

Disparities in the Prevalence and Severity of Sleep and Mental Health Disorders among Retired Elite Athletes Using a Gender-Specific Approach

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ABSTRACT

Aim of the Study: For the past two and a half decades, mental health disorders among retired athletes (particularly elite) have gradually been rising while eventually reaching to a worrisome level. Hence, the current study aimed to examine gender-based differences in the prevalence and severity of sleep disorders and mental health conditions among retired elite athletes.

Methodology: This particular study used the cross-sectional approach. The participants included in the final sample were 268 in number, among which 119 were women and 149 were men aged between 29 to 63 years ($M = 43.2$, $SD = 7.39$). PSQI, Gad and CES-Depression Scale-10 were utilized to gather data.

Findings: The results proposed that with respect to the prevalence of depression, male retired elite athletes reported slightly greater prevalence of depression as compared to female counterparts. Additionally, with respect to anxiety levels, female elite retired athletes demonstrated higher prevalence of moderate to severe anxiety as compared to male elite retired athletes. Sleep disorders, on the other hand, also presented almost similar results with females demonstrating slightly higher prevalence of sleep disorders as compared to male elite retired counterparts. Lastly, although the t-test scores remained non-significant with respect to gender related disparities in depression scores. However, anxiety and sleep disorders did indicate substantial gender differences with female retired elite athletes demonstrating higher levels of both disorders.

Conclusion: These findings reinforce the need for growing body of international literature to design and propose specialized strategies to counter post-retirement mental health disorders among retired elite athletes.

Keywords: Prevalence, Mental health disorders, Sleep disorders, Retired athletes, Gender-specific.

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1. INTRODUCTION

For the past two and a half decades, mental health disorders among retired athletes (particularly elite) have gradually been rising while eventually reaching to a worrisome level. It has rose to such an extent that mental health difficulties are now being recognized as a major post-career challenge (Montero et al., 2024a). Due to this reason, it has successfully been able to draw attention of researchers, sports organizations and healthcare professionals worldwide. Athlete's retirement is a highly sensitive and critical life transition. Many players retire voluntarily due to family responsibilities, career changes and social demands (Schmid et al., 2024). Whereas, some players are forced into retirement because they suffer serious injuries, increasing age and declining performance (Furie et al., 2023). This involuntary retirement, in particular has been observed to influence substantially on athletes as it robs the player of their athletic identity which may ultimately affect their physical, psychological and emotional health (Roberts et al., 2023).

The transition phase after retirement results in either a successful adjustment in which the athlete adapts to the new demands of life or a crisis situation that may be characterised by difficulties in coping (Ivarsson & Gledhill, 2024). This might ultimately increase athletes' psychological and physical strains (Cosh et al., 2021). Moreover, athletes bear not only physical demands but also considerable organizational and environmental pressures throughout their sports careers. It has been reported that athletes face hundreds of different types of stressors during their sporting life, often affecting mental health and sleep (Arnold & Fletcher, 2012). However, with respect to the mental disorders, both anxiety and depression have been suggested to be amongst the most commonly reported conditions (Vella et al., 2026).

Anxiety is a frequently reported mental health condition in athletes. It manifests as a physical and psychological reaction when the individual is exposed to a stressor or threat (Reardon et al., 2024). Anxiety can be caused through a variety of symptoms such as restlessness, nervousness, rapid heartbeat, muscle tension, headaches, insomnia, fatigue and difficulty concentrating (Lolk, 2013). Depression, on the other hand, is also a mental health concern whose characteristics include mood swings, loss of interest in daily activities, loss of pleasure and appetite, and thoughts of suicide (Gouttebauge et al., 2019). Both anxiety and depression have been observed to be highly frequent among retired elite athletes. Even a systematic review study conducted by Runacres and Marshall (2024) revealed that retired elite athletes possessed higher levels of anxiety and depression as compared general population. However, a gender specific approach in this regard still remains unaddressed in light of the current literature, no prior study has yet been conducted.

