

# Axis-I psychiatric morbidity in a sample of Egyptian competitive athletes

Doaa H. Hewedi, Heba F. Hendawy, Walaa M. Sabry, David A. Baron, Ahmed A. Abdel Gawad, Haytham M. Hassan

Department of Psychiatry, Ain Shams University Hospitals, Cairo, Egypt

Correspondence to Walaa Sabry, Lecturer of Psychiatry, MD in Psychiatry, Faculty of Medicine, Ain Shams University, Cairo, Egypt  
Tel: 01212366116;  
e-mail: [sabrywalaa@yahoo.com](mailto:sabrywalaa@yahoo.com)

Received 12 November 2015

Accepted 10 November 2015

Egyptian Journal of Psychiatry  
2016, 37:25–35

## Background

Competitive sport environment puts athletes under a significant amount of psychological burden and stress. Despite the great effort and recent interest in athletic achievements, studies on the prevalence of mental health disorders in athletes are still lacking.

## Aim

This study aimed to provide an insight into the prevalence of different psychiatric morbidities in a sample of Egyptian competitive athletes and to identify the association of psychiatric morbidity prevalence with the athlete's sex, weekly training hours, sport type, and sport injury as a unique experience facing the athletes.

## Participants and methods

A total of 101 competitive athletes were recruited from some of the sporting clubs in Cairo and Giza by using a stratified random sampling method. They were interviewed using the Structured Clinical Interview for DSM-IV (SCID-I) diagnoses.

## Results

SCID-I showed that 31.6% of the participants had current Axis-I psychiatric diagnosis, whereas 34.7% of them reported a history of past psychiatric morbidity. Phobic and adjustment disorders were the most common current psychiatric disorders among athletes. Depressive disorder not otherwise specified and dysthymia were encountered more in female athletes, and substance use was more common in their male counterparts. Combat players had the highest rate of adjustment disorder (48%), whereas the power games athletes had the highest rate of drug abuse (12%). Significant physical injury during the past year was associated with high rates of dysthymia, post-traumatic stress disorder, and social phobia.

## Conclusion

Athletes in Egypt showed among them a high rate of Axis-I psychiatric diagnoses, which could not be ignored and necessitates professional mental health attention for early detection and intervention.

## Keywords:

Axis-I, competitive athletes, morbidity, SCID-I

Egypt J Psychiatr 37:25–35  
© 2016 Egyptian Journal of Psychiatry  
1110-1105

## Introduction

Studies researching into the relationship between sport participation and mental health has yielded conflicting results (Storch *et al.*, 2005; Proctor and Boan-Lenzo, 2010). A number of studies have suggested that participation in sport is associated with psychological privileges and that it acts as a buffer against various sources of stress (Proctor and Boan-Lenzo, 2010).

In contrast to these findings, a growing body of research has provided evidence that competitive athletes are not immune to struggle with their mental well-being (Glick and Horsfall, 2001; Storch *et al.*, 2005; Gill, 2008). They often encounter unique stressors that the general population does not have to deal with, such as time demands, relationships with coaches, missed scheduled classes, stress of competitions, pressures of meeting expectations and pleasing those around them, negotiating relationships, retirement from sport, and

performance anxiety (Storch *et al.*, 2005; Yang *et al.*, 2007; Proctor and Boan-Lenzo, 2010). In addition, student-athletes usually play different identity roles as they are expected to meet the demands of being a student as well (Storch *et al.*, 2005; Yang *et al.*, 2007). Balancing different identity roles can be a significant challenge for the collegiate athlete and this role conflict or interference has been found to negatively affect their mental health (Settles *et al.*, 2002; Killeya-Jones, 2005).

Studies have showed that competitive athletes might experience a wide range of psychiatric and psychological problems (Glick and Horsfall, 2005). Yet, they are

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

hesitant in consulting a psychiatrist for the fear of getting stigmatized (Glick and Horsfall, 2001). Athletes could present with mood, anxiety, and other neurotic disorders (Anderson *et al.*, 1994; Cogan, 1998). Furthermore, substance abuse and antisocial behavior are not uncommon in sports (Martin and Thrasher, 1998). In spite of these rising researches in the field of sports psychiatry, epidemiological studies on psychiatric disorders in athletes are still lacking (Broshek and Freeman, 2005; Reardon and Factor, 2010). Four possible associations between competitive sport activity and psychiatric disorders have been described:

- (i) Athletes may be higher achievers in spite of a coexistent primary psychiatric disorder;
- (ii) Athletic pursuits could be their way of coping with a disorder; or
- (iii) The sport itself causes worsening of the already existing psychiatric illness;
- (iv) Moreover, injury, competitive failure, aging, retirement from sport, and other psychosocial stressors could precipitate mental disorder in athletes (Baum, 2000, 2003).

The lack of data on the mental health status of athletes makes it difficult to develop suitable mental health interventions (Yang *et al.*, 2007). Thus, through this study we aimed to shed light on the prevalence of the common psychiatric morbidities in Egyptian competitive athletes and to identify the possible relationship between psychiatric morbidity with the type of practised sport, amount of weekly training hours, sex difference, and unique experiences facing the athletes such as sport trauma.

### Study hypothesis

We hypothesized that the prevalence of psychiatric morbidity among competitive athletes would be higher than that of the general population and that there would be unique factors associated with high prevalence rate, like specific sex, certain sport types, higher weekly training hours, and unhealed sport physical injury.

---

## Participants and methods

### Study design

The current study was cross-sectional in nature, and was conducted on a sample of Egyptian competitive athletes.

### Site of the study

The participants were selected from the Egyptian sporting clubs that compete in national championships in Cairo and Giza.

### Selection of participants

Participants were selected using the stratified random sampling method. The original sample consisted of 104 athletes. We included Egyptian competitive athletes who were 18 years old or more, could read and write, were still participating in national competitions, and who agreed to give an informed consent; athletes of both sexes were included in the study. The only cause for exclusion was the refusal of the athlete to participate in the study and sign for the study consent. Two athletes withdrew their consent just before the start of the study, without giving specific explanation, and another participant left his club and changed his contact details. Thus, we were left with 101 athletes, all of whom participated in the study.

The participants were further divided into four groups according to the type of their sports: combat sports (karate and judo), individual power sports (running, discus throw, shot put, and jumping), team sports (basket, hand, and volleyball), and other individual sports (tennis, badminton, and parachuting).

