

## Article

# Mental Health in Croatian Competing Adolescent Athletes: Insights from the SMHAT-1 Questionnaire

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**Abstract:** This study examines the prevalence of mental health problems among Croatian adolescent competing athletes, with a focus on gender differences. Mental health issues such as anxiety, depression, sleep disorders, and attention deficiency hyperactivity disorder (ADHD) are particularly relevant in this population due to the combined and simultaneous challenges of competitive sport and adolescence. Understanding gender-specific patterns is crucial for targeted interventions. A cross-sectional study involved 674 Croatian athletes (418 men, 256 women) aged 16–24 years from 43 sports. Data were collected using the Sports Mental Health Assessment Tool (SMHAT-1), which assessed 12 mental health concerns. Descriptive statistics, chi-square tests, effect size analysis with Cramér's V, and power analysis were performed. The results showed significant gender-specific differences. Female athletes reported higher rates of anxiety (22.7% vs. 3.8%,  $p < 0.001$ ), depression (25.4% vs. 5.3%,  $p < 0.001$ ), alcohol use (27.0% vs. 7.7%,  $p < 0.001$ ), ADHD (18.8% vs. 2.4%,  $p < 0.001$ ), and post-traumatic stress disorder (8.2% vs. 1.2%,  $p < 0.001$ ) compared to males. Gender-specific mental health interventions are crucial for improving sport performance and injury prevention. Further research should refine strategies to address vulnerabilities associated with gender and competitive sport environments.



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**Keywords:** mental health; adolescent; gender differences; athletes; SMHAT-1; depression; anxiety

## 1. Introduction

The importance of athletes' psychological well-being has gained increasing attention in recent years, mainly due to the growing pressure in competitive sports. According to the International Olympic Committee (IOC), mental health is crucial for optimal athletic performance and overall well-being and should therefore be given equal importance to physical health [1]. Athletes are exposed to unique stressors, including intense competition, high performance expectations, and rigorous training demands, which can lead to anxiety, depression, and other psychological challenges. Recognizing the need for a supportive environment where athletes can openly discuss these issues is becoming increasingly important [2]. The IOC Mental Health Action Plan highlights the promotion of a culture

that reduces stigma and encourages help-seeking, which is key to building resilience and improving performance [3]. These initiatives reflect a broader trend in sports organizations to integrate mental health into athlete development programs to create a healthier and more sustainable environment [4].

The link between physical activity and psychological health is particularly important during adolescence, a time of rapid physical, emotional, and cognitive development. Research shows that school sport can improve the psychological well-being of adolescents, provided that their basic psychological needs—autonomy, competence, and relatedness—are met. If these needs are not met, adolescents, especially girls, are at a higher risk of developing mental health challenges [5]. These findings highlight the importance of creating a supportive environment that promotes well-being by addressing the psychological needs of adolescents [5].

Focusing on mental health is crucial during adolescence, a key stage of physical and psychological growth. There is ample evidence that regular physical activity significantly improves the psychological and physical health of adolescents. The World Health Organization (WHO) recommends at least 60 min of moderate to vigorous physical activity per day to promote health in adolescence [6,7]. However, excessive or unbalanced exercise can increase the risk of psychological health problems such as depression, anxiety, eating disorders, and sleep disorders. At-risk groups include female athletes, athletes in individual or esthetic sports, injured athletes, and those exposed to bullying or abuse [8].

Adolescents are a vulnerable group in sports due to their unique developmental traits. Intense training and competition, coupled with rapid physical, emotional, and social changes, can exacerbate stress and psychological challenges [9]. Growth spurts during adolescence, combined with overtraining, often lead to physical and psychological strain [10]. Adolescence is divided into three phases: the early phase (ages 10–13) characterized by physical changes and concrete thinking, the middle phase (ages 14–17) with continued growth and abstract thinking, and the late phase of adolescence/young adulthood (ages 18–24) characterized by refined cognitive functioning and the transition to adulthood [11]. Understanding these processes is crucial for the prevention of neuropsychiatric disorders and the support of healthy development [12].

Efforts to reduce mental health stigma among youth athletes are essential. Mental health promotion programs and an environment that encourages open discussions about psychological health issues can improve resilience and well-being [13]. Tailored interventions must also address the specific needs of female athletes who face particular challenges and require specialized support [14,15].

Adolescent elite athletes face additional risks, such as disordered eating behaviors, often due to societal and sport-specific pressures to maintain a certain body weight or appearance. Studies show that female athletes in esthetic or weight-class sports are particularly at risk, with the prevalence of eating disorders in high-risk sports being as high as 43.3% [15]. These statistics highlight the need for targeted interventions to address these pressures and promote healthier behaviors in young athletes.

Adolescence is a critical period for the promotion of mental health, but also a time of vulnerability. Although physical activity offers significant benefits, including improved emotional resilience, social relationships, self-confidence, and reduced risk of disease, its impact on mental health can be complex. Adolescent athletes must balance demanding training schedules, academic commitments, and social expectations. This pressure, combined with gender-specific challenges, increases susceptibility to illnesses such as anxiety, depression, and eating disorders. Addressing these challenges through gender-specific mental health strategies is critical to support young athletes' long-term engagement in sport [5,15].

Research comparing college athletes to non-athletes has shown that there are substantial differences in mental health diagnoses and treatment-seeking behaviors. While non-athletes report higher rates of anxiety, eating, mood, and sleep disorders, these differences are largely due to gender differences between the groups. Regardless of gender, athletes are less likely to seek mental health treatment compared to non-athletes. In addition, athletes report particular academic challenges related to anxiety, sleep, extracurricular activities, and injuries, underscoring the urgent need for psychosocial support tailored to their unique experiences [16].

A study of top Australian athletes has shown that women are disproportionately affected by negative life events such as interpersonal conflict and financial hardship [17]. These challenges contribute to poorer mental health [17]. This highlights the need for gender-specific mental health interventions that address the particular issues faced by female athletes [17]. Mental health is particularly important during adolescence, a critical period of physical and psychological development [17]. These challenges increase the risk for mental health disorders such as anxiety and depression, particularly among female athletes in individual sports [17].

Recent studies indicate that female athletes have a higher risk of psychological health problems compared to their male counterparts. College-aged female athletes are particularly prone to anxiety and depression. This trend is particularly evident in individual sports such as athletics, where depression rates are significantly higher in female athletes than in male athletes [18]. Studies of adolescent athletes show that they are just as susceptible to mental health challenges such as anxiety, depression, ADHD, and eating disorders as their non-athletic peers [18]. The pressures of competitive sports, including intense training, academic commitments, and performance expectations, often exacerbate these issues. Gender differences are notable: female athletes consistently report higher rates of anxiety and depression, particularly in individual sports [18]. These findings emphasize the need for mental health interventions tailored to the specific needs of adolescent athletes to improve outcomes and maintain their participation in sports [18].