In addition to mental health concerns, sleep disorders have become an increasingly recognized issue among retired athletes. Sleep disorders are problems that disturb how a person usually sleeps, including insomnia, poor sleep quality, difficulty maintaining sleep, and irregular sleep-wake cycles (Jaqua et al., 2022). Such disturbances can have serious consequences for physical recovery, emotional regulation, cognitive processing and lasting health effects (Ramos et al., 2023). Additionally, a gender-specific approach is particularly important when examining sleep and mental health disorders among retired athletes. Biological, psychological, and social differences between men and women may influence how mental health symptoms and sleep disturbances are developed, experienced and reported (Legault & Faubert, 2024). Despite these known differences, gender-specific analyses remain limited in research involving retired elite athletes, creating a gap in understanding that this study seeks to address.

1.1. Study Objectives

Therefore, the current study aimed to examine gender-based differences in the prevalence and severity of sleep disorders and mental health conditions, specifically anxiety and depression, among retired elite athletes. By adopting a cross-sectional design, this research seeks to identify patterns of co-occurrence and gender-specific vulnerabilities in post-career health outcomes. The findings of this study may contribute to a more nuanced understanding of the long-term consequences of elite sport participation and

highlight the importance of gender-sensitive approaches in athlete health management. Ultimately, this research may inform targeted support programs, early identification strategies, and policy development aimed at improving the long-term well-being of retired elite athletes.

2. RESEARCH METHODOLOGY

2.1. Study Design

This particular study used the cross-sectional approach to answer the research question.

2.2. Population and Sample

The participants in our study were retired high-level athletes from various sports. They were a total of 268 in number, among which 119 were women and 149 were men. All participants as mentioned earlier were retired and had competed at elite levels. Any participant, who was an active athlete or had less than 1 year of post-retirement experience was excluded. The participants were tracked down through several athletics and sports associations and were contacted individually. They were first verbally informed about the nature of the study and an informed consent was duly obtained from each of the participating retired athletes.

2.3. Measurements

2.3.1. Instruments

In order to evaluate the severity of sleep and mental health disorders, three instruments were used:

2.3.2. Anxiety Measuring Instrument

GAD is a specialized tool that was developed by Spitzer et al. (2006). This questionnaire has a total of seven items that were designed to find out that general anxiety symptoms among individuals. Participants were asked how much they had experienced the anxiety symptoms mentioned in the tool in the last two weeks. The responses were initially recorded by selecting the best option that presented their condition and were then coded. The attained score was divided into four parts that ranged from 0 to 21. It was also ensured that the responses related to anxiety were not older than 2 weeks to maintain their validity. Lastly, GAD demonstrated a Cronbach alpha value of 0.92 for this study whereas, past studies have reported the value ranging between 0.85 to 0.92 which further strengthens its reliability (Rutter & Brown, 2017; Tiirikainen et al., 2019).

2.3.3. Instrument to measure Sleep Disorders

The instrument PSQI was developed by Buysse et al. (1989) to examine the quality of sleep and sleep disorders among individuals. It was important to note that the questionnaire was only valid if the sleep data was collected within a period of one month. It comprised of a total of 7 components which were sub-divided into 19 items. The tool has frequently and excessively been utilized by multiple studies with a similar research population (Esagoff et al., 2024; Pullinger et al., 2025). Additionally, studies conducted in the past have demonstrated a Cronbach alpha ranging between 0.72 to 0.84 (Woosley & Lichstein, 2014; Yucens et al., 2024). However, for this study, the internal coherence of this tool was calculated to be 0.83, therefore making it a suitable and reliable choice.

