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An Analysis of sleep quality index and its correlation with stress, depression, anxiety level in collegiate athletes during tournaments

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KEYWORDS

Sleep quality, Pittsburgh Sleep Quality Index (PSQI), psychological well-being, Depression, Anxiety, Stress Scale (DASS-21), collegiate athletes, tournaments.

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Abstract

Background: This study aimed to examine the connection between sleep quality and psychological factors—specifically stress, depression, and anxiety—in collegiate athletes during tournament periods. Given the significant physical and mental demands placed on athletes during competitions, understanding how sleep quality influences their mental health and athletic performance is vital. The interplay between sleep quality and psychological well-being is crucial, and addressing these factors can have a significant impact on athletes' overall well-being and success in sports.

Materials & Methods: Collegiate athletes from Group A were recruited for the study, where they completed standardized questionnaires to assess their sleep quality, stress, depression, and anxiety levels. The Pittsburgh Sleep Quality Index (PSQI) was utilized to measure sleep quality, while the Depression, Anxiety, and Stress Scale (DASS-21) was used to evaluate psychological well-being. The data were analyzed using descriptive statistics and the Pearson correlation test to identify potential relationships between the variables.

Results: The findings revealed that the athletes had an average PSQI score of 7.44, indicating a moderate level of sleep disruption during the tournament period. The DASS-21 scores reflected moderate levels of stress (52.81), anxiety (50.98), and depression (52.82) among the participants. The Pearson correlation test showed weak positive correlations between sleep quality and stress (0.068), anxiety (0.086), and depression (0.096), suggesting statistically significant but minor associations between these factors.

Conclusion: The study underscores the importance of addressing both sleep quality and psychological well-being in the context of sports performance and athlete welfare. Implementing targeted interventions to reduce sleep disturbances and support mental health could enhance the overall well-being of athletes and potentially improve their performance during tournaments. Further research is recommended to explore other factors affecting athletes' mental health and to develop comprehensive strategies for supporting their well-being and success in sports.

INTRODUCTION

In the fiercely competitive world of college sports, both physically and mentally, athletes are put under enormous pressure in order to achieve the best performances possible during contests(1). The pursuit of excellence in the athletic arena, along with their arduous

training schedules and academic confrontation, all together can take a heavy toll on their health. Quality of sleep emerges as a key factor influencing an athlete's performance not just mentally but emotionally and physically as well(2). Yet the relationship of sleep quality to the mental health of college athletes during intense tournament periods still makes it essential that their performance be optimized and well-being taken care of(3).

The Sleep Quality Index (SQI) is a quantitative scale used to evaluate people's sleep quality and sleep-wake patterns as a whole. It was built to take into account five different aspects of how people sleep: how long they sleep (sleep duration), how well they sleep (sleep efficiency), factors causing sleep problems (sleep disturbances), how long it takes to fall asleep (sleep latency), and difficulties in functioning--both at work and home--because of bad sleep(4). In research and clinical settings it has now become common practice to apply the SQI to discover sleep-related issues and their impact on people's mental as well as physical well-being(5).

To calculate the SQI, tions typically use self-report questionnaires that participants fill out. For example, questions could be asked about sleep habits and patterns, sleep quality, and any sleep-related problems suffered over a specific period (e.g., the past week or month). Participants rate their responses on a fixed scale and the sum of these points becomes an objective measure of their sleep quality(6).

A higher SQI score indicates better sleep quality, while a lower score implies poorer sleep quality and problems associated with sleep. Often SQI scores are correlated by researchers with other measures, such as stress levels, depression, anxiety or even an athlete's performance, to better understand how sleep quality may be affecting these other variables(7).

The SQI is vital to the field of sleep medicine and research, providing doctors and researchers with a tool that can measure sleep quality as well as its relationship to other illnesses or treatments. Similarly, for the study "An Analysis of Sleep Quality Index and its Correlation with Stress, Depression, and Anxiety Levels in Collegiate Athletes during Tournaments," the SQI will serve as one of several important parameters to assess the sleep patterns and sleep quality in our participating student athletes, as they undergo periods of stress, energy/output