Gender differences in mental health deserve particular attention, as research consistently shows that women are more likely to suffer from anxiety and depression than men. Understanding these patterns in adolescent athletes is essential for the development of targeted interventions. The aim of this study is to investigate the prevalence of psychological health problems in adolescent athletes in Croatia, with a focus on gender differences. As far as we know, no previous study has comprehensively examined the mental health of all adolescent athletes in Croatia, so this study makes a valuable contribution to this topic. We hypothesize that female adolescent athletes in Croatia are more likely than their male peers to suffer from psychological distress, including substance abuse, eating disorders, gambling, psychosis, anxiety, depression, sleep problems, alcohol use, ADHD, PTSD, and bipolar disorder.

## 2. Materials and Methods

### 2.1. Study Design

This cross-sectional study complied with the STROBE guidelines (Strengthening the Reporting of Observational Studies in Epidemiology) [19]. It was conducted between September 2023 and December 2023. Approval to use the SMHAT-1 questionnaire, including the addition of sociodemographic questions, was obtained from the head of the Mental Health Working Group (MHWG) of the International Olympic Committee (IOC). Ethical approval was granted by the Ethics Committee of the Medical College in Split, Croatia.

The study followed a structured approach, starting with the survey design, followed by systematic data collection, in-depth analysis, and strategic dissemination of the results (Figure 1).

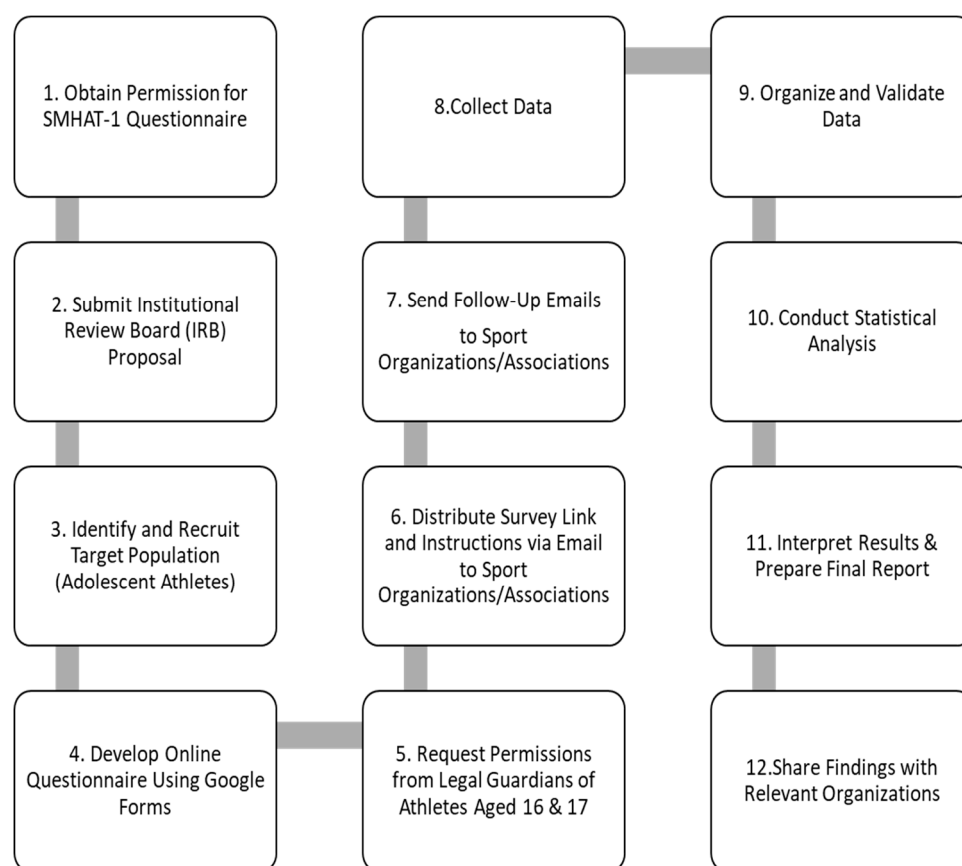


**Figure 1.** Workflow for conducting a survey study with adolescent athletes in Croatia.

## 2.2. Data Collection

A purposive sampling method with a multi-level distribution strategy was used to ensure broad inclusion. To minimize selection bias, a barcode allowing access to the questionnaire was distributed via email through the Croatian Olympic Committee (COC), county sports organizations, and major city associations. To maximize coverage, the email with the required registration information and barcode was sent twice to the COC and affiliated organizations.

For participants aged 16 and 17, parental or guardian consent was required before completing the questionnaire. A consent form was included in the first email, which had to be submitted before the questionnaire could be accessed. Participants completed the survey via Google Forms after receiving detailed information about the purpose of the study and the data processing. Participants gave their consent at the beginning of the questionnaire by ticking a consent box, which allowed them to proceed. Anonymity was maintained throughout to encourage honest and open responses. Incomplete questionnaires with more than 20% missing responses were excluded from the analysis to maintain data reliability and avoid bias in the factor structure and reliability analyses.

## 2.3. Study Instrument

The International Olympic Committee's Sport Mental Health Assessment Tool-1 (SMHAT-1) was developed in 2021 by the IOC Mental Health Working Group in collaboration with sports physicians, psychologists, and mental health experts. It was developed

for licensed healthcare professionals to assess elite athletes (aged 16+) for mental health symptoms and disorders, enabling early detection and timely referral for support and therapy. The preliminary reliability and validity of the instrument were examined in a cross-sectional study of professional soccer players in the Australian A and W leagues [20].

The SMHAT-1 consists of 12 validated questionnaires, each addressing a specific mental health issue. Athletes scoring at or above the threshold were categorized as having the corresponding mental health problem. Where validated versions of the scales were available, we have included references to their previous use. For questionnaires that were not validated as part of the study, we calculated Cronbach's alpha to determine internal consistency. The questionnaires are structured as follows:

