Article

Elite Sport and Sustainable Psychological Well-Being

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Abstract: There is conflicting evidence that sport plays a protective role in the development of psychopathological disorders and contributes to the sustainability of mental health. The aim of the present study was to determine the prevalence of mental disorders among elite Slovenian athletes. We were interested in the prevalence of depression, anxiety, suicide risk, substance abuse, and eating disorders among athletes of both sexes and among athletes of individual and team sports aged 18 years or older. A total of 97 elite athletes participated in the study. We used PAI and EDI-3 questionnaires, and the study also included a control group of 90 non-athletes, matched in gender and age to the target group of elite athletes. Testing was conducted in 2020 and 2021. The comparison between elite athletes and the normative group showed a similar expression of depressive and anxious symptomatology. The athletes have a more pronounced drive for thinness and are more expansive, self-confident, and confident of their abilities compared to the control group. A total of 14% of the athletes show self-confidence to the point of self-grandiosity. Male athletes are more likely to use alcohol and other psychoactive substances and are also more impulsive and risk-taking, while female athletes are at higher risk of developing eating disorders. The study suggests that the prevalence of mental disorders in elite athletes is as high as in the general population. There is an urgent need to sustainably ensure the psychological well-being of athletes.

Keywords: elite athletes; mental health; mental disorders; psychopathology; depression; anxiety; eating disorders; substance abuse

1. Introduction

It is well known that moderate and vigorous exercise is highly beneficial for mental health, but the area of psychopathology in sport is much less addressed [1,2]. There is often a belief among the public (and professionals) that the prevalence of mental disorders among elite athletes is low. This may be due to an over-idealization of elite athletes or the assumption that only mentally strong people can be successful athletes, which in turn implies that there should be no place for people with mental health problems among elite athletes [1,2]. Recently, there has been much discussion about the mental health of elite athletes—maintaining mental health and preventing mental illness have become a major challenge in the modern world [3]. The International Olympic Committee has issued a consensus statement [4], outlining what disorders have been identified in athletes and making several suggestions on how to deal with them. This statement is primarily a message that we should pay a lot of attention to the mental health of athletes if we want sport to be a safe environment in which they can reach their full potential. They specifically point out that there are many barriers to reporting mental health issues, such as stereotypes and lack of support systems—the need for this has been emphasized in other studies [5]. Sustainable mental health requires that we overcome stereotypes and work to create an awareness of the need to discuss and openly address mental health issues. Recognition

of increased risk for psychopathology becomes particularly valuable in protecting mental well-being in a sustainable way. This point has been highlighted in recent calls for an early intervention framework for elite sport [3–5].

When we talk about mental disorders related to elite sport, one of the most commonly represented is depression. Depression is a widely used term. It refers to both a general low mood and a psychiatric syndrome [6]. Previous epidemiological studies on this topic suggest that depression is about as common in athletes as in the general population [6,7], with some studies finding even higher rates of depression in athletes than in non-athletes [8,9]. The typical symptoms of depression for this subgroup may vary slightly. For example, the "classic" depressive symptom of sadness is less common in athletes, and symptomatology is more likely to take the form of irritability, decreased functionality or performance in training and competition, loss of enjoyment in competition, overtraining, and abuse of alcohol and other psychoactive substances [6,10]. Weight loss is also common, so depression in athletes can often be mistaken for anorexia. Injured athletes tend to experience mental distortions (e.g., about the end of their career), while athletes who have recently ended their active sport careers may experience a sense of loss of control and incompetence for life outside the sports arena [6,10]. Overtraining, social relationships, "sports retirement", and sports injuries or the psychological consequences of post-injury reactions have been identified as important risk factors for the development of depression in athletes [1]. Several studies have also shown that elite athletes are also affected by depression. Empirical evidence suggests that it is an important finding, although researchers still point out that too few relevant studies have been conducted [2]. In particular, there are a lack of studies that conduct clinical examinations on athletes.

The prevalence of anxiety disorders in the general population ranges from 10.6% to 12.0%, while the prevalence in elite athletes is 8.6% [11]. Female athletes have significantly higher levels of anxiety symptoms than male athletes. Studies indicate several factors that are significantly associated with anxiety symptomatology in elite athletes. These include female gender, younger age, and recent negative events. Musculoskeletal injuries and dissatisfaction with athletic career are important sport-related factors in anxiety disorders [12]. As in the general population, anxiety symptomatology is frequently associated with depression, and several anxiety disorders often co-occur, making it difficult to study anxiety as such [7]. The most common disorder in French athletes (of both sexes) is generalized anxiety disorder (GAD), which is most prevalent in esthetic sports and in females [13]. Female athletes with GAD were more likely (44%) to have panic disorder, panic disorder with agoraphobia, and obsessive compulsive disorder. GAD was also significantly associated with depression, anorexia nervosa, and bulimia nervosa [7,13]. Higher anxiety in athletes was associated with negative patterns of perfectionism [14].