requirements at or above maximum capacity, etc.. The SQI results may offer valuable clues into the potential associations between sleep quality and mental health characteristics in this particular group of student-athletes, contributing to our understanding of how those shape their overall development and achievements. Yet at the same time looking for adequate detection methodsand appropriate tools is a better idea(8).Sleep is a necessary physiological process that ensures the body and mind can recover. So athletes rely on powerful shallow sleep processes such hormone regulation, organ repair, memory consolidation, etc.--storage/recovery of nutrients as if they were running sprints. These processes are particularly important to athletes, as they directly affect muscle recovery rates, reaction times, decision making abilities and even mood regulation. Accordingly, athletes do not get enough or cannot sleep/go to bed well; because their bodily functions--such as disturbances in some people from daily activity levels because of this failure to compose oneself--are interrupted even while resting and this can lead very well towards poorer Athletic performance, increased chances of injury when under pressure to deliver results etc.(9)Tension, a common experienceamongathletes during tournaments, can produceboth poor performance and genuinely badmental and physical health(11). We aim to shed light on how sleep abnormalitiesand poor sleep efficiency maybe linked to lighting up stress levels by correlating stress with defects in the quality of one's sleep using SQI. Understanding this may turn out to provide new ideas to reduce stress or to single out means aimed at improving the maintenance of high levels(12).

Another psychological factor which can impact athletes' well-being is depression (13). Persistent feelings of sadness and loss of interest characterize depression.

Our investigation is called "Sleep Quality and Depression Among Collegiate Athletes." We hope to show how independent or dependent sleep disturbance might be linked to depressive symptoms in collegiate athletes. With this information, we may begin building models tailored for the needs of collegiate athletes in fighting against their depression and constructing healthier sleep patterns based on these findings.

Anxiety, often arising from the pressure to excel and fear of failure is a considerable challenge for collegiate athletes attending

tournaments where there is considerable upward pressure(15).

By exploring the correlation between anxiety levels and sleep quality-- as indicated by SQI measurements--we are aiming to show just how intertwined sleep disturbances may be with performance anxiety(16). The results from this portion of the study can help in developing methods to enable better sleep, reduce anxiety. Ill ultimately, improve athletes' psychological resistance.

We collected data from collegiate athletes involved in various sports during specified tournament periods using a cross-sectional research design and a full battery of validated questionnaires. The personally reported information on sleep quality, tension, depression, and anxiety was exhaustively examined by scientific methods to produce meaningful correlations. This investigation will be conducted strictly following the most stringent ethical principles and under completely voluntary circumstances guaranteeing privacy for all persons involved.

Also, collegiate athletes are exposed to particular sources of stress and difficulties that can directly affect their mental health. The unremittent quest for victory; the pressure to meet standards; and being at one time a student-athlete, all three postures might cause intensified distress consequences or even clinical depression. They create pressure on one hand is trying out for stately position while back at school another hand is struggling with bad grades(17).

Such psychological factors not only possibly impair an athlete's performance but also destroy both his and her entire life.

The purpose of this study is try to figure out, in any given thing to the sleep quality index of college athletes participating tournaments and its potential links with stress, depression and anxiety. Thus, understanding the relationship between sleep quality and mental health of this particular group can provide results which aathlete s are--researchers, coaches and sports professionals all need of: interventions and support strategies tailoured to improve athletes' performance well-being.

AIM: The aim of this study is to investigate the correlation between sleep quality and stress, depression, and anxiety levels in collegiate athletes during tournament periods.

METHODOLOGY

This study is an observational survey conducted with a sample size of 60 collegiate athletes from Galgotias University, Greater Noida. The research took place in the Noida area, focusing on the relationship between sleep quality and psychological factors during tournament periods. The study's dependent variable is the sleep quality of the athletes, which will be evaluated using standardized tools such as the Sleep Quality Index (SQI) and potentially objective measures like actigraphy. The independent variables include stress, depression, and anxiety levels experienced by the athletes during tournaments. Stress will be assessed through validated psychological scales that measure perceived stress levels. Depression will be evaluated by examining the presence and severity of depressive symptoms using standardized psychological assessments, and anxiety will be measured through established tools designed to assess the presence and intensity of anxiety symptoms.

Control variables in this study include the phases of the tournaments—such as pre-competition, competition, and post-competition periods—as these may impact both sleep quality and psychological factors. Additionally, the study will control for gender and sport discipline to account for potential differences in stress, depression, anxiety, and sleep patterns among athletes. Training load and academic demands are also considered as control variables, ensuring that any observed correlations between sleep quality and psychological factors are not confounded by these factors.

The inclusion criteria for participants are athletes aged 18 to 25 years, both male and female. The study excludes individuals with a history of fractures, injuries, trauma, those currently under medication or treatment, those with a history of sleep disorders, and those with psychosocial disorders. The sample is drawn exclusively from Galgotias University, Greater Noida.