1. Athlete Psychological Strain Questionnaire (APSQ): Measures psychological strain (maximum score: 50). Athletes who scored  $\geq 17$  were classified as above the threshold. The APSQ validated in Croatian was used in this study [21].
2. Generalized anxiety disorder (GAD-7): Assesses anxiety levels (range: 0–27). Scores of 5–9 indicate mild anxiety, 10–14 moderate anxiety, and  $\geq 15$  severe anxiety. Participants who scored  $\geq 10$  were classified as above the threshold [22].
3. Patient Health Questionnaire-9 (PHQ-9): Tests for depression (range: 0–27). Scores of 5–9 indicate mild depression, 10–14 indicate moderate depression, 15–19 indicate moderately severe depression, and  $\geq 20$  indicate severe depression. Participants who scored  $\geq 10$  were categorized as above the threshold [22].
4. Athlete Sleep Screening Questionnaire (ASSQ): Assesses sleep disturbances (range: 0–17). Scores of 5–7 represent mild symptoms, 8–14 moderate symptoms, and  $\geq 15$  severe symptoms. Values  $\geq 8$  were classified as above the threshold (Cronbach's alpha: 0.78).
5. Alcohol Use Disorders Identification Test—Consumption (AUDIT-C): Tests for alcohol abuse (range: 0–12). Participants who scored  $\geq 4$  (men) or  $\geq 3$  (women) were classified as above the cut-off [23].
6. Cutting Down, Annoyance by Criticism, Guilty Feeling, and Eye-openers Adapted to Include Drugs (CAGE-AID): Measures substance use (except alcohol abuse). The scale consists of four dichotomous items. Participants who scored  $\geq 4$  were classified as above the cut-off point [23].
7. Brief Eating Disorder in Athletes Questionnaire (BEDA-Q): Assesses eating disorders using nine items with scores ranging from 0 to 3. Scores  $\geq 4$  were classified as above the cut-off (Cronbach's alpha: 0.64).
8. Attention deficit/hyperactivity disorder (ADHD) screening tool: Assesses inattention and hyperactivity (range: 0–6). Participants with a score  $\geq 4$  were classified as above the cut-off point (Cronbach's alpha: 0.773).
9. Bipolar disorder (BD) scale: Assesses proclivity to manic and depressive episodes. Participants with a score  $\geq 7$  were classified as above the cut-off point (Cronbach's alpha: 0.921).
10. Post-traumatic stress disorder (PTSD) screening tool: Assesses exposure to traumatic events and associated symptoms. Scores  $\geq 3$  indicate a positive screening and were categorized as above the threshold (Cronbach's alpha: 0.706).
11. Screening tool for gambling disorder: Checks for problematic gambling behavior. Scores  $\geq 3$  indicate moderate gambling problems and were classified as above the threshold (Cronbach's alpha: 0.815).
12. Psychosis screening tool: Assesses symptoms such as hallucinations and delusions. Scores  $\geq 6$  indicate significant symptoms and were categorized as above the threshold (Cronbach's alpha: 0.922).

## 2.4. Participants

The athletes included in the study were adolescents aged 16 to 24 years who were actively registered in a Croatian sports club or association, had participated in at least one competition in the last 12 months, and had trained at least 10 h per week. Athletes who had not competed in the last 12 months or whose questionnaires were incomplete, i.e., missing more than 20% of the answers, were excluded.

According to the Ministry of Tourism and Sport [24], there are 213,815 active athletes in Croatia. Based on population data from the Croatian Statistical Office [25] and previous research on training frequency in this age group [26], it is estimated that around 3000 active athletes aged 16–24 train regularly in Croatia. A power analysis conducted on this number resulted in a minimum sample size of 341 required to achieve a 95% confidence level with a 5% margin of error [27]. A total of 674 athletes participated in the study, exceeding the required sample size. This larger sample size increases the reliability and validity of the results and enables more robust statistical analyses.

Table 1 provides a detailed overview of the participants' demographic characteristics, including age, gender, education level, marital status, type of sport, weekly training hours, age of specialisation in a sport, history of sports injuries in the past 12 months, recent competition participation, days to next competition, and history of psychiatric hospitalizations and prescribed medications. The study includes athletes from 43 different sports, ensuring a diverse representation.

**Table 1.** Descriptive statistics of demographic characteristics of the athletes.

| Category                                 | Subcategory                  | Statistics                        |
|------------------------------------------|------------------------------|-----------------------------------|
| Groups                                   |                              | N (%)                             |
|                                          | Age 16–17                    | 104 (15.4)                        |
|                                          | Age 18–21                    | 391 (58.0)                        |
|                                          | Age 22–24                    | 179 (26.5)                        |
| Age                                      |                              | Mean $\pm$ SD<br>20.11 $\pm$ 2.30 |
| How many hours per week do you practice? |                              | N (%)                             |
|                                          | 10–16 h                      | 369 (54.7)                        |
|                                          | 17+ hours                    | 305 (45.3)                        |
| Gender                                   |                              | N (%)                             |
|                                          | Male                         | 418 (62.0)                        |
|                                          | Female                       | 256 (38.0)                        |
| Education Attainment                     |                              | N (%)                             |
|                                          | No elementary school         | 2 (0.3)                           |
|                                          | Elementary school            | 177 (26.3)                        |
|                                          | High school                  | 455 (67.5)                        |
|                                          | Baccalaureate degree         | 33 (5.0)                          |
|                                          | University degree            | 6 (0.9)                           |
|                                          | Postgraduate college         | 1 (0.1)                           |
| Marital Status                           |                              | N (%)                             |
|                                          | Not involved in relationship | 394 (58.5)                        |
|                                          | In relationship              | 279 (41.4)                        |
|                                          | Married                      | 1 (0.1)                           |

**Table 1.** *Cont.*

| Category                                                      | Subcategory | Statistics        |
|---------------------------------------------------------------|-------------|-------------------|
| Type of Sport                                                 |             | N (%)             |
|                                                               | Soccer      | 168 (25.0)        |
|                                                               | Swimming    | 147 (21.8)        |
|                                                               | Athletics   | 77 (11.4)         |
|                                                               | Tennis      | 73 (10.8)         |
|                                                               | Volleyball  | 38 (5.6)          |
|                                                               | Other       | 171 (25.4)        |
| How old you were when you started to practice one sport only? |             | Mean $\pm$ SD     |
|                                                               |             | 9.64 $\pm$ 2.89   |
| Sport-Related Injury (Past 12 Months)                         |             | N (%)             |
|                                                               | Yes         | 175 (26.0)        |
|                                                               | No          | 499 (74.0)        |
| Participation in Competitions (Last 12 Months)                |             | Mean $\pm$ SD     |
|                                                               | Total       | 15.31 $\pm$ 11.86 |
| Next Competition (Days)                                       |             | Mean $\pm$ SD     |
|                                                               | Total       | 17.98 $\pm$ 25.88 |
| Did you ever visit a psychiatrist?                            |             | N (%)             |
|                                                               | Yes         | 131 (19.4)        |
|                                                               | No          | 543 (80.5)        |
| Did a psychiatrist ever prescribe you medication?             |             | N (%)             |
|                                                               | Yes         | 60 (8.9)          |
|                                                               | No          | 614 (91.1)        |

Data are reported as counts and percentages (N and %), or as means with standard deviations (Mean  $\pm$  SD).

### 3. Results and Statistical Analysis

All analyses were conducted using Jasp 0.19.1 and R 4.4.1 to assess the mental health status of competing adolescent athletes, focusing on gender differences. A power analysis was conducted and is detailed in Supplementary File S1.

Table 2 provides a comprehensive overview of the participants' results, organized by gender. For each assessment, participants are classified as "below threshold" or "above threshold" depending on whether their scores meet the criteria for clinical concern. Data are presented as both number of participants (N) and percentage (%) within each gender group. Totals represent the combined results for men, women, and the entire sample. The table also contains the results of the chi-square tests, which are used to test whether the observed differences between the genders in the psychological assessments are statistically significant. For each test, the table shows the calculated chi-square value ( $X^2$ ), the degrees of freedom (df), and the *p*-value. A significant *p*-value (usually  $<0.05$ ) means that the distribution between the genders differs significantly for this test.