Regardless of the consequences (poorer outcomes, loss of salaries and scholarships), athletes abuse psychoactive substances. According to various studies [6], substance abuse is reported to be higher in athletes than in non-athletes in the general population. A review of studies shows a positive association between sports participation and alcohol consumption. In addition, no study that has looked at substance abuse in athletes has demonstrated the protective effect of sport in terms of lower alcohol consumption. Alcohol abuse varies by gender, age, sport, and quality of athlete. In general, alcohol abuse is most common among older elite athletes in team sports [2]. Athletes abuse alcohol to relieve stress or as a reward for good performance. Some athletes report that their alcohol abuse has caused them to perform worse in competitions or training [2]. However, sport also proves to be a protective factor in the area of substance abuse, as athletes are significantly less likely to smoke and abuse hard drugs than non-athletes.

The literature suggests that participation in organized sports provides some kind of protection against hopelessness, depression, suicidal thoughts and attempts, and that physical activity is associated with less frequent suicidal thoughts in men [4,15]. On the other hand, there is evidence that frequent physical activity is associated with suicide risk in women. Suicide is one of the greatest challenges for mental health professionals [14], it is

among the twenty leading causes of death worldwide [16,17]. On the subject of suicidality in athletes, Baum [18] analyzed the medical literature from 1960 to 2000, finding 71 cases of athletes who had considered, attempted, or committed suicide; the latter occurred in 66 cases. The average age of athletes who committed suicide was 22.3 years, 61 participants were male and 10 were female. Baum reflected on the various etiological factors of suicidality in athletes. These include "athletic withdrawal", certain personality traits (perfectionism), substance abuse, various first-axis psychopathologies (anxiety disorders, mood disorders, eating disorders (especially anorexia)), "pressure to win", homosexuality, cultural influences, feeling unable to return to competitive sport after injury, and sexual abuse [18,19]. In this context, Iverson [20] mentions the significant impact of traumatic head injury.

Eating disorders in sport are well-researched. The prevalence of eating disorders is higher in athletes (13.5%) than in non-athletes (4.6%) [21]. Eating disorders occur more frequently in elite sports, far more often in women (although it should not be ignored that they also occur in men), and in sports where body weight affects performance and athletes must, therefore, be lean. In these sports, the percentage of athletes with an eating disorder has been reported to be as high as 47% [22]. Eating disorders vary by sport. Generally, more eating disorders are found in sports with weight classes (martial arts, rowing), further in sports where style is valued (gymnastics, figure skating) and in sports where low body mass is an advantage (ski jumping, sport climbing) [23]. Disorders are more common in athletes who are losing weight to improve performance, athletes who are dissatisfied with their self-image, and/or athletes who have a long history of underperformance. Athletes often have eating and exercise behaviors similar to anorexic patients, but do not meet all criteria. Researchers have begun to use the term anorexia atletica to distinguish one disorder from another [23].

Much of research has been conducted on personality in sports [24]. In recent decades, researchers in this field have generally been divided into two camps. While the first group held that personality was significantly related to athletic performance, the second group took a skeptical perspective and argued that personality was unrelated to athletic performance [24]. More recent reviews of the topic (better measurements and conceptual approaches) indicate that research often reflects differences between athletes and non-athletes; these differences are expected to be relatively small but consistent [24]. McKelvie [25] compared athletes and non-athletes using the Eysenck personality model and found that athletes exhibited lower levels of neuroticism. The traits of extraversion and conscientiousness are relatively more prominent in athletes compared to non-athletes, whereas the trait neuroticism is lower in athletes than in non-athletes [26]. Similar conclusions have also been reached by many previous researchers analyzing personality traits within the five-factor model of personality [27,28]. Compared to non-athletes, athletes have higher levels of inhibition, irritability, aggressiveness, fatigue, physical discomfort and emotionality, and lower levels of health concerns [29]. Higher scores on the dimensions of conscientiousness, extraversion, and emotional stability (less neuroticism) were found in athletes of high-risk sports than in non-athletes and athletes of non-risk sports [30].

Researchers have also found higher levels of self-confidence, need for stimulation, and mental health in professional athletes than in non-professional athletes or non-athletes [31] and higher expression of the dimensions of impulsive stimulus seeking, need for stimulation, impulsivity, and activity, as well as a tendency toward lower expression of the trait neuroticism in mountaineers compared to non-athletes [32]. The comparison of athletes in individual and team sports showed that athletes in individual sports scored significantly higher on the dimensions of acceptance and sociotropy than athletes in team sports. No differences were found between the two groups on the dimensions of neuroticism, extraversion, and openness [26]. Athletes participating in individual sports showed higher levels of inhibition, irritability, aggressiveness, fatigue, physical complaints, openness, and emotionality, and lower levels of self-satisfaction, social orientation and health concerns [29].

In contrast to much research on personality in sport, the area of personality disorders in sport is extremely under-researched [25]. In a study of 100 Egyptian athletes, a structured clinical interview was conducted to diagnose personality disorders [25]. They found that personality disorders in athletes follow the standard DSM classification (the fifth version is currently in use). Obsessive compulsive, borderline, narcissistic, and mixed personality disorders were the most frequently expressed traits in athletes [33].

