

1 Article

2 **Healthy practice of female soccer and futsal:** 3 **identifying sources of stress, anxiety and depression**

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15 **Abstract:** The aim of this study was to examine the post-injury psychological impact looking for to
16 avoid sources of health issues. We have analyzed differences in the stress, anxiety and depression
17 levels between male and female football players who have suffered at least one injury during the
18 last season played respect to similar players who have not been injured. A descriptive
19 cross-sectional design was used. The participants were 187 football players and data on the player's
20 injuries were collected. A Self-reported Questionnaire collected number, type and severity of
21 injuries sustained during the previous sports season (twelve months), and also the player's current
22 situation being injured or not injured. To evaluate the psychological variables, the DASS-21
23 questionnaire was used. Results indicated that the male injured players presented anxiety levels
24 higher than those who were non-injured. When we observe the female players' data, the stress
25 levels of the non-injured ones are higher than those of the injured players. Regarding the
26 non-injured athletes, results showed that the female non-injured players presented values in
27 anxiety higher than those corresponding to the non-injured male players. Thus, sport injury affects
28 mental health issues such as anxiety and stress, and in a different way regarding gender.

29 **Keywords:** Psychological impact; sport injuries; gender

30

31 1. Introduction

32 Sports injuries are inherent to the sports practice and are quite familiar to the majority of
33 athletes, as shown by numerous epidemiological studies [1,2]. In professional or elite football, for
34 example, each player suffers a mean of two sports injuries during a single competitive season [3,4],
35 which causes a significant impact to the club. In this sense, the loss by injury for a month of a titular
36 player costs to his/her club approximately 500,000 euros [5]. In addition, injuries also have a negative
37 impact on the team's performance. Walden et al. [1] indicate that the higher are the injury rates in
38 elite European soccer, the poorer the team performance is. In addition to the economic and sportive
39 consequences for the clubs, injuries may produce other consequences for the player (need for special
40 practices, lose fitness, spent time in the substitute', etc.), added to the associated cognitive and
41 emotional reactions (pain, duel, sadness, anger, fear) that may negatively influence their well-being
42 [6,7]. Considering it globally, sports injuries are the most common cause of abandonment in all kinds
43 of sports careers [8].

44 Given the high incidence of injury in sports practice and its negative consequences on both
45 athletes and other entities (teams, clubs, etc.), it seems very important to determine what are the
46 possible predictors of these injury and eventually try to control them. Historically, the research in

47 this field has been focused on the medical, physiological and biomechanical perspectives, but during
48 the last two decades the role of the psychological factors as a possible cause of the injuries has been
49 also extensively explored [9], also suggesting interdisciplinary theoretical models and practical
50 interventions [10]. The study of the psychological factors that may affect the athlete's vulnerability to
51 the injury has become nowadays some kind of paradigm in the field of sports psychology [10-12].

52 The classical model of stress and sports injury proposed by Andersen and Williams [13] has
53 consolidated an approach that establishes that when the athletes face potentially stressful sports
54 situations, they carry out an estimation of the demands of the situation, and then evaluate their
55 abilities to cope with it and of the eventual consequences. If the athletes perceive that their abilities
56 or resources are not enough strong for to cope with the situation successfully, they are more likely to
57 show stress responses, along with attentional and physiological changes, placing the athlete in a
58 situation of greater risk of injury [13,14]. These athlete's responses may be moderated by three main
59 factors: their personality; their previous history of stress events, and his/her coping resources and
60 strategies. These psychosocial variables can either attenuate or aggravate the athlete's stress
61 response capacity, and therefore affect the athlete's vulnerability to injury [15].

62 Going one step further regarding the severity of the consequences of the injury, it is well
63 documented that depression may be one of the emotional reactions which may appear after the
64 injury occurs [16]. And it is known that women are at least twice as likely to develop clinical
65 depressions compared with men, so this gender difference in the global population could also affect
66 the prevalence of depression in the athletes in some way [17].

67 Likewise, the relationship of the clinical depression and the lesions both at the work
68 (non-sports) and at home has been extensively investigated both as one of the predictors and as a
69 consequence of the injury. Thus, cohort studies have demonstrated the predictive capacity of the
70 depression regarding the incidence of accidental injuries [18]. Also, gender differences have been
71 found in factors associated with post-injury depression in the workplace [19]. However, despite the
72 potential risks associated with the clinical depression, such as suicidal ideation, there is a lack of
73 studies to study it in sports populations [20].

