10</sup>. In contrast, those with symptoms of CMD generally have less severe symptoms than those with a clinical CMD diagnoses<sup>1</sup>. Symptoms of CMD are often characterised by a combination of adverse feelings, thoughts, perceptions or behaviour that may negatively impair the individual's daily activities in work/sport or in general day-to-day life<sup>16</sup>. Symptoms of CMD are often related to distress, burnout, depression, or anxiety<sup>23</sup>.

For the purpose of this blog, MDD, GAD, and symptoms of CMD will only be addressed.

Table 1 Common Mental Disorder Symptoms

Common Mental Disorder	General Symptoms
Major Depressive Disorder (MDD)-  A common but sometimes serious mood disorder, individuals will often experience depressed mood/and or express little interest in their usual activities (i.e. work, sport) on most days for at least a 2 week period <sup>10</sup>	<b>Psychological-</b> decreased motivation/and or interest in activities, impaired concentration, feelings of hopelessness <b>Somatic-</b> low energy, loss of appetite, sleep disturbances <sup>17</sup>
Generalised Anxiety Disorder (GAD)-  A persistent and common disorder, individuals will often experience ongoing anxiety and unfocused worry (persistent for at least 6 months) which is unconnected to recent events, though it may be aggravated by certain situations <sup>18</sup>	<b>Psychological-</b> Excessive anxiety/worry about events and/or activities, restlessness, difficulty concentrating, depersonalisation <b>Somatic-</b> palpitations, sweating, trembling, dry mouth, sleep disturbances <sup>18</sup>

## 2. Prevalence of Depression and Anxiety Symptoms and Risk Factors

It has been established that female athletes generally have a higher rate of reported CMD symptoms than males<sup>14, 15</sup>, which thus, may make female athletes more susceptible to mental health concerns and the potential negative performance consequences of said concerns. This also suggests that female footballers may also have a higher prevalence of reported CMD symptoms than male players (and therefore the potential performance decrements). For example, a study that examined the prevalence of depression and anxiety symptoms in high-level male and female football players<sup>7</sup> (N= 471) found that the reported prevalence of depression symptoms in male (N=182) and female (N=177) first league players (FL) was 6.6% and 13% respectively. It was also reported that male FL players had significantly lower anxiety scores than female FL players ( $t=5.00$ ;  $P= <0.001$ ). The results from this study highlighted that female players generally had higher reported symptoms of CMD's than male FL players which is consistent with other research<sup>20-22</sup>. It should be noted however, the response rate for the self-report depression questionnaire (CES-D) was significantly higher in the females than in the male FL players (97.8% vs 86.3% respectively;  $\chi^2=15.3$ ;  $p<0.001$ ). The lower response rate in male FL players may have falsified the true prevalence of depression and thus, the higher reported prevalence of depression in females (13%) compared to male FL players (6.6%) should be interpreted with caution.

When including the male under 21's (U-21) sample, the U-21's reported a similar (albeit slightly higher) prevalence of depression (15.1%) and anxiety symptoms (2.7%) to the

female FL players (13% and 1.1% respectively). The authors noted that the higher reported prevalence of depression and anxiety symptoms in the U-21 male team compared to the male FL team may be due to age (and potentially level of play due to age). Although this study did not include a female U-21's sample, which would have been beneficial to examine/compare their GAD-7 and CES-D scores to the male U-21 and female FL players, research suggests that athletes of younger age (regardless of gender) are at higher risk of developing depression and anxiety symptoms<sup>24-26</sup>. As the present study indicated gender and age as being salient to depression and anxiety symptoms, these two variables may be predictors of CMD symptoms. This implies that females and younger players- especially young female players, may be more susceptible to mental health issues though further research is needed. It may be beneficial for coaches/applicable staff to be aware of players who may be at higher risk of developing mental health issues by considering the above variables. Furthermore, if coaches are aware of the early signs and possible symptoms of CMD's, early detection could result in quick support/necessary referral for the player, which in turn, may reduce the likelihood of a CMD.