There are conflicting findings in the literature when it comes to psychopathology in sport. On the one hand, there is evidence that sport plays a protective role in the development of psychopathological disorders (e.g., eating disorders, depression, and anxiety disorders), while other research suggests that participation in sport may have an impact on the development of various mental disorders. We can say that sport can contribute to psychological well-being because it can help people learn about themselves, but we also want to show that there is psychopathology in sport. This would then inform how training methods can be improved to help with early detection of psychological problems and allow for an environment where athletes can stay in sport and cope with their disorders. The aim of the present study was to determine the prevalence of mental disorders (particularly relevant to sport) among Slovenian athletes classified as Olympic, World and International level by the Olympic Committee of Slovenia (OKS). We were interested in the prevalence of disorders among athletes of both genders and athletes of individual and team sports aged 18 years or older, namely the prevalence of depression, anxiety, suicide risk, substance abuse (alcohol and other illicit psychoactive substances), and eating disorders. We hypothesized that the most commonly represented psychopathological syndromes (depression, anxiety, alcohol abuse) would be similar in elite athletes as in the general population but eating disorders would be more common. We also hypothesized that other psychopathological syndromes are expressed to a lesser extent in elite athletes than in the general population, and that the personality profile of athletes differs significantly from that of the norm group. Based on the literature reviewed, we hypothesized that Slovenian elite female athletes would have a higher prevalence of eating disorders and anxiety and a lower prevalence of alcohol and other psychoactive substance abuse.

2. Materials and Methods

2.1. Participants

Participants in the study were Slovenian athletes who had reached the International, World or Olympic level at the beginning of the study (2019). Ninety-seven athletes participated in the study, which is 17% of all the athletes listed in these categories (according to the Olympic Committee of Slovenia, 575 athletes are listed in the International, World and Olympic level categories). There were 55 male and 42 female athletes who participated in both individual and group sports. Most of the participants were from the team sports of handball, basketball, and volleyball and from the individual sports of martial arts, cycling, skiing, track and field athletics, and climbing. The participants were 18 years and older. The average age of athletes was 27.22 years with a standard deviation of 6.45 years. The 25th percentile was 23.00, the 50th percentile was 26.00, and the 75th percentile was 30.00. The exclusion criteria were age under 18 years, classification in a lower category, and specific factors that could influence the occurrence of mental disorders in athletes and were not tested in the task (mobility and visual impairment). The study also included a control group of 90 non-athletes who matched the target group of elite athletes in terms of gender and age. The control group consisted of individuals who had never participated in competitive sports.

2.2. Materials

2.2.1. Personality Assessment Inventory (PAI)

An objective adult personality self-assessment instrument [34] was used to obtain information on critical clinical variables: 344 items divided into 22 non-overlapping scales; four validity scales; 11 clinical scales (Somatic complaints, Anxiety, Anxiety related disor-

ders, Depression, Mania, Paranoia, Schizophrenia, Borderline features, Antisocial features, Alcohol problems, Drug problems); five treatment scales (Aggression, Suicidal ideation, Stress, Nonsupport, Treatment rejection); and two interpersonal scales (Dominance and Warmth). The scoring was performed via online application "TESTresuj"—an application used for online psychological testing, developed by Center za psihodiagnosticna sredstva [35], which is the main publisher for psychological tests in the country. The strategies proposed in The Professional Manual [34] were used to interpret the data. The Slovenian translation shows good internal reliability and stability over time, with a median of alpha coefficient for all scales of 0.79 [34].

2.2.2. Eating Disorder Inventory-3

It included 91 items divided into 12 primary scales [36]: Drive for thinness, Bulimia, Body dissatisfaction, Low self-esteem, Personal alienation, Interpersonal insecurity, Interpersonal alienation, Interoceptive deficits, Emotional dysregulation, Perfectionism, Maturity Fears. It also contained three indicators of desirable response behavior. The questionnaire was translated and adapted by the Centre for Psychodiagnostic Resources [36]. The strategies proposed in the Professional Manual were used to evaluate and interpret the data [36].

2.3. Procedure

Data on participants were obtained from the database of the Olympic Committee of Slovenia. We selected the athletes who were classified by the Olympic Committee of Slovenia as Olympic, World and International level. We asked them to participate through social networking websites, in person, or through other people (coaches, psychologists). The tests were conducted individually and mostly in 2020, with a few subjects tested in 2021. The estimated time to solve the test battery was sixty to ninety minutes. Response bias was controlled with validity scales.

Statistics

Data were processed using SPSS (Statistical Package for the Social Sciences, version 23). We used descriptive statistics and the Mann–Whitney U test for the analysis of between group differences. Normality of the distributions was tested using Kolmorogov–Smirnoff tests. Statistical significance was set at 0.05. In order to pay attention to the presence of correlated predictors, preserve statistical power, and reduce the number of statistical comparison as well as to ease the interpretation of our results, we used principal component analysis with a Varimax rotation to obtain principal components which we then used for logistic regression. For parallel analysis, we used O'Connor's script [37]. Parallel analysis [38] is an approach that formally tests the probability that a factor is due to chance. Parallel analysis can minimize over-identification of factors based on sampling error and is superior to relying solely on eigenvalue scores generated by factor analytic processes alone. PA creates Monte Carlo simulations on randomly generated data that matches the sample size and the number variables in the original dataset. Factors above the 95th percentile, generated by the simulations are considered to be "beyond chance." After performing a parallel analysis, researchers can specify the number of components to extract in the subsequent factor analysis [39]. Using PA, we extracted three factors or components (see Appendix A, Table A1).