Table 2 also shows the effect size measured with Cramér's V. The Cramér's V values for the significant chi-square tests range from 0.249 to 0.524, indicating varying degrees of association between gender and the different tests. These values show that gender has a weak to strong influence on the results, with some tests showing a stronger association with gender than others.

Figure 2 illustrates the distribution of participants classified as "below threshold" and "above threshold" for each test, separated by gender. This visualization illustrates the gender-specific trends in test scores and the relative proportions of participants in the different ratings.

**Table 2.** Contingency table and chi-square test and Cramér's V results by gender (N = 674).

| Test      | Gender | Contingency              |                          | Chi-Square Tests |    |        | Cramér's V |
|-----------|--------|--------------------------|--------------------------|------------------|----|--------|------------|
|           |        | Under Threshold<br>N (%) | Above Threshold<br>N (%) | $\chi^2$         | df | p      |            |
| APSQ      | Male   | 143 (34.2)               | 275 (65.8)               | 1.00             | 1  | 0.315  | 0.384      |
|           | Female | 78 (30.5)                | 178 (69.5)               |                  |    |        |            |
|           | Total  | 221 (32.8)               | 453 (76.2)               |                  |    |        |            |
| GAD-7     | Male   | 402 (96.2)               | 16 (3.8)                 | 57.59            | 1  | <0.001 | 0.436      |
|           | Female | 198 (77.3)               | 58 (22.7)                |                  |    |        |            |
|           | Total  | 600 (89.0)               | 74 (11.0)                |                  |    |        |            |
| PHQ       | Male   | 396 (94.7)               | 22 (5.3)                 | 57.21            | 1  | <0.001 | 0.499      |
|           | Female | 191 (74.6)               | 65 (25.4)                |                  |    |        |            |
|           | Total  | 587 (87.1)               | 87 (12.9)                |                  |    |        |            |
| ASSQ      | Male   | 381 (91.1)               | 37 (8.9)                 | 32.50            | 1  | <0.001 | 0.425      |
|           | Female | 192 (75.0)               | 64 (25.0)                |                  |    |        |            |
|           | Total  | 573 (85.0)               | 101 (15.0)               |                  |    |        |            |
| AUDIT-C   | Male   | 386 (92.3)               | 32 (7.7)                 | 46.41            | 1  | <0.001 | 0.344      |
|           | Female | 187 (73.0)               | 69 (27.0)                |                  |    |        |            |
|           | Total  | 573 (85.0)               | 101 (15.0)               |                  |    |        |            |
| CAGE-AID  | Male   | 403 (96.4)               | 15 (3.6)                 | 3.27             | 1  | 0.07   | 0.157      |
|           | Female | 239 (93.4)               | 17 (6.6)                 |                  |    |        |            |
|           | Total  | 642 (95.3)               | 32 (4.7)                 |                  |    |        |            |
| BEDA-Q    | Male   | 60 (14.4)                | 358 (85.6)               | 14.50            | 1  | <0.001 | 0.524      |
|           | Female | 67 (26.1)                | 189 (73.8)               |                  |    |        |            |
|           | Total  | 127 (18.8)               | 547 (81.1)               |                  |    |        |            |
| ADHD      | Male   | 408 (97.6)               | 10 (2.4)                 | 54.01            | 1  | <0.001 | 0.343      |
|           | Female | 208 (81.2)               | 48 (18.8)                |                  |    |        |            |
|           | Total  | 616 (91.4)               | 58 (8.6)                 |                  |    |        |            |
| BD        | Male   | 368 (88.0)               | 50 (12.0)                | 54.88            | 1  | <0.001 | 0.431      |
|           | Female | 164 (64.1)               | 92 (35.9)                |                  |    |        |            |
|           | Total  | 532 (78.9)               | 142 (21.1)               |                  |    |        |            |
| PTSD      | Male   | 413 (98.8)               | 5 (1.2)                  | 21.02            | 1  | <0.001 | 0.249      |
|           | Female | 235 (91.8)               | 21 (8.2)                 |                  |    |        |            |
|           | Total  | 648 (96.1)               | 26 (3.8)                 |                  |    |        |            |
| Gambling  | Male   | 403 (96.4)               | 15 (3.6)                 | 0.22             | 1  | 0.64   | 0.196      |
|           | Female | 245 (95.7)               | 11 (4.3)                 |                  |    |        |            |
|           | Total  | 649 (96.1)               | 26 (3.9)                 |                  |    |        |            |
| Psychosis | Male   | 399 (95.5)               | 19 (4.5)                 | 2.47             | 1  | 0.12   | 0.185      |
|           | Female | 237 (92.6)               | 19 (7.4)                 |                  |    |        |            |
|           | Total  | 636 (94.4)               | 38 (5.6)                 |                  |    |        |            |

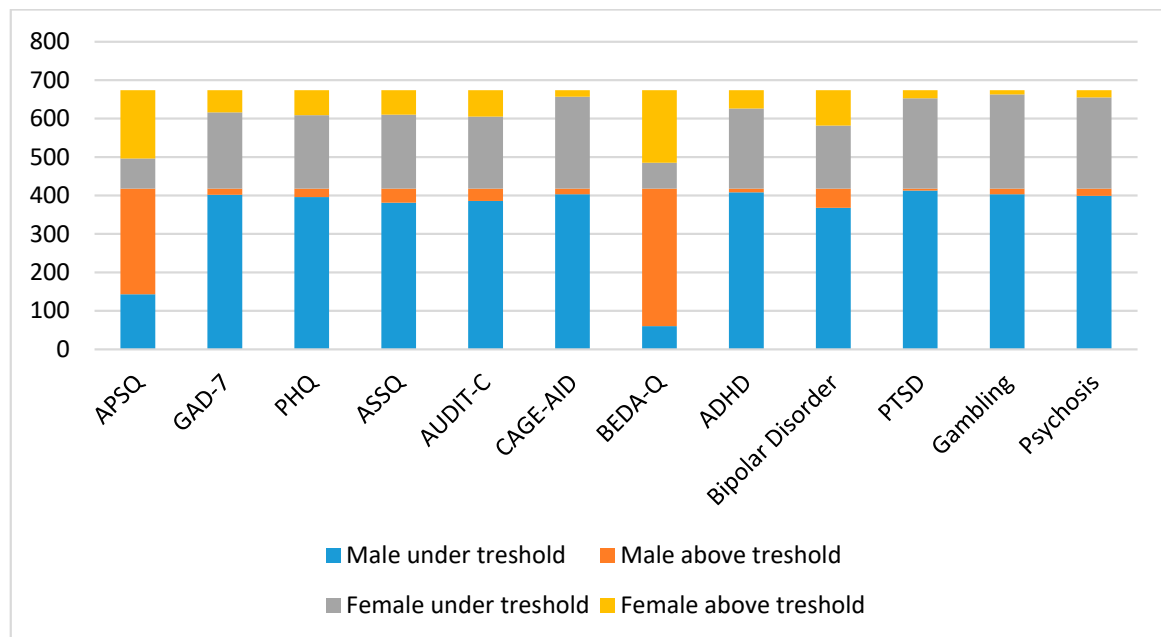


**Figure 2.** Gender-wise threshold comparison across tests.

### Results

The results reveal significant gender differences in the occurrence of mental health disorders. Significant differences were found for anxiety, depression, ADHD, bipolar disorder, sleep disorders, alcohol consumption, PTSD, and eating disorders. These results underline the importance of considering gender differences in psychological health in order to improve diagnosis and treatment strategies. In contrast, no significant gender differences were found in the questionnaires on psychological screening of athletes, alcohol and drug use, gambling, or psychosis.