### Operational definition

The competitive athlete has been described as one who participates in an organized team or individual sport requiring systematic training and regular competition against others while placing a high premium on athletic excellence and achievement (Maron and Mitchell, 1994).

Different levels of competitions were identified, ranging from national (at the level of governorates or the whole country), regional (at the level of Arab, Mediterranean, or African countries), and international competitions (including the World Cup, Olympic, and other official international championships). In this study, the competitive athletes were chosen from those who were at least participating in national competitions.

### Ethical considerations and approvals

Ethical approval for the study was granted by the Ain Shams University Ethical and Research Committee. The authors also received the approval of the National Sports Council before starting the study procedure and got their recommendation letters to the suggested clubs, as well as the approval of the club managers.

In addition, a written informed consent was taken from each athlete to whom we explained the full procedure and the aim of the study. All the participants had the

right to withdraw from the research at any time without giving reasons, and without any negative consequences.

### Tools

- (1) A designed questionnaire was used to gather data about the athletes' sex, age, type of sport, number of sports that they regularly played, training hours, level of competition, and history of significant physical injury that prevented them from practicing their sport the year before the study.
- (2) Structured Clinical Interview for DSM-IV-Clinician Version (SCID-CV) (First *et al.*, 1997) Arabic version (El Missiry *et al.*, 2004). It contains seven diagnostic modules, focused on different diagnostic groups: mood, psychotic, substance abuse, anxiety, somatoform, eating, and adjustment disorders. Arabic version of SCID-I-CV was translated by El Missiry *et al.* (2004) and was validated through its use in numerous studies conducted in research centers in Egypt. We used the clinical version for a relatively easier administration in clinical setting.

### Procedures

For the purpose of confidentiality, we chose to make appointments with the athletes before or after the training time and conducted the interview away from other team members and coaches. The study was carried out over a 15-month period. Participants found to be suffering from any psychiatric disorder were informed about their condition and referred for further assessment and management. The fear of stigma was the main reason behind participants' refusal to involve their coaches and family members to get collateral information.

### Statistical analysis

Data were organized, tabulated, and transferred on the statistical package for the social sciences (SPSS, version 17; SPSS Inc., Chicago, Illinois, USA), using a personal computer; all the suitable statistical parameters were used. Student's *t*-test was used for comparison between means of two groups of participants. The Pearson  $\chi^2$ -test was used to test for significant association between different categorical variables. A statistical level of significance was set at 0.05.

## Results

### Sociodemographic and sport data of the study participants

A total of 101 athletes were enrolled into this study. Athletes of both sexes were included with an equal

distribution. The mean age of the participants was  $21.8 \pm 3.4$  years. In terms of the type of sport, participants were equally distributed into the four types of the studied sports (combat, individual power, team, others). Results showed that 44.6% of the participants were receiving 11–18 h of weekly training (the mean for weekly training hours was  $14.38 \pm 6.66$ ) and that 12% of the study athletes were playing more than one game. Detailed data are shown in Table 1.

### Prevalence of psychiatric disorders among study participants

We used SCID-I-CV to detect Axis-I DSM-IV diagnoses. The athletes who reported having symptoms were categorized according to the time of the attack as follows:

- (i) Never: the participant never had symptoms amounting to Axis-I diagnosis, neither currently nor in the past;
- (ii) Past: had clinical diagnosis in the past; and (iii) current: this was either the first time to have Axis-I

**Table 1** Demographic and sport data of the sample

Variables	Frequency (%)
Sex	
Males	51 (50.5)
Females	50 (49.5)
Age (years)	
Mean $\pm$ SD	21.88 $\pm$ 0.46
<20	30 (29.7)
20–24	49 (48.5)
>24	22 (21.8)
Type of sport	
Combat	25 (24.8)
Power	25 (24.8)
Team	25 (24.8)
Others	26 (25.7)
Number of sports regularly played	
1	89 (88.1)
>1	12 (11.9)
Training hours/week	
Mean $\pm$ SD	14.3 $\pm$ 6.6
<11	34 (33.7)
11–18	45 (44.6)
>18	22 (21.8)
Level of competition	
National	31 (30.7)
Arab/African	47 (46.5)
International	23 (22.8)
Physical injury last year	
No	48 (47.5)
Healed, playing	35 (34.7)
Healed, not playing	7 (6.9)
Not healed, not playing	6 (5.9)
Not healed, Playing	5 (5)

diagnosis and he/she had symptoms at time of the interview. For substance use disorders (SUDs), the term occasional use describes a sporadic use of substance not fulfilling the criteria for any of the SUD categories.

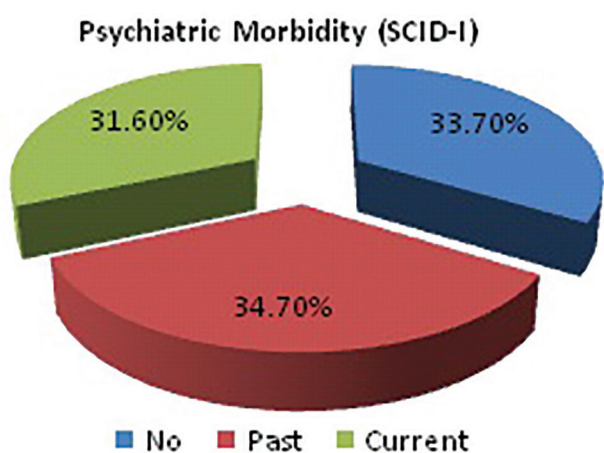
As shown in Fig. 1, 31.6% of the participants had current psychiatric morbidity (one or comorbid psychiatric disorders), whereas 34.7% of them had a past history of psychiatric diagnosis (one or comorbid diagnoses). Thus, 66.3% of the participants had an Axis-I DSM-IV diagnosis at some point in their life (past, current).

None of the study participants were having past or current history of bipolar I disorder, psychotic disorders, hypochondriasis, or bulimia disorders.

Specific phobia was found by far to be the most common current Axis-I diagnosis (15.8%) in athletes, and then adjustment disorder (11.9%), followed by dysthymia (6.9%) (Table 2). The percentage of current specific diagnoses (58.4%) exceeded the overall percentage of the current SCID-I diagnoses (31.6%) because of the presence of comorbid disorders, as 27 (26.7%) athletes were found to have comorbid anxiety and depressive disorders.