This research study was conducted in accordance with the Declaration of Helsinki [40] and the Code of Ethics and Q4 Conduct of the British Psychological Society [41]. The Research Ethics Committee of the University of Maribor granted ethical approval for data collection, and all subjects provided written informed consent before participating in the study.

3. Results

Table 1 provides information on the mean values or average profile of the sample of elite athletes. The profile is relatively homogenous. None of the scores reach or exceed 60, which is the threshold for significant expression of the characteristics on each scale. On average, elite athletes scored highest on the Mania, Dominance, Anxiety and Antisocial traits scales. They scored the lowest mean scores on the Depression, Drug problems, Stress and Nonsupport scales.

Table 1. Elementary statistical parameters, T values for the elite athletes' group, and percentage of athletes with a significantly expressed level of psychopathological symptomatology or personality traits on PAI, skewness, kurtosis, and Kolmogorov–Smirnoff.

	N	*M* (*T*)	*SD* (*T*)	60 < *T* < 69	*T* > 70	Skewness	Kurtosis	Kolmogorov–Smirnoff/* p
Anxiety	89	53	10.71	10%	7%	1.30	2.53	<0.01 *
Depression	93	46	9.40	4%	4%	1.72	3.93	<0.01 *
Drug problems	92	47	9.27	9%	2%	2.04	6.12	<0.01 *
Suicidal ideation	96	50	12.50	4%	5%	3.77	16.75	<0.01 *
Somatic complaints	92	48	8.98	6%	2%	2.47	10.23	<0.01 *
Anxiety-related disorders	90	50	9.36	12%	4%	0.90	1.28	0.01 *
Mania	94	57	11.16	24%	14%	1.05	2.88	0.02 *
Paranoia	94	49	11.71	9%	6%	0.78	0.94	0.01 *
Schizophrenia	95	51	12.73	12%	12%	1.25	1.79	<0.01 *
Borderline traits	94	49	12.93	5%	15%	1.40	2.30	<0.01 *
Antisocial traits	94	52	11.39	11%	10%	1.21	2.08	<0.01 *
Aggression	94	51	12.00	12%	7%	1.05	0.77	<0.01 *
Alcohol problems	93	50	11.46	10%	4%	2.48	10.295	<0.01 *
Stress	95	48	9.12	5%	2%	1.29	1.80	<0.01 *
Nonsupport	96	48	9.69	6%	3%	0.94	0.90	<0.01 *
Treatment of rejection	95	49	10.99	13%	1%	−0.47	0.10	<0.01 *
Warmth	95	50	9.43	15%	0%	−0.47	0.17	<0.01 *
Dominance	95	54	12.29	25%	2%	1.79	9.78	<0.01 *

N: numerus, *M*: mean, *SD*: standard deviation, *T*: *T*—scores are an example of standardized scores, where the mean is equal to 50 and the standard deviation is equal to 10. They are a linear transformation of Z-scores, which have a mean of 0 and a standard deviation of 1. A T score can be obtained from a Z-score by the formula $T = 50 + 10Z$; * *p*: the significance level.

A significant percentage of athletes who scored higher than 60 (i.e., presenting individual symptoms or problems on individual scales) were reflected in the scales with the highest mean scores (Mania, Dominance, Anxiety, and Antisocial traits). A higher percentage of athletes scoring above 60 were found on the Aggression and Schizophrenia scales. The increases on the Schizophrenia scale were due to increases on the Schizophrenia—Withdrawal and Thought disorders subscales.

The distribution of all variables deviates significantly from the normal distribution, as tested with Kolmogorov–Smirnoff test. We, therefore, used the Mann–Whitney test to compare the differences between the groups.

Table 2 shows statistically significant differences between elite athletes and the control group on the dimensions Mania, Paranoia, Schizophrenia, and Nonsupport. Elite athletes have a higher level of ambition and self-confidence than the non-athletes in the control group, but are also more socially distant and more cautious in relationships.

We found some statistically significant differences between the groups of male and female elite athletes, which is represented in Table 3. Male athletes should have more problems with alcohol and drug abuse and also be more impulsive and risk-taking, while female athletes should be at a higher risk for eating disorders (drive for thinness).

Table 2. Comparison of athletes and the control group on PAI and EDI-3 questionnaires.