The GAD-7 results showed that more women (22.7%) than men (3.8%) were above the threshold for anxiety. The chi-square statistic was  $\chi^2 = 57.59$ , with  $p < 0.001$ , indicating that anxiety symptoms are much more common in female athletes. This emphasizes the need for gender-specific interventions to treat anxiety.

The PHQ showed that women (25.4%) were significantly more likely to exceed the threshold for depression compared to men (5.3%) ( $\chi^2 = 57.21$ ,  $p < 0.001$ ). This gender-specific discrepancy underlines the importance of focusing the investigation and treatment of depression on female athletes.

The ASSQ results showed that more women (25.0%) than men (8.9%) scored above the threshold for autism spectrum concerns ( $\chi^2 = 32.50$ ,  $p < 0.001$ ). This suggests that female athletes may experience autism-spectrum-related challenges differently, often associated with sleep problems.

The AUDIT-C test revealed that a higher percentage of female athletes (27.0%) exceeded the threshold for problem drinking than male athletes (7.7%), with  $\chi^2 = 46.41$  and  $p < 0.001$ , indicating an urgent need to address risky drinking in female athletes.

Female athletes (18.8%) were significantly more likely than males (2.4%) to exceed the threshold for ADHD symptoms, with  $\chi^2 = 54.01$  and  $p < 0.001$ . These results highlight the need for greater awareness of ADHD in women, as their symptoms can often go unnoticed.

The bipolar disorder (BD) questionnaire revealed that women (35.9%) were more likely than men (12.0%) to score above the threshold for bipolar symptoms, with  $\chi^2 = 54.88$  and  $p < 0.001$ . This significant gender difference suggests that female athletes may be at higher risk for bipolar-related psychological challenges.

PTSD was more common in female athletes (8.2%) than male (1.2%), with  $X^2 = 21.02$  and  $p < 0.001$ . This highlights the impact of gender-specific factors, such as trauma exposure, which may increase susceptibility to PTSD in female athletes.

The Binge-Eating Disorder Assessment (BEDA) test showed that more women (26.1%) than men (14.4%) exceeded the threshold for binge-eating symptoms, with  $X^2 = 14.50$  and  $p < 0.001$ . This result suggests that interventions for eating disorders should take into account the higher prevalence among female athletes.

The APSQ found no significant differences in psychological distress between men (65.8%) and women (69.5%), with  $X^2 = 1.00$  and  $p = 0.315$ . This indicates that both genders experience similar levels of psychological distress overall, necessitating universal support interventions.

The CAGE-AID results showed low levels of problematic alcohol and drug use in both genders. Males (3.6%) and females (6.6%) reported similar rates, with  $X^2 = 3.27$  and  $p = 0.07$ . These results suggest that substance misuse is not a major problem in this population.

Minimal differences were observed for gambling addiction, with males (3.6%) and females (4.3%) reporting similar levels. The difference was not significant, with  $X^2 = 0.22$  and  $p = 0.64$ . This shows that gambling addiction is not strongly associated with gender in this sample.

The results of the psychosis test showed slightly more psychotic symptoms in women (7.4%) than in men (4.5%), but the difference was not statistically significant ( $X^2 = 2.47$ ,  $p = 0.12$ ). This suggests that the gender differences in psychotic symptoms may not be significant.

#### 4. Discussion

The aim of this study was to investigate the prevalence of mental health concerns among adolescent athletes in Croatia, with a focus on gender differences. The results of the study showed that female athletes were significantly more likely than their male counterparts to suffer from psychological challenges including psychological distress, anxiety, depression, sleep disorders, alcohol use, ADHD, PTSD, and bipolar disorder.

No significant gender differences were found in the prevalence of gambling or psychosis. These results partially confirm the hypothesis of the study, as most mental health problems were more common in female athletes, but not all. The higher prevalence of anxiety, depression, and other mental health problems in female athletes is consistent with previous research indicating that women are generally at higher risk for these conditions [28,29]. However, the lack of gender differences in gambling and psychosis highlights the need for further investigation. These findings highlight the need for immediate action on gender-specific mental health interventions for adolescent athletes.

The GAD-7 and PHQ tests showed that female adolescents are more prone to internalizing disorders such as anxiety and depression. This is consistent with research showing that Croatian female adolescents, like their peers worldwide, are more likely to experience depressive symptoms due to social, emotional, and biological factors [30]. A meta-analysis of 13 studies found that female student athletes were significantly more likely to experience depression, anxiety, and stress compared to males [29]. Other studies also suggest that female adolescents suffer more frequently from anxiety and depression, have a lower level of psychological well-being, and are more prone to self-harm [30]. These findings suggest that female athletes face particular challenges that increase their vulnerability to mental health problems and warrant gender-specific interventions. Worldwide, anxiety and depressive disorders are more common in women [31]. Research by Altemus has shown that female athletes are approximately twice as likely to be affected by anxiety

and depression as their male counterparts [32]. The consistency of these findings with global research is likely due to a combination of biological and external factors. Stable biological factors such as hormonal fluctuations and increased emotional reactivity may independently increase the risk of anxiety and depression in female athletes. External influences, such as social pressure, performance expectations, and cultural norms also contribute to these trends. In addition, female adolescents are more likely to seek help and disclose emotional difficulties, which may increase the detection of mental health problems compared to male adolescents [28,29]. This highlights the importance of understanding gender differences in mental health and the particular vulnerability of female athletes due to biological, psychological, and social challenges.

In our study, gender-specific differences were observed in the Athlete Sleep Screening Questionnaire (ASSQ), with women scoring above the threshold significantly more often than men. This is consistent with previous research showing that female athletes take longer to fall asleep and have more disturbances during the day compared to male athletes [33,34]. These differences in sleep behavior can be attributed to a combination of biological, psychological, social, and environmental factors. Biologically, hormonal fluctuations, especially during the menstrual cycle, significantly influence the sleep quality of female athletes. During the luteal phase, for example, a higher core body temperature and lower melatonin production delay the onset of sleep and lead to fragmented sleep, an effect that is exacerbated by hormonal changes during puberty [35]. Psychologically, female athletes are more prone to anxiety, stress, and rumination—cognitive patterns that impair both falling asleep and staying asleep [36]. Social and environmental pressures such as societal expectations, athletic performance demands, and external responsibilities also place a greater burden on female athletes, increasing stress and negatively impacting sleep [37,38]. In addition, female athletes may have less access to or less frequent use of sleep-specific interventions compared to their male counterparts [39]. This discrepancy suggests that cultural and psychological factors such as perfectionism and prioritizing responsibilities over recovery contribute to poorer sleep hygiene in female athletes. At the same time, male athletes may under-report sleep-related problems, which could confound the observed gender differences [39]. The combination of higher physiological sensitivity to stress and cultural tendencies in female athletes underscores the need for tailored interventions to improve sleep hygiene and effectively address these challenges. We hypothesize that poor sleep quality in female athletes may increase their vulnerability to psychological challenges such as anxiety and depression, creating a feedback loop that further impairs their overall health and athletic performance. These findings underscore the need for targeted interventions, such as sleep education programs and stress management strategies, to address the unique challenges faced by female athletes. In addition, these sleep disorders may also serve as an indicator of more general mental health challenges in this population.