74 In a retrospective study, Brewer and Petrie [21] –using the *Epidemiological Studies Depression*
75 *Scale* (CES-D)- found that the symptoms of clinical depression in athletes who had suffered an injury
76 in the past season they played were significantly higher than the symptoms shown by those who
77 had not suffered any injury during the same season. Looking for gender differences, they found
78 significant differences between the female athletes who had reported an injury and those who had
79 not, while these differences did not appear in male athletes. Later, Appaneal et al. [22], using
80 self-reported interviews, also found gender differences with considerable size effects, significantly
81 related to the injuries duration.

82 However, as was indicated above, the main line of research has been developed after the
83 Andersen & Williams model [13,14], being mainly focused twofold. First, we have a large amount of
84 the research on the relationship between high levels of stress and the narrowing of the attentional
85 field, as well on the relationship between training in muscular and mental relaxation and the
86 improvement of the perception and discrimination of the peripheral and central field of vision
87 [23,24]. Second, research has been also centered on how some variables can mediate the relationship
88 between the level of perceived stress and the injury, such is the case of the competitive anxiety,
89 depression, coping strategies, social support, etc. [25,26]. However, the results have not always been
90 coincident, and even sometimes they are contradictory.

91 However, very few studies have tried to analyze if this stress model is able to explain well the
92 mechanisms of stress response in male and female athletes. For instance, Andrews & Chen [27]
93 analyzed the mental toughness and coping strategies of male and female athletes regarding their
94 relationship with sport injuries, finding that men showed a higher level of mental toughness than
95 the female athletes. In addition, male athletes showed greater self-esteem and better coping
96 resources -such as focusing on task, or a greater use of the visualization technique- while women
97 showed greater detachment and resignation, as coping strategies. In this same vein, some studies
98 indicate that there are significant differences between male and female athletes regarding this levels

99 of competitive anxiety [28], or on how they deal with the stress related to the competitive sport
100 practice [29], indicating also some differences when considering the coping strategies used for to
101 face the stress which may appear after the injury occurs [27].

102 Therefore, and guided by current theory, our objective was to examine the post-injury
103 psychological impact. More specifically, we have examined if there are differences in the stress,
104 anxiety and depression levels between men and women football players (football association and
105 indoor football) who have suffered at least one injury during the last season played respect to similar
106 players who have not been injured.

107 2. Materials and Methods

108 2.1. Design and participants

109 A descriptive cross-sectional design was used. The participants were 187 football players (55.6%
110 women and 44.4% men; 82.4% football association and 17.6% indoor football), aged between 16 and
111 34 years old, with a mean age of 22.07 years (\pm 4.7) belonging to teams of similar competitive level of
112 the Football Federation (3^a and 2^a B of football association; 1^a, 2^a and 3^a of indoor football). Of the
113 total sample, 58.3% of the players had suffered an injury during the last season played, and the
114 41.7% had not been injured during the same season.

115 2.2. Variables and instruments

116 The protocol for collecting epidemiological data on the player's injuries was based on the
117 definition and injury registry system coming from Junge et al. [30], used in follow-up studies of the
118 International Olympic Committee (IOC) and the International Federation of Football Associations
119 (FIFA). Added to that, a Self-reported Questionnaire [31] was used to record the number, type and
120 severity of injuries sustained during the previous sports season (which lasted approximately one
121 year), marking clearly the player's current situation being injured or not injured at the time of the
122 study.

123 To evaluate the psychological variables, the Spanish version of the DASS-21 questionnaire was
124 used [32]. It is composed of 21 items - Likert type with four response options-, and measure the basic
125 symptoms of depression, anxiety and stress. The DASS have adequate psychometric reliability and
126 validity properties in a range between .73 and .81 [32].

127 2.3. Procedure

128 A list of the federated clubs was requested to the Football Federation of the Region of Murcia
129 (Spain), and those teams that met the requirements of sampling by convenience were selected:
130 geographical viability and facility of the contacts. Later, an appointment was made with the sports
131 directors and meetings were organized with the players and coaches of each team to explain the
132 objectives of the study, clarify doubts and request their participation. Finally, those players who
133 agreed to participate in the research signed an informed consent. The study was conducted in
134 accordance with the Declaration of Helsinki.