2.3.4. CES-Depression Scale-10

To identify and collect depression-related data, we utilized CES-Depression scale comprising of 10 items. This tool was developed by Andresen et al. (1994) with an objective of collecting depression-specific data from each individual within the last week. Any data that was beyond this timeframe of one week was considered invalid. If the sum of scores of each item exceeded the cut-off point of 10, the individual was then considered to exhibit signs of depression. The reason to use this tool in our study for gathering depressive symptoms of the retired athletes was based on two reasons; 1) The tool was time-efficient and easy to understand which was our top priority while gathering data from retired athletes; 2) This tool has

been utilized by multiple studies to gather depression related data (Błachnio et al., 2015; Donovan et al., 2017; Richard et al., 2013). Lastly, for this study, a CronBach alpha score of 0.86 further strengthened its reliability.

2.4. Procedure

The permission to use each tool was taken on a priority basis and before the start of this study. Once the permissions were gathered, then a final questionnaire comprising of all three data gathering instruments and a demographic tool was developed. The participants were approached individually and were provided with the questionnaire in physical form. Before initiating the process, each participant was provided with detailed instructions on how to fill questionnaire. They were also explained about their right to willingly participate and can leave the study at any time of their choosing. They were then provided with around 25 to 30 minutes to complete the questionnaire.

2.5. Statistical Analysis

Initially, to calculate the frequencies and percentages of the demographic characteristics of each participant, descriptive statistics were applied. Additionally, to figure out the gender related differences between sleep and mental health disorders among retired elite athletes, the prior procedure was repeated. Lastly, to explore any gender related differences between these variables, independent samples t-test was applied with the significance value set at <0.05 . All these procedures were run through IBM SPSS v25.

3. RESULTS

3.1. Descriptives of Demographic data

The participants included in the final sample were 268 in number, among which 119 were women and 149 were men aged between 29 to 63 years ($M = 43.2$, $SD = 7.39$). Most of the participants were married 86.2 percent whereas, 9 percent of them were single. Lastly, 2.6 percent of them were divorced whereas the remaining 2.2 percent were widowed.

Table 1: Socio-demographic profile of participants

Variable	Category	n	%
Gender	Female	119	44.4
	Male	149	55.6
Marital Status	Single	24	9
	Married	231	86.2
	Divorced	7	2.6
	Widower/Widow	6	2.2
Employment Status after retirement	Employed	196	73.1
	Unemployed and seeking for job	55	20.5
	Unemployed and not seeking for job	17	6.3

Note: N= 268, n = frequency and (%) = percentage

With respect to the employment status after retirement, around 73.1 percent of the participants were involved in some kind of work. Additionally, while 20.5 percent were not working but they were looking for employment opportunities. Lastly, 6.3 percent were neither employed nor were they looking for any employment. (See Table 1)

3.2. Prevalence of Depression among male and female retired elite athletes

To examine any gender related differences in depression scores among male and female retired elite athletes, descriptive statistics were applied.

Table 2: Frequency of depression among retired elite athletes

Gender	Category of depression	n	%
Female	Having depression	90	75.6
	Not having depression	29	24.4
Male	Having depression	116	77.9
	Not having depression	33	22.1

Note: N = 268, n = frequency % = percentage

The results showed in table 2 presented that 75.6% of women who were retired at elite levels of their respective sports were dealing with depression while 24.4% did not exhibit any form of depression. Conversely, among male elite retired athletes 77.9% demonstrated the symptoms of depression whereas 22.1% do not have depression.

3.3. Prevalence of Anxiety among male and female retired elite athletes

The prevalence of anxiety levels with respect to gender among retired elite athletes were also calculated through descriptive statistics. (See Table 3)

Table 3: Frequency of anxiety among retired elite athletes

Gender	Category of anxiety	N	%
Female	Minimal	2	1.7
	Mild	27	22.7
	Moderate	77	64.7
	Severe	13	10.9
Male	Minimal	7	4.7
	Mild	41	27.5
	Moderate	96	64.4
	Severe	5	3.4

Note: N = 268, n = frequency % = percentage

The outcome revealed that the majority (64.7%) of the female elite retired athletes possessed moderate level of anxiety, with 22.7% having mild anxiety, 10.9% demonstrating high anxiety and only 1.7% exhibiting severe anxiety. Conversely, among male elite retired athletes, the proportion of those with moderate anxiety was the highest with 64.4%, followed by 27.5% with moderate anxiety, 4.7 % with mild anxiety, and 3.4 % with severe anxiety.