Our study shows significant gender differences in the prevalence of ADHD, with more females above the threshold. Although ADHD in childhood is typically more common in males [31], the prevalence in adulthood is almost equal between males and females [40]. This finding is consistent with the possibility that female athletes may be underdiagnosed earlier in life [41]. ADHD traits, such as rapid decision making, can offer advantages for athletic performance. However, female athletes with ADHD face unique challenges, including prolonged recovery from concussions and social difficulties, which can negatively impact both their athletic and personal lives [41]. These results underscore the need for early identification and tailored interventions that address the unique needs of female athletes with ADHD [41]. Our findings underscore the importance of diagnostic tools and the need for further research to explore the unique challenges ADHD presents in female athletes. However, the psychometric properties of the scale used in our study, particularly

its internal consistency, may represent a limitation. While the scale achieved an acceptable level of internal consistency, it did not reach the threshold for being classified as good or excellent. As a result, the findings should be interpreted with caution. Future studies should aim to validate and refine the measurement tools to ensure more robust and reliable results.

We found significant gender differences in alcohol consumption among athletes, with female athletes exceeding the AUDIT-C threshold more frequently than male athletes. These behaviors may reflect gender-specific coping mechanisms, with women resorting to alcohol to cope with stress and emotional challenges in a demanding athletic environment [17,42]. Walton et al. suggest that female athletes experience more adverse life events than male athletes, which could explain their higher alcohol consumption as a coping strategy [17]. Benzi et al. observed that while men were slightly more likely to consume alcohol regularly, women were more likely to binge drink, highlighting the complex social factors that influence drinking behavior in sport [42]. Similarly, in a systematic review, Zhou and Heim found that female student athletes were more likely than non-athletes to report intoxication, to consume larger amounts of alcohol, and to engage in binge drinking more frequently. These findings highlight the role of social norms and team identity in shaping alcohol consumption, particularly in team sports [43]. In contrast, authors of Lewis's textbook reported that overall alcohol consumption was higher in males, with 9.0% of male athletes and 4.3% of female athletes reporting alcohol use. This is consistent with wider international studies showing high rates of lifetime alcohol use among adolescents [31,44]. These findings highlight the need for interventions that address the social, emotional, and cultural factors that contribute to alcohol use among athletes [31,44]. The discrepancy between our findings and the global literature, which often reports higher alcohol consumption among males, may be explained by shifting temporal trends. Recent studies suggest a narrowing gender gap in alcohol use, particularly among younger generations. This trend could reflect evolving sociocultural norms and attitudes toward drinking among females. However, the specific sociocultural influences on alcohol consumption in athletic populations remain unclear and warrant further investigation.

Our study found significant gender differences in bipolar disorder (BD), with female athletes more likely to exceed the threshold than male athletes. Consistent with previous research, women are more likely to experience depressive episodes in BD, which is influenced by hormonal fluctuations [45]. A systematic review by Readon and Factor also reported a higher prevalence of mood disorders in the sporting environment, particularly in female athletes exposed to the pressures of high-level competition. Their findings highlight the importance of understanding gender differences in order to develop tailored treatment approaches for adolescent athletes [46]. Another study emphasized the need to recognize psychiatric disorders such as BD in athletes and found that female athletes are more likely to be affected by mood disorders than their male counterparts. This discrepancy may be influenced by social factors and the stigmatization of mental health problems in the sports context [47]. These findings highlight the need for gender-specific interventions to address the particular mental health challenges faced by female athletes [47]. Our findings and those of other studies in athlete populations differ from those in the general population, which indicate an equally high prevalence of bipolar disorder in both genders. This highlights the need for further research to investigate how the unique environment and pressures of sport may influence the manifestation and reporting of bipolar disorder in athletes.

The prevalence of PTSD was higher in women in our study. Social stigmatization may contribute to a gender bias in the diagnosis of PTSD [44]. Akesdotter et al. also found significant gender differences in the prevalence and reporting of PTSD and other mental disorders in athletes. Their study highlights the importance of tailored support and early

intervention strategies to help young athletes effectively overcome these challenges. Female athletes were also found to have higher rates of mental health symptoms compared to their male counterparts [48]. Research shows that women are more likely to develop PTSD than men, which is likely due to both biological and psychosocial factors [49]. Differences in the processing and internalization of trauma may lead to greater emotional distress in women following traumatic events. In addition, female athletes are often exposed to specific stressors such as gender discrimination or harassment in the sporting environment, which further increases their risk of PTSD. Studies suggest that female athletes are more likely to experience psychological and sexual harassment or abuse, which has a significant impact on their mental health [50]. The psychological trauma associated with sports injuries also disproportionately affects female athletes. One study found that female athletes reported greater emotional trauma compared to their male counterparts, highlighting the gender disparity in the psychological impact of sports injuries [51]. This disparity is consistent with findings that women are more likely to be exposed to interpersonal trauma and are more likely to report PTSD symptoms. The lifetime prevalence of PTSD is estimated to be 10–12% in women and 5–6% in men, reflecting greater exposure to certain types of trauma and differences in symptom reporting [51]. These findings highlight the need for gender-specific interventions, including tailored psychosocial support and early intervention strategies, to address the particular challenges faced by female athletes [51]. Non-significant findings in other areas, such as gambling behavior and psychosis prevalence, suggest that certain mental health conditions may be influenced less by gender-specific factors and more by common environmental or structural aspects of sport. These common factors, such as rigorous routines, frequent supervision and performance-oriented cultures, may help attenuate the typical gender differences. It is crucial to explore these findings further in order to identify protective mechanisms within the sporting environment that could be utilized to support athletes' mental health more broadly. Practical implications for mental health should focus on creating a safe, inclusive environment that actively addresses risks such as harassment and discrimination. Sports organizations should implement trauma-informed care practices to support female athletes' unique responses to trauma and provide access to sports-psychology-trained professionals. In addition, promoting a culture of openness and psychological safety within teams can help to reduce stigma and encourage athletes to seek help. Tailored interventions such as resilience-building workshops, stress management programs, and accessible counseling services are crucial to effectively address gender-specific mental health needs.