135 2.4. Statistical analysis

136 First, a descriptive analysis of the variables was performed showing means and standard
137 deviations. After analyzing the normality of the data with the Kolmogorov-Smirnov test, it was
138 found that the data were normal, so it will use parametric statistics. Subsequently, the Student's *T*
139 test was used for independent samples, using Cohen's *d* for the calculation of the effect size. In all
140 cases, a significance level of $p < .05$ was used. The data were analyzed with the statistical package
141 SPSS, V. 21.0.
142

143 3. Results

144 Table 1 shows the mean values and the standard deviation of the variables Stress, Depression
145 and Anxiety, for both the injured and non-injured athletes in Males.
146

Table 1. Mean \pm SD of the studied variables in **Males**

Variables	Injured (<i>n</i> = 52)	Non-injured (<i>n</i> = 31)
Stress	15.07 \pm 7.83	15.61 \pm 9.66
Depression	8.42 \pm 7.89	7.35 \pm 6.76
Anxiety	6.84 \pm 6.92	4.32 \pm 3.26

147 Table 2 shows the mean values and the standard deviation of the variables Stress, Depression
148 and Anxiety, for both the injured and non-injured athletes in Female.
149
150

Table 2. Mean \pm SD of the studied variables in **Female**

Variables	Injured (<i>n</i> = 57)	Non-injured (<i>n</i> = 47)
Stress	13.08 \pm 7.47	16.97 \pm 7.78
Depression	7.92 \pm 7.09	10.08 \pm 8.20
Anxiety	7.75 \pm 6.66	9.40 \pm 7.92

151 The data presented in Table 1-2 show that -regarding the male players- the non-injured ones
152 presented values slightly higher than those who were injured in Stress, and slightly lower in
153 Depression, although no statistically significant differences were found ($t_{81} = .276, p = .783$, and $t_{81} =$
154 $-.628, p = .532$). Statistically significant differences were observed between the injured and
155 non-injured players in the variable Anxiety ($t_{77.80} = -2.243, p = .028, d = .465$).
156

157 When we observe the female players' data, it can be seen that in the three variables analyzed,
158 the values of the non-injured ones are slightly higher than those of the injured players, although no
159 statistically significant differences were observed in either Depression or Anxiety ($t_{102} = 1.437, p =$
160 $.154$, and $t_{102} = 1.153, p = .251$), but these differences are significant regarding the variable Stress
161 ($t_{102} = 2.592, p = .011, d = .51$).

162 On the other hand, the data in Table 1-2 indicate that there were no statistically significant
163 differences between injured male and female players regarding the Stress ($t_{107} = 1.356, p = .178$),
164 nor in Depression ($t_{107} = .344, p = .732$), the same with the Anxiety ($t_{107} = -.698, p = .487$). Similarly,
165 when we observe the non-injured athletes, there were no statistically significant differences in either
166 Stress ($t_{76} = -.688, p = .494$) or Depression ($t_{76} = -1.539, p = .128$), but significant differences were
167 found in Anxiety ($t_{66.07} = 3.920, p = .001, d = .83$).

168 4. Discussion

169 This study was aimed to determine if there were differences in the stress, anxiety and
170 depression levels among those football players who had suffered at least one injury during their last
171 season played respect to those who had not suffered any injuries, as well as to establish if there were
172 gender differences in these groups.

173 The results of the study clearly show that there are no differences in levels of perceived stress,
174 anxiety and depression among male and female football players who had suffered at least one sports
175 injury. It can be said that the injury situation affects men and women emotionally in a quite similar
176 way, in contrast to some previous research in the field of sports, but in agreement with other studies
177 that have analyzed the way to deal with the stress related to the injury. In this sense, the work of
178 Andrews and Chen [27] shows that men show greater mental toughness while female athletes show
179 greater detachment and resignation from the injury, in addition to minor differences in the
180 preference of use of the different coping strategies, such as occur with the visualization technique.