3.4. Prevalence of Sleep Disorders among male and female retired elite athletes

Similar to the above two variables, prevalence of sleep disorders with respect to gender among retired elite athletes were calculated through descriptive statistics. (See Table 4)

Table 4: Frequency of good or poor sleep quality among retired elite athletes

Gender	Category of sleep	N	%
Female	Poor sleep	97	81.5
	Good sleep	22	18.5
Male	Poor sleep	120	80.5
	Good sleep	29	19.5

Note: N = 268, n = frequency % = percentage

The results proposed that among the female retired elite athletes 81.5% showed sleep disorders due to poor sleep quality whereas, only a small proportion 18.5% reported good sleep quality or no sleep disorders. On the other hand, among male retired elite athletes 80.5% demonstrated sleep disorders due to poor sleep quality however, only 19.5% revealed good sleep quality or no sleep disorders.

3.5. Gender related differences between Depression, Anxiety and Sleep Disorders

To examine the disparities in the sleep, depressions and anxiety scores with respect to gender, independent samples t-test was employed. (See Table 5)

Table 5: Gender differences between Depression, Anxiety and Sleep Disorders

Variable	Female		Male		t	p	Cohen's d
	M	SD	M	SD			
Depression	11.80	3.44	11.64	2.927	0.397	0.691	0.05
Anxiety	11.31	3.053	10.34	2.79	2.711	0.007	0.33
Sleep Disorders	6.55	1.97	5.81	1.682	3.237	0.001	0.41

Note: p = <0.05

Based on the results of the t-test, no significant or clear difference was found in the depression scores between female (M = 11.80, SD = 3.44) and male (M = 11.64, SD = 2.927) retired elite athletes with t = 0.397, p = 0.691. Additionally, with respect to the anxiety levels, female retired elite athletes reported higher anxiety levels (M= 11.31, SD = 3.053) in contrast to male retired elite athletes (M=10.34, SD=2.79) with t = 2.711 and p = .007. Due to the Cohen's d value being 0.33, this difference was considered to be ranging between small to moderate. Lastly, with respect to sleep disorders, female retired elite athletes (M = 6.55, SD = 1.97) exhibited more sleep disorders in comparison with male retired elite athletes (M = 5.81, SD = 1.68) with t = 3.237 and p = .001. The effect size of this disparity was moderate due to the Cohen's d value of 0.41.

4. DISCUSSION

The present study (which was cross-sectional in design), was conducted with objective of determining the gender-based differences in the prevalence and severity of sleep disorders and mental health conditions, specifically anxiety and depression, among retired elite athletes. With respect to the prevalence of depression, male retired elite athletes reported slightly greater prevalence of depression as compared to female counterparts. Additionally, with respect to anxiety levels, female elite retired athletes demonstrated higher prevalence of moderate to severe anxiety as compared to male elite retired athletes. Sleep disorders, on the other hand, also presented almost similar results with females demonstrating slightly higher prevalence of sleep disorders as compared to male elite retired counterparts. Lastly, although the t-test scores remained non-significant with respect to gender related disparities in depression scores. However, anxiety and sleep disorders did indicate substantial gender differences with female retired elite athletes demonstrating higher levels of both disorders. These findings reinforce the need for growing body of international literature to design and propose specialized strategies to counter post-retirement mental health disorders among retired elite athletes particularly females.

One of the primary objectives of the current investigation was to examine gender-based differences in depression among retired elite athletes. The findings revealed that a high proportion of both female (75.6%) and male (77.9%) retired elite athletes exhibited symptoms of depression, with no statistically significant difference between the two groups. These findings are consistent with earlier research which suggested that depression is a common post-retirement challenge among elite athletes regardless of gender (Runacres & Marshall, 2024; Wolanin et al., 2015). However, some studies have reported slightly higher vulnerability among female athletes due to greater emotional sensitivity and social stressors Sabinudóttir et al. , which was not observed in the present study. The lack of notable gender disparity may be attributed to shared transitional challenges such as loss of athletic identity, reduced social support, and difficulties in adapting to post-sport life, which tend to affect both genders in a relatively similar manner (Giannone et al., 2017).