For some tests in our study, such as CAGE-AID (screening for drug abuse), the differences between the genders were not statistically significant. Although the *p*-values suggest that the results are close to significance, there is no clear evidence of a gender-specific association for substance abuse problems in our sample. This may be due to the fact that genetic, environmental, and social factors influence substance use disorders and psychosis in men and women in a similar way [52]. One study examining substance use in female athletes found clear gender differences in substance use patterns, with women reporting lower rates of substance use overall than men. However, the specific trends varied by substance type and method [52]. In contrast, Kloos et al. found that men tended to have higher rates of substance use, reflecting differences in clinical presentation between the genders [53]. The lack of significant gender differences in our results may be explained by the structured environment of competitive sport, where strict regulations, lifestyle control, and routine health monitoring may attenuate the typical gender differences observed in broader populations [53,54]. The regulated nature of competitive sport may contribute to more uniform stress responses and reduce traditional gender differences in substance misuse. These findings suggest that the unique environment of sport minimizes gender

differences in substance use and psychosis compared to the general population [54]. This controlled environment may mitigate some risk factors for substance misuse typically seen in the general population, such as peer pressure or lack of supervision. In addition, the collective focus on performance and health optimization in competitive sports may reduce opportunities and motivations for substance use among athletes of both genders. These factors highlight the protective role that a structured sporting environment can play in reducing gender differences in substance misuse. In addition, the emphasis on performance optimization in sport may limit substance use in both genders, contributing to these results. However, the relatively small number of participants who crossed the substance misuse threshold may have limited the statistical power of our analysis, potentially masking subtle differences between the sexes. Future studies with larger samples could provide a more comprehensive understanding of gender-specific trends in substance use among adolescent athletes. The practical implications of these findings suggest that sport organizations should continue to prioritize strategies to prevent substance misuse in sport settings. Expanding routine health monitoring and education about the risks of substance misuse can further enhance these protective factors. In addition, promoting team cultures that emphasize mental and physical well-being can help keep substance abuse among athletes at a low level. By using the structure of sport to promote healthy behaviors, sports organizations can serve as a model for substance abuse prevention.

The results of the gambling test in our study showed no significant gender differences, suggesting that problem gambling behavior may occur to a similar extent in men and women. Some studies claim that both genders are equally influenced, which can be attributed to the relatively low prevalence of gambling behavior in the athlete population or to external factors such as team culture and social environment. The results of these studies indicate a slightly higher prevalence among female athletes, contrary to the trend observed in the literature that men tend to have a higher rate of gambling problems [42]. The prevalence of gambling addiction is typically between 2% and 7%, with men being more commonly affected than women [31]. A British study, for example, found that boys gamble more often than girls, and classified boys as problem gamblers. In Finland, 62% of adolescents reported gambling, with a higher proportion of boys than girls [55]. The lack of significant gender differences in gambling behavior in our study suggests that some mental illnesses are gender-specific, while others—such as substance abuse, psychosis, and gambling—may affect athletes similarly due to shared environmental influences or structured lifestyles. This finding contradicts the general trend in the literature, which often reports higher rates of gambling problems in men. The unique environment of sport could explain this discrepancy. One possible reason is the highly structured nature of sports, where strict schedules, frequent supervision, and an emphasis on performance leave little time or opportunity for gambling. These factors could lead to similar behavioral patterns across genders, as they limit opportunities to gamble equally. In addition, the influence of team culture could provide a set of shared norms and values that discourage both male and female athletes from gambling. Such cultural factors in sport could override broader societal patterns and create an environment in which gender differences in gambling are less pronounced. It is also possible that the stress and pressure of competitive sport causes female athletes to use similar coping mechanisms to their male counterparts, such as gambling. This common response to stress may explain why gambling behavior in athletes is not consistent with trends in the general population, where men tend to be more affected. It is also possible that the pressure and stress of competitive sport may lead female athletes to seek coping mechanisms, which may include gambling, but this needs to be investigated further. Further research is needed to investigate how these common

environmental influences, team culture, and stress responses contribute to the observed lack of gender differences in gambling among athletes.

Our study found no significant gender differences in athletes' psychological strain as measured by the Athlete Psychological Strain Questionnaire (APSQ). However, previous research suggests that female athletes tend to experience higher levels of psychological strain, particularly when injured [56]. Another study highlights that psychological distress is common in both genders but differs in its nature and impact, with female athletes being more susceptible to psychosocial stressors that increase anxiety and depression [56]. Research validating the APSQ in elite male and female athletes shows that the questionnaire effectively captures psychological distress related to performance, self-regulation, and external coping strategies [56]. The study included a heterogeneous group of athletes, which allowed for a comparison of psychological distress between genders, and which supports the utility of the APSQ as a tool to assess stress in competitive sports [56]. The results of our study are in contrast to the aforementioned studies. This discrepancy may be due to the unique pressures and support systems in competitive sport, which could attenuate gender differences in psychological distress. For example, common environmental factors such as rigorous training schedules, performance expectations, and the demands of balancing personal life with sport could have an equalizing effect on stress between the genders. This discrepancy may be influenced by factors such as the type of sport, level of competition, and cultural expectations, which may play a greater role in psychological distress than gender alone. The cultural context of sport often places male and female athletes under intense scrutiny and pressure, which could contribute to similar levels of stress. We consider it possible that male athletes are less likely to report psychological stress, contributing to the lack of perceived gender differences. However, it is also possible that the structured environment of competitive sport, with its clear goals and external regulations, helps both genders to cope with stress in a similar way. The emphasis on team cohesion, shared goals, and collective support in many sports environments may further minimize gender differences by fostering a sense of solidarity and mutual encouragement. These elements could cushion the psychological strain experienced by both genders and thus promote resilience. The practical implications of these findings suggest that interventions should focus on utilizing the protective factors inherent in the sport environment. Programs to strengthen team cohesion and promote open communication about mental health could help both male and female athletes to manage stress more effectively. Mental health interventions should also include strategies to manage performance anxiety and life-sport balance, as these stresses are common to all genders. In addition, access to psychological support tailored to the specific needs of competitive athletes can help to further equalize mental health outcomes and ensure that both genders receive appropriate care.

In our study, significant gender differences were found in the BEDA-Q test, indicating a higher tendency of male adolescents to develop eating disorders. Borowiec et al. report that the risk of eating disorders is higher in women, especially in sports where body image and weight are emphasized, with women found to have higher rates of eating disorders than men in lean sports [57]. In contrast, our results showed a higher proportion of male adolescent athletes crossed the eating disorder threshold than female athletes. Another study found significant gender differences in eating disorders among athletes. Male athletes were more likely to cross the threshold into disordered eating behaviors, while female athletes were more likely to report body dissatisfaction and disordered eating behaviors [58]. These findings suggest a complex interplay between gender-specific factors and the prevalence of eating disorders in athletes. They emphasize the need for tailored interventions that address the unique challenges of male and female athletes in competitive sports [58]. We hypothesize that this may reflect a growing cultural awareness of eating

disorders in men, which reduces the stigmatization of symptoms and contributes to a higher representation of male athletes in these outcomes. The higher scores for male athletes in our study may be due to a combination of underrepresentation in the existing literature, sport-specific pressures, psychosocial factors, cultural changes in awareness of male eating disorders, and compensatory behaviors related to performance expectations. Further research is needed to thoroughly explore these dynamics and provide targeted interventions for all athletes, regardless of gender. These findings may be influenced by the temporal increase in societal and athletic emphasis on male physique, muscularity, and leanness, which could lead to an increase in disordered eating behaviors in male athletes. In addition, male athletes may resort to compensatory behaviors such as restrictive diets or excessive training to enhance their performance or conform to sport-specific ideals of beauty.