		Athletes			Non-Athletes				
		N	*M*	*SD*	*N*	*M*	*SD*	*U*	*p (U)*
Personality Assessment Inventory (PAI)	Anxiety	89	20.20	10.72	84	19.96	9.62	3678.00	0.86
	Depression	93	12.10	9.88	86	11.93	8.25	3820.00	0.60
	Drug problems	92	2.68	3.82	87	2.34	3.02	3994.00	0.98
	Suicidal ideation	96	2.18	5.30	88	2.52	4.86	3884.00	0.30
	Somatic complaints	92	9.63	9.17	87	8.07	6.44	3796.00	0.55
	Anxiety-related disorders	90	18.31	8.01	87	17.92	8.72	3845.00	0.84
	Mania	94	28.36	9.78	84	22.68	12.00	2574.50	<0.01 *
	Paranoia	94	22.29	9.88	85	19.34	8.54	3305.500	0.05 *
	Schizophrenia	95	14.46	9.14	87	10.90	6.98	3133.00	<0.01 *
	Borderline traits	94	16.62	11.24	86	15.58	8.51	4006.00	0.92
	Antisocial traits	94	15.20	9.32	82	12.89	8.15	3292.00	0.10
	Aggression	94	14.11	8.24	87	12.13	7.39	3488.50	0.09
	Alcohol problems	93	4.24	5.25	89	3.94	3.88	4054.00	0.81
	Stress	95	4.31	3.47	90	4.31	3.60	4160.50	0.75
	Nonsupport	96	4.74	3.422	89	3.76	3.11	3537.00	0.04 *
	Treatment rejection	95	15.05	3.92	89	14.90	3.83	4061.50	0.64
	Warmth	95	23.41	4.89	86	23.76	4.92	3892.50	0.58
	Dominance	95	20.60	6.61	88	19.39	5.92	3573.00	0.09
Eating disorder inventory-3 (EDI-3)	Drive for thinness	92	6.42	6.339	87	4.69	4.54	3471.50	0.12
	Bulimia	92	2.26	3.49	88	1.86	2.68	3882.50	0.62
	Body dissatisfaction	96	21.88	2.327	89	21.83	1.94	4272.00	0.62

N: numerus, *M*: mean, *SD*: standard deviation, *U*: Mann–Whitney U test, *p (U)*: statistical significance, *: statistical significance on the level < 0.05.

Table 3. Comparison of male athletes and female athletes on PAI and EDI-3 questionnaires.

		Male Athletes			Female Athletes				
		N	*M*	*SD*	*N*	*M*	*SD*	*U*	*p (U)*
Personality Assessment Inventory (PAI)	Anxiety	47	18.51	9.00	42	22.10	12.20	820.50	0.17
	Depression	52	11.50	8.20	41	12.85	11.66	1047.00	0.88
	Drug problems	49	3.78	4.52	43	1.44	2.29	727.50	<0.01 *
	Suicidal ideation	53	1.74	3.14	43	2.72	7.13	1065.50	0.54
	Somatic complaints	49	10.02	8.49	43	9.19	9.97	983.00	0.58
	Anxiety-related disorders	49	17.92	7.40	41	18.78	8.75	995.50	0.94
	Mania	51	28.59	9.96	43	28.09	9.66	1066.50	0.82
	Paranoia	51	22.76	9.63	43	21.72	10.25	1028.00	0.60
	Schizophrenia	53	15.26	8.90	42	13.45	9.43	948.50	0.22
	Borderline traits	51	15.59	10.21	43	17.84	12.36	1000.00	0.46
	Antisocial traits	51	17.39	8.99	43	12.60	9.12	676.50	<0.01 *
	Aggression	51	15.18	8.67	43	12.84	7.56	937.00	0.22
	Alcohol problems	51	5.71	6.11	42	2.45	3.20	650.00	<0.01 *
	Stress	53	4.17	3.51	42	4.48	3.46	1053.50	0.65
	Nonsupport	53	4.92	2.90	43	4.51	4.01	940.00	0.14
	Treatment rejection	53	15.43	3.60	42	14.57	4.30	1018.00	0.48
	Warmth	53	23.11	4.87	42	23.79	4.95	1011.50	0.45
	Dominance	52	20.38	4.66	43	20.86	8.45	1110.00	0.95
Eating disorder inventory-3 (EDI -3)	Drive for thinness	50	4.24	4.24	42	9.02	7.41	646.00	<0.01 *
	Bulimia	50	1.90	2.68	42	2.69	4.25	935.50	0.35
	Body dissatisfaction	54	21.44	2.00	42	22.43	2.62	927.50	0.12

M: mean, *SD*: standard deviation, *U*: Mann–Whitney U test, *p (U)*: statistical significance, *: statistical significance on the level < 0.05.

We also tested for differences between athletes in individual and team sports but found no differences in any of the dimensions measured.

Because of the interplay of predictive variables, they were combined by primary component analysis. Based on the scree plot and parallel analysis (see Appendix A), three components were extracted and rotated using Varimax rotation, the results are shown in Table 4. We calculated the relationship between the predicted variables with bivariate logistic regression.

Table 4. Rotated Component Matrix.

	Component		
	1	**2**	**3**
Anxiety	0.86	0.12	−0.04
Depression	0.90	−0.05	0.16
Drug problems	0.13	0.17	0.79
Suicidal ideation	0.72	0.06	0.18
Somatic complaints	0.67	0.24	0.31
Anxiety-related disorders	0.75	0.17	−0.03
Mania	0.28	0.84	0.05
Paranoia	0.70	0.41	0.12
Schizophrenia	0.80	0.24	0.22
Borderline traits	0.88	0.29	0.08
Antisocial traits	0.42	0.62	0.39
Aggression	0.44	0.67	0.19
Alcohol problems	0.31	0.35	0.60
Stress	0.63	0.20	0.26
Nonsupport	0.71	0.15	0.24
Treatment rejection	−0.81	0.13	0.17
Negative impression	0.72	0.28	0.21
Warmth	−0.48	0.16	−0.18
Dominance	−0.26	0.78	−0.10
Positive impression	−0.70	−0.18	0.19
Infrequency	−0.19	0.02	0.42
Drive for thinness	0.54	0.14	−0.15
Bulimia	0.49	0.09	0.14
Body dissatisfaction	0.57	0.05	−0.46
Inconsistency	−0.30	0.14	−0.54

The decision to use three components was based on parallel analysis and the scree plot. After putting the components into a logistic regression, represented in Table 5, we found that the second component (which we called energetic) best discriminated between elite athletes and non-athletes. Gender and age had no effect. We called the first component emotional problems and the third one was called substance use (see Appendix A). Further justification for this decision can be seen from the scree plot (see Figure A1 in the Appendix A) and principal components analysis (see Table A2 in the Appendix A).