The most common past diagnoses among participants were specific phobia (18.8%), followed by adjustment disorder (11.9%), and then social phobia (10.9%) (Table 2). Participants reported that they did not seek any psychiatric advice or received any medications for their past psychiatric symptoms. The percentage of past specific diagnoses (85.4%) exceeded the overall percentage of the past SCID-I diagnoses (34.7%) because of the presence of comorbid disorders, as 51 (50.7%) athletes were found to have either one or two comorbid disorders.

Figure 1



Axis-I psychiatric morbidity among athletes.

Mood and anxiety disorders represented the most common current Axis-I diagnosis in the study sample. Depressive disorder was collectively found in 19.9% of the participants at the time of interview, as 4% had current major depression, 5% had depressive disorder not otherwise specified (NOS), and 6.9% had dysthymia. Overall, 2% had bipolar affective disorder (BAD) II disorder and 2% had BAD NOS. Whereas current anxiety disorder (panic, social phobia, specific phobia, obsessive compulsive disorder (OCD)) was found in 22.8% of the participants (Table 2).

With regard to illicit substances used by the participants, three (3%) athletes reported past use of

Table 2 Prevalence of current and past psychiatric morbidity among athletes

	Frequency (%)
<i>Current psychiatric morbidity (SCID-I)</i>	
Mood disorders	20 (19.9)
Depression	4 (4.0)
Depression (NOS)	5 (5.0)
Dysthymia	7 (6.9)
BAD II	2 (2)
BAD NOS	2 (2)
Anxiety disorders	23 (22.8)
Panic	1 (1.0)
OCD	4 (4.0)
Social phobia	3 (3.0)
Specific phobia	16 (15.8)
Somatiform disorders	2 (2)
Somatization	1 (1.0)
Body dysmorphic disorder	1 (1.0)
Eating disorders	1 (1)
Anorexia	1 (1.0)
Adjustment disorder	12 (11.9)
<i>Past psychiatric morbidity (SCID-I)</i>	
Mood disorders	18 (17.9)
Depression	2 (2)
Depression NOS	9 (8.9)
Dysthymia	4 (4.0)
BAD NOS	3 (3.0)
Anxiety disorders	46 (45.6)
Panic disorder	1 (1.0)
OCD	7 (6.9)
PTSD	5 (5.0)
Agoraphobia	1 (1.0)
Social phobia	11 (10.9)
Specific phobia	19 (18.8)
GAD	2 (2.0)
Somatiform disorders	3 (3)
Somatization	3 (3.0)
Eating disorders	4 (4)
Anorexia	4 (4.0)
Adjustment disorder	12 (11.9)
SUD	3 (3)
Past abuse	3 (3.0)

SCID-I, Structured Clinical Interview for DSM-IV; SUD, substance use disorder; NOS, not otherwise specified; BAD, bipolar affective disorder; OCD, obsessive compulsive disorder; PTSD, post traumatic stress disorder; GAD, generalized anxiety disorder.

substance, mainly cannabis (3%); all athletes denied any current use of substance (Table 2).

Four (4%) athletes reported occasional use of two or more substances as follows: two players used cannabis and alcohol, one used cannabis and opiates (tramadol), and one used cannabis and benzodiazepines. Thus, cannabis (4%) was the most frequently used substance, followed by alcohol (2%), opiates, and benzodiazepine (each 1%). The main reasons reported by these athletes for using these substances were out of desire to seek novel experiences and to share it with his/her peers. The one who used tramadol was a long distance runner, and admitted that he used it to increase his workout.

A total of 47 (46.5%) athletes reported using supplements at the time of the study. All of them denied the use of anabolic steroids and mentioned using amino acids, vitamins, iron, etc. They used them without medical prescription, depending on their coaches' and peers' experience or their own trials. They used it for the purpose of doping in an attempt to enhance their performance and gain competitive advantage.

#### Sex differences in the prevalence of psychiatric morbidity among athletes

Comparisons between male and female participants in the study were made regarding the overall prevalence of past and current psychiatric morbidity using SCID-I. Having a psychiatric disorder in general did not differ significantly between male and female athletes. Whereas the results revealed that more females than males displayed the diagnoses of depression NOS and dysthymia ( $P = 0.019$  and  $0.023$ , respectively). In contrast, males had the SUD diagnoses more than did females ( $P = 0.025$ ) (Table 3).

#### Psychiatric morbidity in relation to amount of training hours

Results showed that no significant association between any of the Axis-I psychiatric morbidities and various amounts of training hours (Table 4).

#### Psychiatric morbidity in relation to the sport type

The sports groups were compared as regards the results of SCID-I, with no significant difference found on the rate of presence of different Axis-I diagnoses except for adjustment disorder and SUD. Combat players were found to have the highest rate of adjustment disorder (12 athletes,  $P = 0.011$ ), whereas power games athletes had the highest rate of drug abuse (three athletes,  $P = 0.017$ ) (Table 5).

#### Relation between significant last year physical injury and psychiatric morbidity among athletes

SCID-I results demonstrated statistical difference between

**Table 3 Sex difference in the prevalence of psychiatric morbidity among athletes**

Psychiatric morbidity (SCID-I)	Sex		Total	P value ( $\chi^2$ )
	Male	Female		
SCID-I				
Never	19	15	34	0.440
Yes	32	35	67	
Depression				
Never	49	46	95	0.386
Yes	2	4	6	
Depression NOS				
Never	48	39	87	0.019*
Yes	3	11	14	
BAD II				
Never	50	49	99	0.989
Yes	1	1	2	
BAD NOS				
Never	47	49	96	0.179
Yes	4	1	5	
Dysthymia				
Never	49	41	90	0.023*
Yes	2	9	11	
Panic				
Never	51	48	99	0.149
Yes	0	2	2	
OCD				
Never	49	43	90	0.321
Yes	4	7	11	
PTSD				
Never	49	47	96	0.630
Yes	2	3	5	
Agoraphobia				
Never	51	49	100	0.310
Yes	0	1	1	
Social phobia				
Never	46	41	87	0.233
Yes	5	9	14	
Specific phobia				
Never	37	29	66	0.124
Yes	14	21	35	
GAD				
Never	51	48	99	0.149
Yes	0	2	2	
Somatization				
Never	50	47	97	0.298
Yes	1	3	4	
Body dysmorphic disorder				
Never	50	50	100	0.320
Yes	1	0	1	
Anorexia				
Never	50	46	96	0.162
Yes	1	4	5	
Adjustment disorder				
Never	42	35	77	0.145
Yes	9	15	24	
Substance use disorders				
Never	44	50	94	0.025*
Abuse	3	0	3	
Occasional	4	0	4	

Never, the participant never has any symptoms suggestive of psychiatric disorder; Yes, the participant had a current or past attack; SCID-I, Structured Clinical Interview for DSM-IV; NOS, not otherwise specified; BAD, bipolar affective disorder; OCD, obsessive compulsive disorder; PTSD, post traumatic stress disorder; GAD; generalized anxiety disorder; \*Significant statistical difference.