181 However, this result contrasts with the difference found in levels of competitive anxiety
182 between uninjured male and female athletes who are in full sports practice. Female athletes seem to
183 manifest a higher level of anxiety than men, agreeing with previous studies that have also shown
184 that there are significant differences in competitive anxiety between men and women [28] and even
185 with some studies that have found some differences in the way of dealing with the stress associated
186 with the competitive practice [29]; and against others who have not found such kind of differences
187 [33]. Although there are differences found regarding the way coping strategies are used by both
188 genders, it has also been reported that there were no fundamental gender differences in coping with
189 the stress of competition when the perceived it in a similar way. In a meta-analysis of the use of
190 stress coping strategies (not only in sport), a mixed situation has been found: the differences between
191 gender focus on the typology of the strategies used, as well as on the perception of the magnitude of
192 the stressor, rather than the background of the differential relationship between gender and the
193 coping styles [34].

194 On the other hand, the results of the study show that within the male players, those who had
195 suffered an injury showed significantly higher anxiety values than those who had not been injured,
196 being in agreement with other studies [11,35]. This is a collateral facet that sometimes has been
197 associated with other quite relevant psychological indicators at the injury rehabilitation process,
198 such as the player's perceived fatigue. In this vein, Liberal et al. [36] found that during the last
199 rehabilitation phase of several injured football players, there was an increase in perceived fatigue
200 and anxiety, as well as lack of concentration, and an increment in the worry about their own
201 performance in competition, accompanied with a lack of confidence in their abilities, and a some
202 decrease in their motivation towards the practices too. Although it is possible to say that the
203 emotional functioning of the two groups of the present study is pretty similar, it is important to
204 consider the different levels of anxiety between these two studies, attending the fact that this level
205 correlates with their perception of the magnitude of the threat and worry with their situation. This
206 point, as seen before, is very important regarding the prevention side of the psychological
207 interventions with injured athletes [12,37]. And although in the Ivarsson et al. [9] meta-analysis, the
208 role of the athletes' personality traits -which could include the trait anxiety- is found to have to a
209 marginal association with the injury rates, the current research should not overlook the influence of
210 a key aspect such as this.

211 Indeed, the results of the study show that in the group of players, those who had suffered an
212 injury showed significantly lower stress values than those who had not been injured, results that are
213 not in agreement with what is found in the majority of previous studies [9,25,31], Petrie et al. [25],
214 neither with should be predicted exclusively by the Andersen & Williams model [13,14].

215 In addition, in a very recent systematic literature review by Ivarsson et al. [9], the results
216 outlines again the role of the stress response as the more powerful predictor of the injury rates.
217 Perhaps, opposed to the male players, female footballers who are injured perceived their situation as
218 a decrease in their level of pressure and responsibility, something that may not happen while they
219 are active in practices and, above all, in competition. In any case, it should be considered as a
220 relevant data that should be studied deeply in the future.

221 Finally, it should be considered that despite the absence of significant differences in the variable
222 depression, it should be taken into account that if in the group of male players their scores in
223 depression are higher in the subgroup of injured players respect to the non-injured, within the
224 female players group occurs the opposite, being their scores higher in the group of non-injured
225 female. This fact also occurs in the same direction with the stress and anxiety variables in the same
226 subgroup of uninjured players, indicating thus a clear direction of the next research from this study,
227 perhaps following the path outlined by Appaneal et al. [22]. Consequently, it seems logical to
228 consider that some psychological features related to the health, such as stress, anxiety and, or
229 depression, could be, in one way or another, influencing both the players' vulnerability to injury and
230 rehabilitation and re-insertion processes [38,39], being verified the existence of a bias regarding the
231 gender of the athletes [17].
232

233 4.1. Limitations and future research

234 The sample number, without being too low, should be increased, which would obviously give
235 greater force to the statistical analysis of the data. On the other hand, perhaps it would also be
236 interesting to homogenize the sample with respect to the sport modalities, because although both
237 specialties shared common basic rules, the two sports have to be considered quite different in
238 physical and technical skills, both for practices and matches. Lastly, it is evident that studying sports
239 injuries with just a retrospective analysis may decrease the predictive value of the findings, so it
240 would seem good to use longitudinal or prospective designs in further studies on this topic.

241

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243 AG-M, MS and EO revised the work critically for important intellectual content; AO wrote the paper; AG-M,
244 MS and FR-P reviewed and edited the paper; all authors read and approved the final manuscript.

245

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250

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