Table 5. Bivariate logistic regression.

Predictors		**Dependent Variable—Group Affiliation**					
		B	***S.E.***	**Wald**	**df**	***p***	***Exp (B)***
Step 1	Factor 1 (emotional problems)	0.13	0.20	0.37	1	0.54	0.13
	Factor 2 (energetic)	0.51	0.21	50.78	1	0.02	0.51
	Factor 3(substance use)	−0.02	0.23	0.01	1	0.92	−0.02
	Gender	0.20	0.44	0.21	1	0.65	0.20
	Age	−0.04	0.03	10.47	1	0.22	−0.04
	Constant	10.18	0.96	10.53	1	0.22	10.18

B: coefficient for the constant, *S.E.*: standard error around coefficient, Wald: Wald chi-square test, df: degree of freedom, *p*: statistical significance, *Exp (B)*: exponentiation of the *B* coefficient.

The results showed that elite athletes have significantly higher ambition and much higher self-confidence than the control subjects. They are more aggressive and have a tendency to be impulsive.

4. Discussion

Regular exercise is known to be one of the most important contributions to good psychophysical health. Does this also apply to elite Slovenian sports (similar to the results of a growing number of studies conducted on top foreign athletes [6,7,11]) or do top Slovenian athletes exhibit similar psychopathological symptomatology as the general population?

We tried to answer this question in the present study, in which we analyzed the prevalence of mental disorders among top Slovenian athletes who are classified in the highest classes according to the OKS classification. We wanted to find out whether sport is a preventive factor and can promote sustainable mental health—which would mean that there are fewer disorders than in the general population—or whether it is a trigger—in which case, there would be more mental disorders than in the general population.

The comparison of the results of the Slovenian athletes with those of the norm group shows a similar expression of depressive symptomatology, confirming the hypothesis formulated on the basis of the review of previous studies [1,6,7]. Thus, participation in sport in relation to depression is neither preventive nor protective, even for top Slovenian athletes. Considering the risk factors for the development of depressive symptomatology in athletes identified in previous studies (overtraining, social relationships, sports withdrawal, and sports injuries [1]), the results of our study are as expected, as the risk factors are widespread and present in the Slovenian sports environment and should be further evaluated. Sports injuries are a factor that is difficult to avoid in the careers of elite athletes [6,10], as well as relationship dynamics between athletes, sports staff, and coaches, which are a potential factor for depressive episodes in athletes.

A certain percentage of top Slovenian athletes, similar to the general population, suffer from dysphoria, depressive feelings, and low mood. Some of them (9%) also have occasional and transient suicidal thoughts (which is consistent with the previous findings of Baum [18] and Smith and Milliner [19]), although suicidal thoughts and intentions are not exclusively related to depressive symptomatology, but may be a consequence or part of a variety of psychopathological symptoms (e.g., manic, psychotic episode) or personality traits (borderline traits). In particular, the expression of suicidal thoughts in Slovenian athletes underscores the urgency of psychological intervention in this specific area, especially knowing that suicidal thoughts, whether expressed or unexpressed, lead to an increased risk in the act itself.

Depressive symptomatology often accompanies a spectrum of anxiety disorders. Although moderate exercise is thought to have an anxiolytic effect [42], the effect of physical activity on anxiety symptomatology is lower in elite sports. The latter is probably due to other factors (e.g., sports injuries, dissatisfaction with sports career, fear of failure, limited employment opportunities) reported by researchers in this field [12]. The prevalence of anxiety in elite athletes is comparable to the prevalence of tension, sensitivity, and restlessness in the general population [11,13], which is also confirmed in our study. Slovenian top athletes are as anxious as participants in the control group. Some of them are deeply anxious, tense, or agitated and, as such, are likely to be less productive and successful in their athletic careers and less effective in other areas of their lives. From this perspective, in-depth research into the elite sport-specific determinants of anxiety is certainly worthwhile and recommended to help medical-psychological professionals in the field plan and implement psychological support for athletes.