Another objective of this study was to investigate gender differences in anxiety levels among retired elite athletes. The results indicated that although both groups predominantly experienced moderate levels of anxiety, however, anxiety levels appeared to be relatively higher in female athletes than male participants.

This finding aligns with previous literature highlighting that female athletes are generally more prone to anxiety-related symptoms due to heightened emotional processing and societal expectations (Acharjee et al., 2025; Correia & Rosado, 2019). Conversely, some research suggests that male athletes may underreport anxiety due to cultural norms surrounding masculinity, which could partially explain the observed difference (Richardson & Kilty, 1995). These variations may be driven by biological factors such as hormonal fluctuations, as well as psychosocial influences including coping styles, emotional expressiveness, and perceived support systems during the retirement transition (Niles et al., 2018).

The study also aimed to assess gender-based differences in sleep disorders among retired elite athletes. The findings demonstrated that poor sleep quality was highly prevalent in both groups, with slightly higher proportions observed among female athletes (81.5%) compared to males (80.5%). These results are in agreement with prior studies indicating that sleep disturbances are a persistent issue among retired athletes due to changes in lifestyle, reduced physical activity, and psychological distress (Montero et al., 2024a; Silva et al., 2019). Some studies, however, have suggested more pronounced sleep issues among female populations due to greater susceptibility to stress and anxiety, which is marginally reflected in the present findings (Montero et al., 2024b). The high prevalence of sleep disorders in both groups may be explained by disrupted circadian rhythms post-retirement, lingering performance-related stress, and the interrelationship between sleep disturbances and mental health conditions.

A further objective was to examine overall gender differences across depression, anxiety, and sleep disorders among retired elite athletes. The results indicated no significant gender differences in depression; however, females reported significantly higher levels of anxiety and sleep disturbances compared to males, with small to moderate effect sizes. These findings are partially supported by existing literature, which often reports higher anxiety and sleep-related issues among female populations (Gouttebauge et al. (2019); Yao et al. (2020), while also suggesting minimal gender differences in depression within athletic populations (Dimitriadou et al., 2022). Nonetheless, some contradictory evidence highlights greater depressive symptoms among female athletes (Purcell et al., 2019), which was not evident in this study. The observed pattern may be explained by gender-specific coping mechanisms, where females tend to internalize stress leading to heightened anxiety and sleep disturbances, whereas both genders may experience depression similarly due to shared career termination stressors and identity loss.

4.1. Limitations

This study has a few limitations that should be kept in mind before reciprocating it. Since it used a cross-sectional design, therefore it is not possible to say for sure that what eventually caused these observed outcomes. Additionally, as the gathered data was based on self-reports, therefore, there is a chance of lack of highly accurate responses from some participants. Furthermore, as the sample size of this study was limited, therefore, it may be relatively difficult to apply these findings to all retired athletes. Lastly, factors like type of sport, injuries, and lifestyle after retirement were not considered, which could have also influenced the results.

4.2. Directions for Future Research

Future research should try to understand this issue from a broader perspective by including more participants and different types of athletes. It would also be useful to study how personal and environmental factors influence mental health after retirement. This could help in developing more practical and effective support strategies.

5. CONCLUSION

To examine the disparities with respect to gender in the prevalence and severity of sleep disorders and mental health conditions, specifically anxiety and depression, among retired elite athletes was the prime focus of this study. The results revealed that apart from depression, gender specific disparities might exist in anxiety and sleep disorders among elite retired athletes with females reporting higher levels of both

variables than male counterparts. The results suggest that greater attention should be given to developing ways to help retired athletes, particularly females, manage their mental health.

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Conflict of Interest

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