When looking solely at professional female footballers and the prevalence of mental health, the research is limited. One available study (N= 290; 203 first and 87 lower league players) examined depression and anxiety symptoms in 7 lower league (LL) and 10 FL female German football teams<sup>24</sup>. For the depression (CES-D) questionnaire, the study reported a 97.6% response rate for the entire group. Overall, symptoms of mild/moderate (16-21) and severe (>21) depression were reported in 48 (16.6%) and 41 (14.1%) of players respectively. For generalised anxiety disorder (GAD-7) (reported response rate= 99%), moderate (10-14) and severe (>14) symptoms were reported in a total of 20 (6.9%) and (1.4%) players respectively. Interestingly, a higher prevalence rate of mild/moderate and severe depression and anxiety symptoms were reported in second league (SL) players (depression= mild-16/25.4%, severe-13/20.6%; anxiety= moderate-6/9.2%, severe- 3/4.6%) compared with FL players (depression= mild-23/12.8%, moderate-21/11.7%; anxiety= moderate- 11/6.0%, severe- 0/0%).

The overall prevalence rates of reported depression and anxiety symptoms in the present study were higher than those in the female sample in the study above<sup>7</sup>. The results also highlighted that females in SL teams may be more likely to experience depression and anxiety symptoms than those in FL teams, which is similar to other research in football<sup>27</sup> and other sports<sup>21,28</sup>. Moreover, it was also identified that independent of level of play, match experience was a significant predictor for depression and generalised anxiety ( $P= 0.003$ ). This implies that those in FL and SL teams with lower match experience may be at higher risk of depression and/or anxiety symptoms than those with higher match experience. Additionally, subjective need for psychotherapy was found as a significant predictor of depression symptoms ( $P= 0.001$ ), and younger age was associated with increased generalised anxiety symptoms ( $P= 0.005$ ). This suggests that players who received psychotherapy currently/previously were at higher risk of developing depression symptoms than players who did not previously undertake psychotherapy, and younger players were more likely to experience anxiety symptoms than older players.

As seen in the above studies and other research, player characteristics (i.e. gender and age) and other determinants (i.e. match play experience and level of play)<sup>24,25,27,28</sup>, could place players at higher risk of developing symptoms of CMD. Furthermore, during their sporting careers, players are likely to be exposed to both non-sport-related and sport-specific stressors<sup>1</sup> (outlined below in table two), which can also lead to depression and anxiety symptoms<sup>2</sup>. Though certain characteristics/determinants and stressors may play an individual at higher risk of developing symptoms of CMD, depression and anxiety symptoms are generally multi-faceted and are likely to depend on a dynamic interaction between multiple stressors<sup>17</sup>. Thus, it is likely that a combination of factors contributes to the development of mental health issues. Although further research is needed, both of the above studies showed a prevalence of depression symptoms in their female populations which suggests that professional female football players may be a higher risk group for symptoms of CMD's. With this in mind, it would be beneficial to raise awareness and knowledge of mental health issues in female players to improve their health-seeking behaviour and potentially reduce the stigma attached to mental health.

*Table 2 Non-Sport Related, Sport-Specific Stressors, and Risk Factors for Symptoms of CMD*

Non-Sport-Related Stressors		Sport-Specific Stressors		Risk Factors	
Psychological	Personality, behaviour, mood	Leadership	Conflict with coaches/organisation/governing bodies. Issues with the media, spectators ext.	Gender	Female
Biological	Genetic predisposition, biochemical	Environmental	Poor facilities/equipment. Adverse weather conditions. Poor travel and accommodation arrangements	Age	Under 21's
Sociological	Familial, cultural, socioeconomic	Cultural	Lack of support from team mates. Poor communication between team. Adverse behaviour/attitudes from other players	Match Experience	Low
Physical	Illness/injury	Personal	Injury, illness, decreased performance	Level of Play	Lower League
				Player Position*	Conflicting Research

### 3. Influence of Psychological Health on Performance

### 3.1. MDD/ Symptoms of Depression

As previously discussed, symptoms of depression and MDD are often related to (but are not limited to): sleep disturbance, interest/pleasure reduction, energy changes/fatigue, attention/concentration impairment, psychomotor disturbances, and appetite/weight changes<sup>30</sup>. Each one of these factors individually, but more so when combined, can negatively influence performance. It should be noted, given the lack of research surrounding the direct effects of mental health on performance, it becomes advisable to view the research in other contexts.