Although personality traits or a particular accentuation of personality traits are significantly associated with eating disorders and other first axis psychopathological syndromes, the topic of personality disorders in elite sport remains very under-researched [33]. The authors of the study found that obsessive compulsive, borderline, narcissistic and mixed

personality disorders were most frequently expressed by athletes. Our study did not focus on personality pathologies in athletes because the diagnosis of personality disorders is complex and requires individualized, in-depth diagnostic assessments that are beyond the scope of the present study. However, we identified some personality traits or deviations from personality traits based on the questionnaires and concluded that Slovenian top athletes are significantly more expansive, self-confident, and convinced of their high abilities compared to the control group. A higher percentage of athletes (14%) achieve results showing the presence of ambition and strong self-confidence, even to the point of self-aggrandizement. These results are consistent with some previous studies [31,33] that highlight self-confidence and narcissistic traits as one of the most represented traits in athletes. However, there are also studies [43] that deny differences in narcissism between athletes and non-athletes, pointing to a stereotypical view of athletes. In addition, some studies [44,45] have shown that (grandiose) narcissism has a negative impact on athletic training and performance. Therefore, it seems important to think about other possible reasons for higher scores in questionnaires. Top athletes are raised (perhaps even pushed, especially by the media) to project an image of themselves as confident, inclusive, and ambitious, sometimes even brash and provocative—the very qualities they emphasize in their answers. Thus, the result may reflect the true differences or the desired image. Regardless, it can be assumed that the traits of self-confidence, ambition, and self-conviction contribute to athletes' performance in both training and competition to the point of excessive self-aggrandizement, while the expression of the trait in elite athletes may be reversed towards lower performance, motivation, and effort due to a false belief in their (overestimated) abilities.

Given the above conclusions about the high expansivity and self-confidence of top Slovenian athletes (which we confirmed with the bivariate logistic analysis) and the previous research on personality in top sport, the following important finding of this study is surprising. Top Slovenian athletes tend to be more unconventional, individualistic, cautious, realistic, and socially withdrawn, with some athletes (12%) almost at the point of alienation. For athletes in individual sports, these traits can be an advantage and a factor for success, at least to some degree, while it is more difficult for athletes in team sports to positively evaluate personality organization where the traits of individuality, withdrawal, and alienation predominate. In contrast to the Dominance and Energy traits, which account for a clear difference between top athletes and the control group, the differences in Cautiousness and Individuality may be influenced by confounding variables. Further research on this topic is needed.

Since the comparison of top Slovenian athletes in team and individual sports did not reveal a statistically significant difference in any of the studied dimensions, it can be concluded that even in team sports, there are athletes who prefer individuality, social withdrawal, and unconventionality. Identifying, guiding, and psychologically supporting such athletes are likely to improve the psychophysical performance of both individual athletes and sports teams.

As mentioned earlier, we found no statistically significant differences between athletes in individual and team sports. A trend toward higher alcohol abuse in team sports was found (consistent with the literature, which concludes that, in general, older elite athletes are most likely to abuse alcohol in team sports [2]), but not at the level of statistical significance.

The present study also shows a trend toward higher alcohol abuse in male athletes compared to female athletes. Based on the profile of the results obtained, male athletes are more likely to consume alcohol and other psychoactive substances compared with female athletes, which may lead to negative consequences in different areas of life. The latter is consistent with previous research highlighting the problem of psychoactive substance abuse, particularly among elite male athletes [2,6]. Athletes are also more impulsive and risk-taking. Combined with the increasing tendency to abuse drugs, these characteristics are an important risk factor for the development of more serious psychopathologies, including suicidal thoughts and actions, and highlight the need for psychological interventions.

According to the results of our study, it would be useful to focus on eating disorders in female athletes, as they have a relatively higher risk of developing various eating disorders. Female gender has also been shown in previous studies to be a risk factor for the development of eating disorders related to sport [22]. Here, we can agree with Purcell [5] that early detection systems and an established framework for screening are necessary, as these disorders seriously threaten sustainable mental health. It seems an established mental health "detection—and—response system" is absolutely necessary for the sustainable mental well-being of athletes, both during and after their careers.

5. Conclusions

The comparison of the results of the top Slovenian athletes and the norm group showed a similar expression of depressive symptomatology, confirming the hypothesis formulated on the basis of a review of the previously conducted studies. Depressive symptomatology in Slovenian elite athletes, as in the general population, is comorbid with a spectrum of anxiety disorders. Slovenian elite athletes are as anxious as participants in the control group. Some of them are more markedly anxious, tense, or agitated and, therefore, may function less well in sports and in life in general.

According to research, Slovenian top athletes are significantly more expansive, self-confident, and confident about the high level of their abilities compared to the control group. A higher percentage of athletes (14%) achieve results that indicate the presence of ambition and strong self-confidence to the point of self-aggrandizement. From the profile of the results obtained, it appears that male athletes are more likely to use alcohol and other psychoactive substances compared to female athletes, which can lead to negative consequences in different areas of their lives. Male athletes are also more impulsive and risk-taking, while female athletes are more likely to develop an eating disorder (higher urge to be thin).

Thus, these studies have shown that the mental health of elite athletes is not enhanced by sport, but that athletes are at higher risk for developing problems with mental health. The stereotypical view of mental health in elite sport needs to change. We need to better understand the pressures athletes face and protect them from more severe and prolonged mental health problems and disorders.

Appendix A

Table A1. Total Variance Explained.