**Table 4 Relation between psychiatric morbidity and amount of training hours/week**

Psychiatric morbidity (SCID-I)	N	Training hours/week (mean ± SD)	P value (t-test)
<b>SCID-I</b>			
Never	34	13.97 ± 7.606	0.673
Yes	67	14.57 ± 6.180	
<b>Depression</b>			
Never	95	14.41 ± 6.839	0.792
Yes	6	13.67 ± 2.733	
<b>Depression NOS</b>			
Never	87	14.52 ± 6.791	0.573
Yes	14	13.43 ± 5.932	
<b>BAD II</b>			
Never	99	14.27 ± 6.694	0.323
Yes	2	19.00 ± 1.414	
<b>BAD NOS</b>			
Never	96	14.45 ± 6.810	0.592
Yes	5	12.80 ± 2.168	
<b>Dysthymia</b>			
Never	90	14.50 ± 6.930	0.567
Yes	11	13.27 ± 3.849	
<b>Panic</b>			
Never	99	14.34 ± 6.727	0.809
Yes	2	15.50 ± 0.707	
<b>OCD</b>			
Never	90	14.48 ± 6.858	0.633
Yes	11	13.45 ± 4.906	
<b>PTSD</b>			
Never	96	14.45 ± 6.782	0.592
Yes	5	12.80 ± 3.701	
<b>Agoraphobia</b>			
Never	100	14.43 ± 6.664	0.339
Yes	1	8.00	
<b>Social Phobia</b>			
Never	87	14.09 ± 6.734	0.304
Yes	14	16.07 ± 6.145	
<b>Specific phobia</b>			
Never	66	14.26 ± 6.799	0.823
Yes	35	14.57 ± 6.487	
<b>GAD</b>			
Never	99	14.41 ± 6.696	0.614
Yes	2	12.00 ± 5.657	
<b>Somatization</b>			
Never	97	14.25 ± 6.739	0.380
Yes	4	17.25 ± 3.775	
<b>Body dysmorphic disorder</b>			
Never	100	14.28 ± 6.638	0.194
Yes	1	23.00	
<b>Anorexia nervosa</b>			
Never	96	14.58 ± 6.726	0.152
Yes	5	10.20 ± 3.493	
<b>Adjustment disorder</b>			
Never	77	14.69 ± 6.677	0.387
Yes	24	13.33 ± 6.644	
<b>SUD</b>			
No	94	14.13 ± 6.643	0.409
Abuse	3	18.33 ± 3.512	
Occasional use	4	17.00 ± 8.718	

Never, the participant never has any symptoms suggestive of psychiatric disorder; Yes, the participant had a current or past attack; SCID-I, Structured Clinical Interview for DSM-IV; SUD, substance use disorder; NOS, not otherwise specified; BAD, bipolar affective disorder; OCD, obsessive compulsive disorder; PTSD, post traumatic stress disorder; GAD; generalized anxiety disorder.

**Table 5 Psychiatric morbidity among athletes in relation to the type of sport**

Psychiatric morbidity (SCID-I)	Type of sports				Total	P value
	Combat	Team	Others	Power		
<b>SCID-I</b>						
Never	7	7	12	8	34	0.464
Yes	18	18	14	17	67	
<b>Depression</b>						
Never	22	24	25	24	95	0.535
Yes	3	1	1	1	6	
<b>Depression NOS</b>						
Never	20	21	25	21	87	0.367
Yes	5	4	1	4	14	
<b>BAD II</b>						
Never	24	25	26	24	99	0.556
Yes	1	0	0	1	2	
<b>BAD NOS</b>						
Never	23	25	24	24	96	0.520
Yes	2	0	2	1	5	
<b>Dysthymia</b>						
Never	23	24	23	20	90	0.310
Yes	2	1	3	5	11	
<b>Panic</b>						
Never	25	25	25	24	99	0.572
Yes	0	0	1	1	2	
<b>OCD</b>						
Never	23	20	24	23	90	0.417
Yes	2	5	2	2	11	
<b>PTSD</b>						
Never	23	24	25	24	96	0.883
Yes	2	1	1	1	5	
<b>Agoraphobia</b>						
Never	25	25	25	25	100	0.405
Yes	0	0	1	0	1	
<b>Social phobia</b>						
Never	22	22	22	21	87	0.962
Yes	3	3	4	4	14	
<b>Specific phobia</b>						
Never	16	16	16	18	66	0.874
Yes	9	9	10	7	35	
<b>GAD</b>						
Never	25	25	25	24	99	0.572
Yes	0	0	1	1	2	
<b>Somatization</b>						
Never	24	23	26	24	97	0.543
Yes	1	2	0	1	4	
<b>Body dysmorphic disorder</b>						
Never	25	25	26	24	100	0.381
Yes	0	0	0	1	1	
<b>Anorexia</b>						
Never	24	23	25	24	96	0.883
Yes	1	2	1	1	5	
<b>Adjustment</b>						
Never	13	22	22	20	77	0.011*
Yes	12	3	4	5	24	
<b>SUD</b>						
Never	24	22	26	22	94	0.017*
Abuse	0	0	0	3	3	
Occasional	1	3	0	0	4	

Never, the participant never has any symptoms suggestive of psychiatric disorder; Yes, the participant had a current or past attack; SCID-I, Structured Clinical Interview for DSM-IV; SUD, substance use disorder; NOS, not otherwise specified; BAD, bipolar affective disorder; OCD, obsessive compulsive disorder; PTSD, post traumatic stress disorder; GAD; generalized anxiety disorder; \*Significant statistical difference.

injured and noninjured groups of athletes. The differences were in the presence of Axis-I disorder in general ( $P = 0.033$ ). More specifically, dysthymia, post traumatic stress disorder (PTSD), and social phobia were the most prevalent disorders in injured athletes (who had significant physical injury affecting their participation in competitions during the year preceding the interview) (Table 6).