As such, adequate sleep hygiene is recognised as a crucial part of athlete recovery, health optimisation and is a vital part of cognitive, motor, and physiological functioning<sup>35</sup>. An athlete experiencing sleep disturbances/sleep deprivation due to symptoms of depression or MDD may encounter a decline in such functioning (depending on the severity of the sleep disturbances/deprivation)<sup>37</sup> and may also be at increased risk of injury<sup>38,39</sup>. Although not related to sleep deprivation from depression, numerous studies have shown that sleep restriction in football negatively affects athletic performance<sup>40-42</sup>. For example, a study<sup>40</sup> examined the effects of a 20-minute nap following 3 hours of sleep deprivation on brain activity, leg muscle strength, running-based anaerobic spring test (RAST), and auditory reaction time (ART) in male college football players (N=11). The results for each variable for normal sleep (NS) vs deprived sleep (DS) were as followed; leg muscle strength (kg) (NS= 164 ± 9 vs SD= 138 ± 8); RAST (average power [W]) (NS= 541 ± 26.3 vs DS 457 ± 23.5) Fatigue Index (W/s) (NS= 10.8 ± 1.3 vs SD= 6.1 ± 1.1); ART (m/s) (NS= 350 ± 17.2 vs SD= 372 ± 22.8).

The results from this study suggest that sleep deprivation had a negative effect on the athlete's ART, leg strength, anaerobic performance test, and fatigue. Although the study was conducted on a small sample size and on males, multiple other studies have shown that sleep deprivation can have a negative effect on an athletes cognitive and physiological function in both genders<sup>71-73</sup>. Therefore, it's not unrealistic to suggest that athletes experiencing sleep deprivation/disturbances due to psychological issues may experience some cognitive and/or physiological performance decrements as a consequence. Football utilises skill training that requires optimal cognitive functioning, sprint efforts involving anaerobic performance<sup>36</sup>, and repeated powerful movements (i.e. kicking, jumping and tackling) that are highly correlated with maximal strength<sup>43,44</sup>. As both cognitive and physiological functioning is an integral part of footballing performance, if these aspects are impaired due to sleep disturbances as a result of mental health then this may affect the athlete's ability to train effectively and thus, a decline in performance may occur.

Energy changes/fatigue and attention/concentration impairment may also negatively influence cognitive and physiological functioning and thus performance<sup>47-49</sup>. Fatigue is a complex state with a multifactorial genesis which, when described in terms of football, can affect both cognitive (i.e. decision making) and physiological (i.e. running performance/distance travelled) ability<sup>50</sup>. During match-play players are subjected to prolonged periods of demanding cognitive activity coupled with anaerobic efforts determined in sprint bouts<sup>45</sup> which consequently induces fatigue<sup>46</sup>. Many studies have demonstrated the negative impact that fatigue has on technical skill and decision making<sup>47-</sup>

<sup>49,51</sup>, factors of which are paramount to football performance. Thus, if a player is already experiencing fatigue as a result of depression symptoms (let alone match-play induced fatigue) the player may experience a decline in performance outcomes such as technical skills, decision making and running performance. Additionally, attention deficits/concentration impairments may also affect the athlete's ability to make cognitive decision making<sup>52</sup> (again an integral part of football performance). If the athlete is unable to concentrate on the demands of the task and execute said task (i.e. tackle or kicking manoeuvre) then this may cause them to perform at a level below their demonstrated capability.