We found no significant difference between genders when it comes to psychosis. The article by Currie et al. deals with psychotic disorders, including gender differences in their prevalence. [59]. However, in the general population, psychotic symptoms are more commonly observed in males during adolescence and early adulthood, while psychotic disorders in females may also occur later in life [59]. Psychotic disorders such as schizophrenia occur slightly more frequently in men than in women [59].

The lack of significant gender differences in psychosis prevalence in our study could be due to several factors related to the sporting environment. One possible explanation is the unique structure and demands of sport, which could attenuate the gender differences observed in the general population. Shared routines, close supervision, and an emphasis on physical and mental performance may create a more unified environment and reduce the influence of external factors that typically contribute to gender differences in psychosis prevalence. Another factor could be the age distribution in our sample. The average age of our participants is below the typical onset of psychosis in women, which often occurs later compared to men. This difference in age distribution may mask gender inequalities observed in the general population, where men are more likely to be affected by early-onset psychosis. As we focus on a younger athlete population, our results may not capture this delayed onset in women. In addition, the influence of team dynamics and support structures in sport should be considered. The strong sense of community and collective focus in sporting environments may have a protective effect against psychosis that is similar across genders. This could explain why we did not observe significant gender differences in our sample. Further research is needed to explore these possibilities and to understand how the unique environment of sport interacts with factors such as age, gender, and mental health outcomes, particularly psychosis.

## 5. Strengths and Limitations

This study was supported by the Croatian Olympic Committee, which facilitated the distribution of the questionnaire and helped to reach a wide range of athletes. Participants from all over the country were included, providing a broad overview of the mental well-being of young Croatian athletes. The inclusion of athletes from 43 different sports enhances the generalizability of the findings.

In terms of limitations, the electronic distribution of the questionnaire may have led to selection bias, as athletes who do not have regular access to electronic communication may be underrepresented. This limitation may affect the generalizability of the results and sample distribution. In addition, no controls for potential confounders were performed (apart from the aforementioned socioeconomic level, training environment, and coaching style). These omitted variables may have influenced the results and should be considered

in future studies. Comorbidities were not considered in this analysis, particularly those above the threshold on multiple scales, which should be considered in subsequent studies.

Another limitation is the fact that the data are based on self-reporting, which can lead to bias, e.g., through over- or under-reporting of symptoms. Furthermore, due to the cross-sectional design, it is only possible to establish a causal relationship or evaluate changes over time to a limited extent. Future studies should consider longitudinal approaches to better understand the temporal dynamics of psychological challenges in adolescent athletes. The study sample also showed a gender imbalance, with more male (418) than female athletes (256). This discrepancy could limit the generalizability of the results, especially when it comes to accurately reflecting the psychological challenges of female athletes, who are underrepresented. The uneven distribution may also reduce the robustness of gender-specific comparisons. Future studies should aim for a more balanced sample to gain a more comprehensive understanding of the psychological challenges faced by male and female athletes. A further limitation of this study is that we did not use multifactorial statistical analyses, such as generalized linear models, to account for factors that might influence the results. Thus, although we found gender differences in mental health problems, we are aware that these differences may not be due to gender alone. The literature suggests that sport type may play a role, as some sports may increase or decrease the likelihood of mental health problems. However, the results of our preliminary analysis of differences in mental health problems according to sport type were not significant.

Most of the results are consistent with existing research suggesting that female athletes have a higher risk of psychological challenges. However, the findings in relation to ADHD differ from the established literature. Another limitation is the small number of questions in certain scales, which reduced statistical power and may have obscured subtle differences that could have been identified with more detailed measures. Future research should use more advanced methods to take these factors into account and investigate how gender, sport type, and mental health are related. Although this study provides a valuable initial overview, further studies are needed to confirm and extend these findings.

## 6. Implications for Interventions

Targeted support and tailored interventions are essential for adolescent athletes facing psychological problems. Early identification of these problems and programs tailored to the specific stresses of adolescent athletes can help reduce their impact. Based on the results, female athletes require particular attention and care compared to males. Interventions should address the particular stresses faced by female athletes, such as body image issues, performance anxiety, and societal expectations. Mental health programs could include access to female sports psychologists, stress management workshops, and nutrition education to address eating disorders. Creating a supportive team culture and encouraging open conversations about mental health can also help to reduce stigma and create a safe environment for female athletes to seek help. Future interventions and research should consider alternative survey methods, such as face-to-face or paper-based questionnaires, to ensure wider participation and better representation of athletes from different socioeconomic backgrounds. Partnerships with schools and sports organizations can help make these surveys accessible, especially in areas with limited digital access.

## 7. Conclusions

The study highlights mental health challenges among Croatian adolescent athletes, with a focus on gender differences. Female athletes are more likely than male athletes to struggle with mental health issues, including anxiety, depression, sleep problems, excessive alcohol consumption, ADHD, bipolar disorder, and PTSD.

These findings underscore the urgent need for gender-specific mental health interventions tailored to the unique pressures faced by female athletes, such as hormonal changes, societal expectations, and gender-based stressors. Early detection and targeted support, including addressing body image concerns, interpersonal trauma, and emotional regulation, are crucial to reducing these stresses and preventing long-term mental health issues. Tailored support systems are critical to enhancing participation in sports and improving overall well-being. Future research should prioritize longitudinal studies to better understand the development of mental health in adolescent athletes and refine gender-specific interventions. Identifying key stressors and coping strategies will enable more effective support for athletes' mental health. The results of this study can inform the development of sports policies that prioritize mental health. Key initiatives could include mandatory mental health education programs, access to mental health professionals within sports organizations, and promoting a culture that normalizes seeking help. These measures can foster resilience, improve performance, and support long-term engagement in sports. By integrating these insights into practice, sports organizations and mental health professionals can create inclusive and supportive environments that promote the mental health and well-being of all athletes, ultimately enhancing their quality of life both on and off the field.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/psychiatryint6010029/s1>.

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**Institutional Review Board Statement:** This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the Medical College in Split, Croatia. Approval number class: 003-08/23-03/0015, file number: 2181-198-03-O4-23. The approval was granted in April 2023. We contacted the Head of the Mental Health Working Group (MHWG) of the International Olympic Committee (IOC) on 1 January 2023 to obtain permission to use the SMHAT-1 questionnaire and to preface the questionnaire with sociodemographic questions. Prof. Gouttebarga replied that we were not allowed to change the SMAHT-1 questionnaire, but that we could add questions before or after the SMHAT-1 questionnaire as we deemed necessary. After we received the approval, we started with the translation and cultural adaptation.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data presented in this study are available upon request.

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