### Discussion

Studies on the prevalence of psychiatric disorders among athletes are scarce. The fear of stigma and widespread assumption that only psychiatrically free athletes are able to compete at the highly professional level are the main reasons behind the deficiency of psychiatric research in this field (Linder *et al.*, 1991). Athletes themselves have a high tendency to minimize apparent signs of weakness. Moreover, athletic behaviors sometimes resemble symptoms of mental disorders (e.g. meticulous attention to diet, relative hyperactivity), thereby confounding recognition of illness (Reardon and Factor, 2010). But available research data about the prevalence of mental disorders in this area alarmed mental health professionals that this hypothesis needs to be revised. There have been few studies looking at the prevalence of some psychiatric disorders in various athlete populations. Eating disorders and substance abuse are the most studied of these disorders and appear to be common problems in athletes (Reardon and Factor, 2010). However, to provide evidence-based understanding and treatment for this population group, we especially need more researches on the prevalence of other different psychiatric disorders and their associated risk factors. Thus, the aim of the current study was to detect the prevalence of psychiatric morbidity among a sample of Egyptian competitive athletes.

We used the SCID-I psychiatric interview to detect the psychiatric morbidity among athletes, both currently and in the past. Results illustrated that 31.6% of the participants had current Axis-I psychiatric diagnosis. To the best of our knowledge, no studies were found on the prevalence of each and different psychiatric disorders in athletes. Yet, several studies proposed that athletes experience psychiatric disorders, including mood disorders, at the same rate as does the general population (Burton, 2000; Reardon and Factor, 2010). Whereas trying to compare our findings with the results of the Egyptian national survey by Ghanem *et al.* (2009), we found that the findings of the current study revealed a higher prevalence (31.6%) of Axis-I diagnoses than did the Egyptian general population (16.93%). The difference could be explained by different methodological issues, like different tools of assessment, different age groups (being younger in the

**Table 6 Correlation between current Axis-I diagnosis and rate of unhealed physical injury during the last year**

Psychiatric morbidity (SCID-I)	Physical injury		Total	P value ( $\chi^2$ )
	No	Yes		
SCID-I				
Never	21	13	34	0.033*
Yes	27	40	67	
Depression				
Never	45	50	95	0.9
Yes	3	3	6	
Depression NOS				
Never	44	43	87	0.126
Yes	4	10	14	
BAD II				
Never	47	52	99	0.944
Yes	1	1	2	
BAD NOS				
Never	46	50	96	0.730
Yes	2	3	5	
Dysthymia				
Never	46	44	90	0.038*
Yes	2	9	11	
Panic				
Never	47	52	99	0.944
Yes	1	1	2	
OCD				
Never	45	45	90	0.154
Yes	3	8	11	
PTSD				
Never	48	48	96	0.036*
Yes	0	5	5	
Agoraphobia				
Never	48	52	100	0.339
Yes	0	1	1	
Social phobia				
Never	45	42	87	0.032*
Yes	3	11	14	
Specific phobia				
Never	29	37	66	0.322
Yes	19	16	35	
GAD				
Never	47	52	99	0.994
Yes	1	1	2	
Somatization				
Never	47	50	97	0.357
Yes	1	3	4	
Body dysmorphic disorder				
Never	48	52	100	0.399
Yes	0	1	1	
Anorexia				
Never	47	49	96	0.206
Yes	1	4	5	
Adjustment disorder				
Never	39	38	77	0.260
Yes	9	15	24	
SUD				
Never	83	11	94	0.632
Abuse	3	0	3	
Occasional	4	0	4	

Never, the participant never has any symptoms suggestive of psychiatric disorder; Yes, the participant had a current or past attack; SCID-I, Structured Clinical Interview for DSM-IV; SUD, substance use disorder; NOS, not otherwise specified; BAD, bipolar affective disorder; OCD, obsessive compulsive disorder; PTSD, post traumatic stress disorder; GAD; generalized anxiety disorder; \*Significant statistical difference.

current study), and different sample size (being smaller in our study).

As regards classification of psychiatric morbidity among athletes using SCID-I, results displayed that mood and anxiety disorders were the most common disorders (19.9 and 22.8%, respectively). These results are different than that reported for a similar age group in the national Egyptian survey by Ghanem *et al.* (2009), although they found that depressive and mood disorders were the most common among their sample, but their rates were much lower than our results (6.4% for mood disorder, 4.75% for anxiety disorders). A systematic review on some epidemiological studies on Egypt by Khalil *et al.* (2009) revealed that the prevalence of depressive disorder ranged between 8 and 10%. Another Egyptian study on the prevalence of depressive disorders among adolescent secondary school students revealed a prevalence rate of 13.3% for depressive disorders (Khalil *et al.*, 2010). Variation in results may be due to different sample size, tools used for assessment, and the age of the participants.

However, our findings are in agreement with that of a study by Yang *et al.* (2007), who found that more than 20% of the athletes had depressive symptoms, and by Markser (2011), who concluded that depression was the most common mental disorder affecting athletes. Other studies disagree with our findings, such as that by Oler *et al.* (1994), who reported that athletic participation was a marker for a decreased likelihood of depression and suicidal ideation, and a study by Donohue *et al.* (2004), who compared 72 National Collegiate Athletic Association (NCAA) athletes and 64 recreational athletes at one university with data previously collected on 435 control students at another university. They found no difference in psychiatric symptoms, including those of depression, between the recreational and NCAA athletes, and between all athletes and controls.