Similarly, factors such as interest/pleasure reduction, psychomotor disturbances, and appetite/weight changes all have the ability to influence changes in performance. For example, if an athlete loses interest in football they may be less likely to engage in their sporting activity<sup>17</sup>. Psychomotor disturbances can slow motor response times and decrease overall motor activity<sup>53</sup> which can potentially affect technical related skills. Finally, appetite/weight changes may also affect physiological function. Body composition and body weight contribute to optimal sports performance. As such, body composition can affect strength and agility, whereas body weight can influence factors such as the athlete's speed, power and endurance<sup>54</sup>. If an athlete encounters appetite changes such as appetite loss they may experience extended periods of restricted energy intake which may subsequently induce rapid weight loss/body composition changes<sup>55</sup>. Therefore, performance parameters such as speed, endurance, and power may be affected in athletes who are experiencing drastic body composition and body weight changes (e.g. increased fat mass or reduced fat mass and/or lean mass) due to symptoms of depression or MDD.

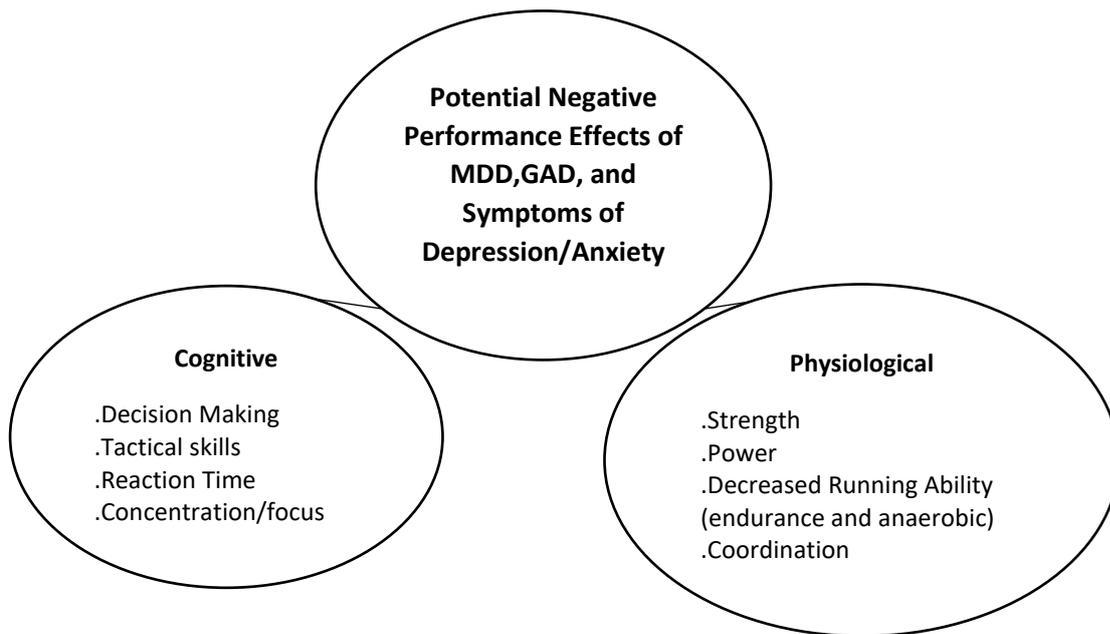
As seen above, multiple factors can influence cognitive and physiological performance, though it's hard to determine to what extent symptoms of depression and MDD can influence performance due to limited research. So whilst it is clear that there is a prevalence of depression symptoms in female players, it still isn't as clear as to how symptoms of depression and MDD may directly negatively influence performance in football. With this in mind, future research directly examining the effects of mental health on football performance is needed to further understand the effects at a cognitive and physiological level. By doing so, it may help researchers, players, coaches and organisations implement strategies to help support those with mental health issues who are experiencing a decline in their performance.