	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10,440	41,760	41,760	10,440	41,760	41,760	9366	37,465	37,465
2	2526	10,105	51,864	2526	10,105	51,864	2971	11,882	49,347
3	1752	7008	58,872	1752	7008	58,872	2381	9526	58,872
4	1228	4910	63,783						
5	1080	4321	68,104						
6	972	3887	71,991						
7	941	3765	75,756						
8	759	3035	78,791						
9	622	2488	81,278						
10	616	2465	83,744						
11	557	2229	85,972						
12	460	1840	87,812						
13	410	1640	89,453						
14	390	1561	91,013						
15	382	1529	92,542						
16	317	1269	93,812						
17	292	1168	94,980						
18	231	923	95,902						
19	210	841	96,743						
20	188	752	97,495						
21	152	608	98,104						
22	142	569	98,673						
23	131	525	99,198						
24	107	430	99,627						
25	093	373	100,000						
	Extraction method: principal component analysis.								

Table A2. Principal components.

Principal Components		
Specifications for this Run:		
Ncases		187
Nvars		26
Ndatsets		1000
Percent		95
Random Data Eigenvalues		
Root	Means	Prcntyle
1,000,000	1,757,466	1,875,840
2,000,000	1,634,048	1,718,920
3,000,000	1,544,825	1,616,713
4,000,000	1,466,745	1,528,737
5,000,000	1,395,992	1,455,797
6,000,000	1,335,833	1,387,288
7,000,000	1,277,079	1,321,858
8,000,000	1,221,888	1,268,294
9,000,000	1,169,490	1,213,034
10,000,000	1,119,637	1,166,333
11,000,000	1,070,228	1,112,042
12,000,000	1,023,807	1,063,702
13,000,000	979,587	1,018,173
14,000,000	935,563	973,422
15,000,000	894,484	931,661

Table A2. *Cont.*

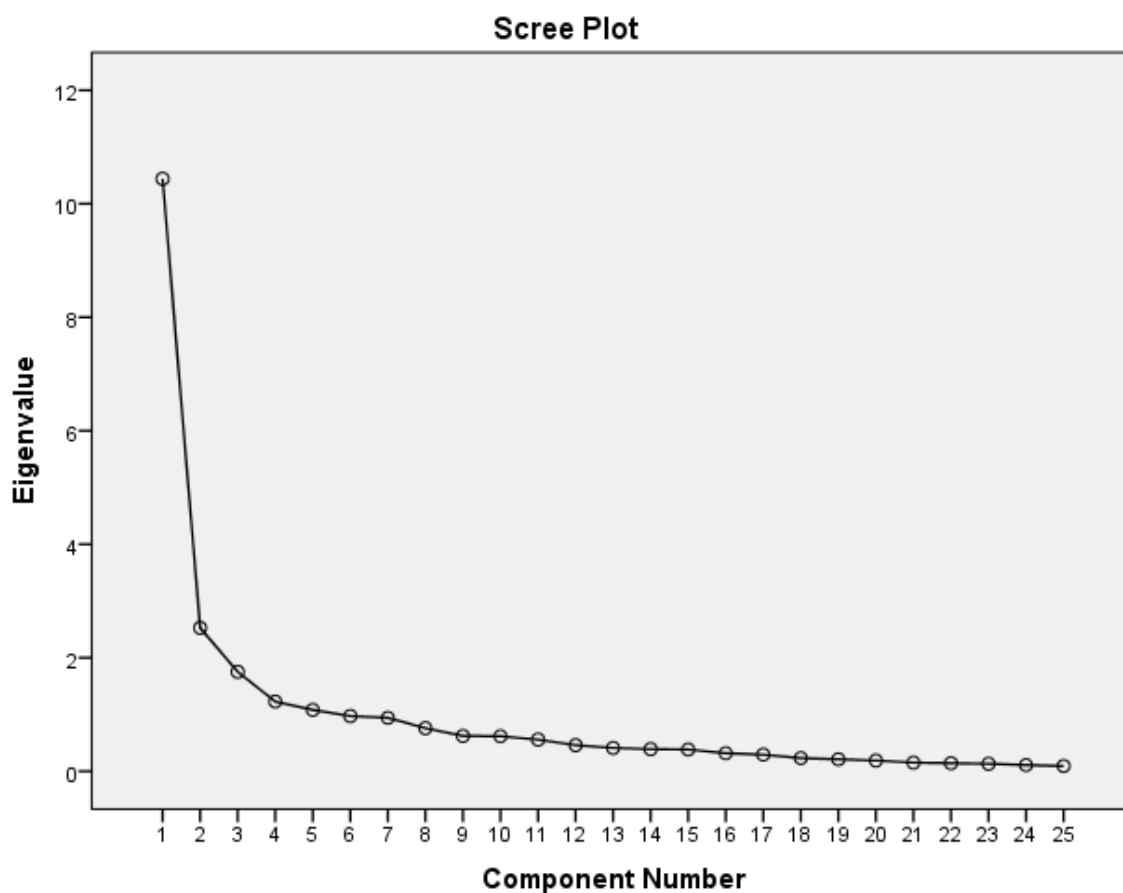|		
16,000,000	853,407	890,069
17,000,000	813,367	851,429
18,000,000	774,087	811,469
19,000,000	733,846	771,684
20,000,000	694,562	731,111
21,000,000	653,961	689,576
22,000,000	614,836	652,299
23,000,000	575,356	614,728
24,000,000	534,154	575,065
25,000,000	489,246	528,949
26,000,000	436,504	482,804
	—— END MATRIX ——	

Figure A1. Scree plot.

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