Surprisingly, none of the study athletes had received the diagnosis of bulimia disorder, and the diagnosis of anorexia nervosa among the study sample was as low as 1%, which is nearly similar to the rate of general population (Qian *et al.*, 2013). This finding is in contrast to the findings of several other studies, which found that the rate of anorexia or bulimia among athletes might range from 13 to 15% (Byrne and McLean, 2001; Black *et al.*, 2003; Sundgot-Borgen and Torstveit, 2004). This could be explained by the fact that the high figures in these previous studies were related mainly to the type of practiced sports. These previous studies involved sports that usually emphasize the importance of thinness, in which the body weight could affect the performance outcome, such as esthetic

sports (ballet-figure skating), sports with body weight classes, and those sports in which body weight could give an advantage, such as marathon running. The current study did not include such types of sports. This contributed to the low rates of eating disorders in the current study.

Our results pointed out that 34.7% of the athletes had past psychiatric disorder (one or more comorbid disorder) to which they did not seek or received any help. This could reflect the magnitude of unnoticed mental health problems among this population.

With regard to the prevalence of substance abuse among the studied sample, the current study detected a past history of abuse in 3% of the athletes, whereas in 4% only occasional use was reported. Cannabis was the most frequently used substance (4%), followed by alcohol (2%), opiates, and benzodiazepine (1% each). All athletes denied any current use of substance. Our results are similar to the results of the Egyptian survey by Ghanem *et al.* (2009), who found that alcohol and drug dependence/abuse were the least prevalent in their study (0.03 and 0.13, respectively) and that cannabis was the most commonly used substance. A systematic review on some epidemiological studies in Egypt by Khalil *et al.* (2009) revealed that cannabis was the most common substance used among Egyptians in the majority of studies on substance abuse; however, a wide range for abuse/dependence rate (3.9–39.3%) was reported in this systemic review.

In contrast, our results were markedly lower compared with the international large scale studies where alcohol use among college athletes has been reported to be as high as 75–93% for men athletes and 71–93% for women athletes (Johnson *et al.*, 2004), and with a study by Green *et al.* (2001), who found that alcohol was the most widely used drug in the past year in 80.5% of the athletes, followed by marijuana at 28.4%, and smokeless tobacco at 22.5%. The difference in results could be explained by several factors; the current study used only diagnostic interviewing tests, with no other sources of collateral information or laboratory investigations. In addition, the participants met the interviewer for the first time and that hindered them from being spontaneous and from openly answering such questions; this may be the cause that even those who reported their abuse, mentioned it was in the past. Cultural and religious influence should be taken in consideration with regard to the type of abused substance. The current study showed that alcohol abuse was reported to be less frequent than cannabis abuse, which is very common in the Arabic Islamic world. Alcohol is culturally and religiously unaccepted compared with cannabis, which is seen differently, as



a sign of manhood (Okasha, 1999). The current study showed that the males reported the use of a substance more than did females, which could be related to certain cultural constructs, especially in the Arab world, that accept the use of certain types of substances among males and strongly reject them for females.

Moreover, in the current study, 46.5% of the athletes reported use of supplements with an intention for enhancing their athletic performance, including amino acids, iron, vitamins, etc, and all athletes denied using androgen anabolic steroids (AASs). They reported getting their supplement through their coaches and peers. In a repeated survey into the frequency of doping among German professional athletes undertaken in 2009, it was estimated that 35% of them had consciously taken illegal performance-enhancing substances at least once during their sporting careers (Markser, 2011). AAS use was reported at 1.1% overall rate in other studies (Green *et al.*, 2001). In Jordan, 26% of the body-building athletes were found to be current users of AAS, and like Egyptian athletes, they reported receiving their supplements through their peers and coaches (Tahtamouni *et al.*, 2008).

Studying sex differences in the prevalence of psychiatric disorders among athletes has received scant research attention. In the current study, females displayed more depressive symptoms than did male athletes, specifically depression NOS and dysthymia disorders. This result agrees with the results of a study by Yang *et al.* (2007). It is still unclear why female athletes experience more symptoms of depression. But previous studies have reported a greater incidence of depression among female athletes compared with males (Donohue *et al.*, 2004; Storch *et al.*, 2005; Yang *et al.*, 2007). Various theories have been suggested to explain the reported sex difference in the prevalence of depression. Typically, these theories have pointed to potential hormonal or cognitive differences (LaFrance and Stoppard, 2006) and sex role socialization with different rearing environments, different social roles, and different societal attention toward female sports in general (Altemus, 2006). Another possible explanation for the results of this study is that women are generally more willing than men to seek help and thus report their symptoms (Yang *et al.*, 2007).

Surprisingly, results of the current study revealed that there was no significant relation between psychiatric morbidity and weekly training hours. We had expected to detect an increase in Axis-I diagnoses, especially mood disorders, among athletes with higher weekly training hours, as an indicator for extensive exercise. This is in contrast to the findings of several studies, like that by Morgan *et al.* (1987), who studied 400

competitive collegiate swimmers over 11 years and found that mood-state disturbance increased in a dose-response manner as the training stimulus increased during the season, and then fell to baseline with a reduction in training load. Other studies showed the incidence of depressive mood related to excessive training hours is estimated to be 7–20% per training season (Alves *et al.*, 2006), and this prevalence is believed to be even higher in the case of endurance sports (Mackinnon, 2000) and among elite athletes secondary to their extensive training program (Peluso and Andrade, 2005). Variability in results might be due to the fact that the smallest percentage (22%) of the study sample had an excessive training hours (>18 h), and a high proportion of the study sample (45%) had 11–18 training hours weekly and 33% of the study athletes were being trained less than 11 h weekly.

In terms of association of specific sport type with certain psychiatric morbidity, the difference between groups in certain Axis-1 diagnoses was found in adjustment disorder where the combat athletes showed the highest morbidity, as there is high competition level among the combat athletes. They usually focused on the individual differences between them and their competitors, who come into immediate contact with them; this in turn lead to heightened precompetition anxiety levels, which lead to frustration and depressive symptoms in cases of loss. SUD was the most common among the power sports group; this could be attributed to the nature of such sports that requires unique quality of performance regarding speed, power, and accuracy (Nia and Besharat, 2010).