### *3.2. Generalised Anxiety Disorder/ Symptoms of Anxiety*

Among athletes, although trait anxiety (e.g. stable trait of personality) and event-dependent transitory state (e.g. state anxiety) characteristics can inevitably overlap<sup>58</sup>, assessment of symptom patterns, severity and duration should be used to differentiate GAD/general symptoms of anxiety from competition anxiety<sup>10</sup>. Interestingly the relationship between competition (state) anxiety and performance has been much studied over the years<sup>66-70</sup>, yet current research examining the direct effects of GAD/general symptoms of anxiety on performance in athletes remains scant. In general populations, anxiety symptoms are highly related to sleep disturbances<sup>60, 61</sup>, fatigue (i.e. general, physiological and psychological)<sup>56,57</sup>,

and are associated with impaired functioning and cognitive performance<sup>59</sup>. As highlighted above (3.1.), factors relating to sleep disturbances and fatigue have the potential to decrease performance via decreased cognitive and/or physiological function. Thus, athletes experiencing sleep disturbances or fatigue-related issues as a result of GAD/symptoms of anxiety may suffer performance decrements (refer above to 3.1. for a more comprehensive view).

GAD and symptoms of anxiety can negatively impair cognitive function in terms of poor concentration/lack of focus<sup>62</sup> and memory<sup>63</sup> (again effects dependant on the severity of anxiety/symptoms of anxiety). During match-play, athletes are exposed to an infinite number of internal (players own thoughts and emotions and prediction of opposing team teams movements) and external (weather/pitch conditions and noise from the crowd) stimuli<sup>64</sup>. In this context, if an athlete is unable to focus on a particular stimulus (due to concentration impairments as a result of GAD/symptoms of anxiety) that is relevant and facilitative to her/his attentional focus, it may negatively influence their performance by diverting their information-processing resources from the relevant task (i.e. decision making or physical related manoeuvre). To note, without any specific research it's hard to determine the potential performance outcomes of non-sport related anxiety. One thing to account from the literature is that high trait performance athletes generally have higher levels of cognitive state anxiety<sup>66,67</sup> which has shown to generally decrease performance in various sporting contexts<sup>66-70</sup>. With this in mind: 1) if an athlete with GAD/symptoms of anxiety display high levels of trait anxiety they may be more predisposed to higher levels of cognitive state anxiety which could potentially decrease performance and 2) sport-related performance anxiety produces similar cognitive (i.e. poor concentration, negative thoughts, and fear ext.) symptoms to that of GAD<sup>65</sup>, and thus athletes with cognitive symptoms of GAD (similar to cognitive sports anxiety symptoms) may experience the same negative performance decrements to those with high sport-related cognitive anxiety levels.



*Illustration 1 Potential Cognitive and Physiological Performance Effects of Mental Health*

In a female player football context it is hard to draw specific conclusions about the effects of clinical mental health conditions (MDD and GAD) and symptoms of depression and anxiety on performance purely due to the lack of research on said conditions/symptoms and performance, and the lack of research on this population even though it is evident there is a prevalence of mental health (more specifically depression/symptoms of depression) in this population (refer to section 2.). When examining some of the individual symptoms of depression/anxiety (i.e. sleep deprivation, fatigue and concentration impairment) and performance the vast majority of research found that performance declined via cognitive/and or physiological function. Though the research was not based on symptoms from mental health (such as fatigue caused by depression/anxiety), its worth noting how fatigue and sleep deprivation ext. in other contexts generally resulted in decreased performance (in which case may also relate to athletes experiencing similar symptoms, but from mental health-related symptoms). To address the gap in the knowledge base further research is needed to avoid speculation.

#### **4. Take Home Message**

It can be concluded that female footballer players generally have a higher prevalence of depression/anxiety symptoms than their male counterparts. Players can experience sport-related and non-sport related stressors which can lead to depression and anxiety symptoms, as well as certain variables potentially placing players at higher risk of developing said symptoms (table 2). Additionally, players with symptoms of depression/anxiety, CMD, or MDD may experience a decline in performance via cognitive and/or physiological function (illustration 1) though research examining the direct effects of mental health on performance is needed.

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