Reporting physical injury during the past year was associated with the presence of SCID-CV positive diagnosis in the current study, particularly dysthymia, PTSD, and social phobia. This can be understood in the light of mutual relation and association between physical injury with mood and anxiety symptoms among athletes. This data have been confirmed in several previous studies (Wiese-Bjornstal *et al.*, 1995; Lavalley and Flint, 1996; Johnson, 1997; Wiese-Bjornstal *et al.*, 1998; Junge, 2000; Putukian and Echemendia, 2003; Broshek and Freeman, 2005; Galambos *et al.*, 2005; Walker *et al.*, 2007; Nippert and Smith, 2008; Lockhart, 2010). These studies added that physical injury could be caused by an increased level of anxiety, especially performance anxiety, and depressive symptoms. In addition, depressive and anxiety symptoms could develop as a response to physical injury itself and includes frustration, tension, grief, depression, low self-esteem, loss of identity, and anxiety from reinjury. Because psychological variables influence injury onset, duration, and recovery, many researchers have concluded that 'rehabilitation from

sport injury should involve not only physical, but psychological considerations' (Crossman, 1997).

## Conclusion

This study added to the limited research on the area of sport psychiatry. High prevalence of Axis-I disorders among Egyptian competitive athletes highlights the magnitude of overlooked mental health problems in this population group. The study showed that the percentage of current psychiatric morbidity was 31.7% among athletes, and past psychiatric morbidity was 34.7%, which could not be ignored. Depressive disorders were found to be higher in female athletes than in males, whereas SUD was more prevalent in male athletes than in females. Psychiatric morbidities were found to be associated with specific risk factors; some of them were unique to athletes themselves as the type of sport and history of unhealed injury. We recommend that all competitive athletes receive screening for their mental well-being as a routine assessment and those psychiatric symptoms in athletes should never be taken lightly, and should receiving care and support as early as possible. It is also extremely important for coaches to be familiar with the symptoms of common psychiatric disorders and the ways in which athletes may express their feelings. Finally, guiding athletes with the involvement of mental health specialist through injury or rehabilitation is of vital importance.

Further researches are needed to focus on the athletes' different coping strategies, prognosis, and the various therapeutic intervention that could be beneficial for the athletes.

## Strength and limitations

To the best of our knowledge, this study is one of the few that has investigated the prevalence of different psychiatric disorders among competitive athletes. The use of a valid reliable tool in assessment in the form of SCID-I strengthened the results.

However, our study was limited by a small sample size, which may limit the generalization of the study. Future epidemiological studies on large numbers of athletes at different stages of competition are mandatory to tailor preventive and interventional mental health services among athletes. Furthermore, it was a cross-sectional study, and thus caution is still warranted in explaining the findings compared with longitudinal studies, which would be more confirmative. Another limitation is the lack of comparison or control group with which to compare the prevalence of different psychiatric

disorders. A control group consisting of athletes who do not have any Axis-I psychiatric morbidity could have been used and strengthen the correlation analysis. Instead, we compared our results with those of other national surveys and systematic reviews on some national epidemiological studies. However, it would serve as a pilot research to be followed by more specific research into each psychiatric disorder.

## Acknowledgements

The authors thank Professor Aida Seif Eldawla and professor Mohamed Fekry for their great support and help. They also thank all athletes for their cooperation in this work.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

- Altemus M (2006). Sex differences in depression and anxiety disorders: potential biological determinants. *Horm Behav* 50:534–538.
- Alves RN, Costa LOP, Samulski DM (2006). Monitoring and prevention of overtraining in athletes. *Rev Bras Med Esporte* 12:262e–266e.
- Anderson M, Denson E, Brewer B, Van Raalte JL (1994). Disorders of personality and mood in athletes: recognition and referral. *J Appl Sport Psychol* 6:168–184.
- Baum AL (2000). Psychopharmacology in athletes. In: Beigel D, Burton RW, editors. *Sport psychiatry*. New York, NY: WW Norton and Company Inc. 249–259.
- Baum AL (2003). Evidence-Based Reviews Sport psychiatry: How to keep athletes in the game of life, on or off the field Some athletes' toughest opponents are depression, addictions, and eating disorders. Managing these patients' mental illnesses is a new niche for psychiatry. Vol 2.
- Black DR, Larkin LJ, Coster DC, Leverenz LJ, Abood DA (2003). Physiologic screening test for eating disorders/disordered eating among female collegiate athletes. *J Athl Train* 38:286–297.
- Broshek DK, Freeman JR (2005). Psychiatric and neuropsychological issues in sport medicine. *Clin Sports Med* 24:663–679.
- Burton RW (2000). Mental illness in athletes. In: Beigel D, Burton RW, editors. *Sport psychiatry*. New York, NY: WW Norton and Company Inc. 61–81.
- Byrne S, McLean N (2001). Eating disorders in athletes: a review of the literature. *J Sci Med Sport* 4:145–159.
- Cogan K (1998). Putting the 'clinical' into sport psychology counseling. In: Hays K, editor. *Integrating exercise, sports, movement, and mind: therapeutic unity*. New York: The Haworth Press. 131–143.
- Crossman J (1997). Psychological rehabilitation from sports injuries. *Sports Med* 23:333–339.
- Donohue, B, Covassin, D, Lancer K, Dickens Y, Miller A, Hash A, Genet J. (2004). Examination of psychiatric symptoms in student athletes. *J Gen Psychol* 131:29–35.
- El Missiry A, Sorour A, Sadek A, Fahy T, Abdel Mawgoud M, Asaad T (2004). Homicide and psychiatric illness: an Egyptian study [MD thesis]. Cairo: Faculty of Medicine, Ain Shams University.
- First MB, Spitzer RL, Gibbon M, Williams JBW, Benjamin LS (1997). *Structured Clinical Interview for DSM-IV-clinician version (SCID-CV) (user's guide interview)*. Washington, DC: American Psychiatric Press.
- Galambos SA, Terry PC, Moyle GM, Locke SA (2005). Psychological predictors of injury among elite athletes. *Br J Sports Med* 39:351–354.
- Ghanem M, Gadallah M, Meky FA, Mourad Sand El-Kholy G (2009). National survey of prevalence of mental disorders in Egypt: preliminary survey. *Eastern Mediterranean Health Journal* 15:65–75.
- Gill EL (2008). Mental health in college athletics: it's time for social work to get in the game. *Soc Work* 53:85–88.

- Glick JD, Horsfall JL (2001). Psychiatric conditions in sports: diagnosis, treatment, and quality of life. *Phys Sportsmed* 29:44–55.
- Glick JD, Horsfall JL (2005). Diagnosis and psychiatric treatment of athletes. *Clin Sports Med* 24:771–781.
- Green GA, Jryasz FD, Petr TA, Bray CD; (2001): NCAA study of substance abuse habits of college student-athletes. *Clin J Sport Med* 11:51–56.
- Johnson U (1997). Coping strategies among long-term injured competitive athletes. A study of 81 men and women in team and individual sports. *Scand J Med Sci Sports* 7:367–372.
- Johnson LD, O'Malley PM, Bachman JG, Schulenberg JE (2004). *Monitoring the future national survey on drug use, 1975–2003, volume II. College students and adults ages 19–25. NIH publication no. 04-5508*. Bethesda, MD: National Institute on Drug Abuse.
- Junge A (2000). The influence of psychological factors on sports injuries. Review of the literature. *Am J Sports Med* 28(Suppl 5):S10–S15.
- Khalil AH, Abou El Ella El, Hamed MAM, Lotfy MM (2009). Systematic review of some epidemiological studies on psychiatric disorders in Egypt [MSc thesis]. Cairo: Faculty of Medicine, Ain Shams University.
- Khalil AH, Rabie MA, Abd-El-Aziz MF, Abdou TA, El-Rasheed AH, Sabry WM (2010). Clinical characteristics of depression among adolescent females: a cross-sectional study. *Child Adolesc Psychiatry Ment Health* 4:26.
- Killea-Jones LA (2005). Identity structure, role discrepancy and psychological adjustment in male college student-athletes. *J Sport Behav* 28:167–185.
- LaFrance MN, Stoppard JM (2006). Constructing a non-depressed self: women's accounts of recovery from depression. *Feminism Psychol* 16, 307–325.
- Lavallee L, Flint F (1996). The relationship of stress, competitive anxiety, mood state, and social support to athletic injury. *J Athl Train* 31:296–299.
- Linder D, Brewer B, Van Raalte J, DeLange N (1991). A negative halo for athletes who consult sport psychologists: replication and extension. *J Sport Exerc Psychol* 13:133–148.
- Lockhart BD (2010). Injured athletes' perceived loss of identity: educational implications for athletic trainers. *Athl Train Educ J* 5:26–31.
- Mackinnon LT (2000). Overtraining effects on immunity and performance in athletes. *Immunol Cell Biol* 78:502–509.
- Markser VZ; (2011): Sport psychiatry and psychotherapy. Mental strains and disorders in professional sports. Challenge and answer to societal changes. *Eur Arch Psychiatry Clin Neurosci* 261 (Suppl 2):S182–S185.
- Maron, BJ, Mitchell, JH (1994). Revised eligibility recommendations for competitive athletes with cardiovascular abnormalities. *J Am Coll Cardiol* 24:848–850.
- Martin H, Thrasher D (1998). Chemical dependence and treatment of the professional athlete. In: Lawson G, Lawson A, editors. *Alcoholism and substance abuse in special populations*. New York: Aspen Publishers. 315–339.
- Morgan WP, Brown DR, Raglin JS, O'Connor PJ, Ellickson KA (1987). Psychological monitoring of overtraining and staleness. *Br J Sports Med* 21:107–114.
- Nia ME, Besharat MA (2010). Comparison of athletes' personality characteristics in individual and team sports. *Procedia SocBehav Sci* 5:808–812.
- Nippert AH, Smith AM (2008) Psychologic stress related to injury and impact on sport performance. *Phys Med Rehabil Clin N Am* 19:399–418.
- Okasha A (1999). Mental health in the Middle East: an Egyptian perspective. *Clin Psychol Rev* 19:917–933.
- Oler, MJ, Mainous III, AG, Martin, CA, Richardson, E, Haney, A, Wilson, D, Adams, T (1994). Depression, suicidal ideation, and substance use among adolescents. Are athletes at less risk?. *Arch Fam Med*, 3: 781–785.
- Peluso MAM, Andrade LHSG (2005). Physical activity and mental health: the association between exercise and mood. *Clinics* 60:61–70.
- Proctor SL, Boan-Lenzo C (2010). Prevalence of depressive symptoms in male intercollegiate student-athletes and nonathletes. *J Clin Sport Psychol* 4:204–220.
- Putukian M, Echemendia RJ (2003). Psychological aspects of serious head injury in the competitive athlete. *Clin Sports Med* 22:617– 630.
- Qian J, Hu Q, Wan Y, Li T, Wu M, Ren Z, Yu D (2013). Prevalence of eating disorders in the general population: a systematic review. *Shanghai Arch Psychiatry* 25:212–223.
- Reardon CL, Factor RM (2010). Sport psychiatry: a systematic review of diagnosis and medical treatment of mental illness in athletes. *Sports Med* 40:961–980.
- Settles IH, Sellers RM, Damas A (2002). One role or two? The function of psychological separation in role conflict. *J Appl Psychol* 87: 574–582.
- Storch EA, Storch JB, Killikany EM, Roberti JW (2005). Self-reported psychopathology in athletes: a comparison of intercollegiate student-athletes and non-athletes. *J Sport Behav* 28:86–97.
- Sundgot-Borgen J, Torstveit MK (2004). Prevalence of eating disorders in elite athletes is higher than in the general population. *Clin J Sport Med* 14:25–32.
- Tahtamouni LH, Mustafa NH, Alfaouri AA, Hassan IM, Abdalla MY, Yasin SR (2008). Prevalence and risk factors for anabolic-androgenic steroid abuse among Jordanian collegiate students and athletes. *Eur J Public Health* 18:661–665.
- Walker N, Thatcher J, Lavallee D (2007) Psychological responses to injury in competitive sport: a critical review. *J R Soc Promot Health* 127:174–180.
- Wiese-Bjornstal DM, Smith AM, LaMott EE (1995). A model of psychologic response to athletic injury and rehabilitation. *Athl Train Sports Health Care Perspect* 1:17–30.
- Wiese-Bjornstal DM, Smith AM, Shaffer SM, Morrey MA (1998). An integrated model of response to sport injury: psychological and sociological dynamics. *J Appl Sport Psychol* 10:46–69.
- Yang J, Peek-Asa C, Corlette J, Cheng G, Foster DT, Albright J (2007). Prevalence of and risk factors associated with symptoms of depression in competitive collegiate student athletes. *Clin J Sport Med* 17:481–487.