PROCEDURE

The study conducted an observational survey to explore the correlation between sleep quality and psychological variables among collegiate athletes at Galgotias University. Participants, aged 18-25, were athletes without prior injuries, sleep disorders, or current treatments affecting sleep or mental health. A total of 200 eligible athletes participated after providing informed consent. Data were collected using the Pittsburgh Sleep Quality Index (PSQI) and

the Depression, Anxiety, and Stress Scale-21 (DAAS-21).

Data Analysis:

- **Descriptive Statistics:** Summarized participant demographics.
- **Sleep Quality:** Calculated mean PSQI scores and standard deviations.
- **Psychological Variables:** Assessed mean scores for depression, anxiety, and stress.
- **Correlation Analysis:** Pearson correlation coefficients were used to explore the relationships between sleep quality and psychological factors.

RESULTS

1. Sleep Quality: The Pittsburgh Sleep Quality Index (PSQI) results indicated that the athletes had an average PSQI score of 7.44, suggesting a moderate level of sleep disturbances during the tournament period. Poor sleep quality can have significant implications for athletes' physical recovery, cognitive function, mood, and stress levels, potentially affecting their ability to cope with the demands of competitive sports.
2. Psychological Well-being: The Depression, Anxiety, and Stress Scale (DASS-21) results revealed moderate levels of stress (52.81), anxiety (50.98), and depression (52.82) among the athletes. These psychological factors can significantly influence athletes' sports performance and overall well-being during tournaments.
3. Correlations: The Pearson correlation test results showed weak positive correlations between sleep quality and stress (0.068), anxiety (0.086), and depression (0.096) levels in the collegiate athletes. These correlations were statistically significant but indicated only minor relationships between sleep quality and psychological factors. Other variables may also play significant roles in influencing athletes' psychological well-being.

TABLE NO 1: DEMOGRAPHIC DESCRIPTIVE STATISTICS.

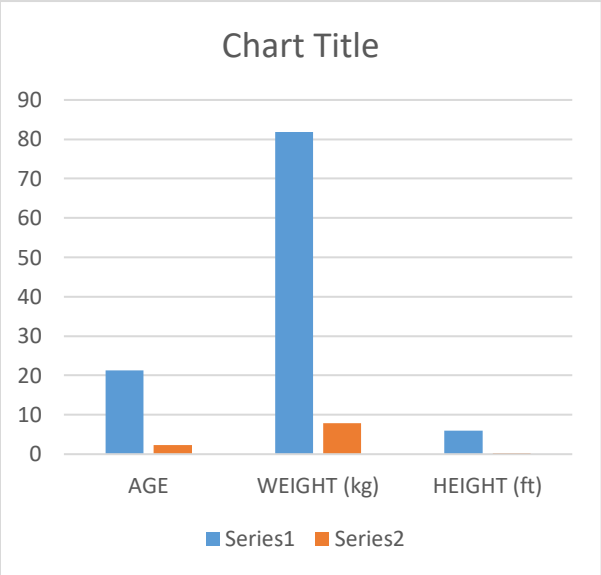


Table No. 1 presents the descriptive statistics for the demographic variables of Group A, which is likely a subset of the collegiate athletes participating in the study. The table

VARIABLES	GROUP A
AGE	21.30±2.264
WEIGHT (kg)	81.85±7.827
HEIGHT (ft)	5.950±0.293

provides information about three variables: Age, Weight, and Height. The descriptive statistics are represented as means (averages) with their respective standard deviations (SD) to give an indication of the central tendency and the variability of the data. The average age of the participants in Group A is 21.30 years, with a standard deviation of 2.264 years, indicating that the age distribution of the athletes is somewhat dispersed. This suggests that the athletes' ages vary around the average age by approximately 2.26 years.

Regarding weight, the average weight of the athletes in Group A is 81.85 kilograms, with a standard deviation of 7.827 kilograms. This indicates that there might be some variability in the weight of the athletes within the group, with weights varying around the average by approximately 7.83 kilograms. In terms of height, the average height of the athletes in Group A is 5.950 feet, with a standard deviation of 0.293 feet. The narrow standard deviation suggests that the heights of the athletes are relatively consistent, with most of them clustered around the mean height.

TABLE NO 2: EXPERIENCE AND SLPEEING DURATIONS

VARIABLES	**MNEA**±SD
DURATION IN SPORTS	4.54±1.107
SLEEPING DURATION	5.57±1.136

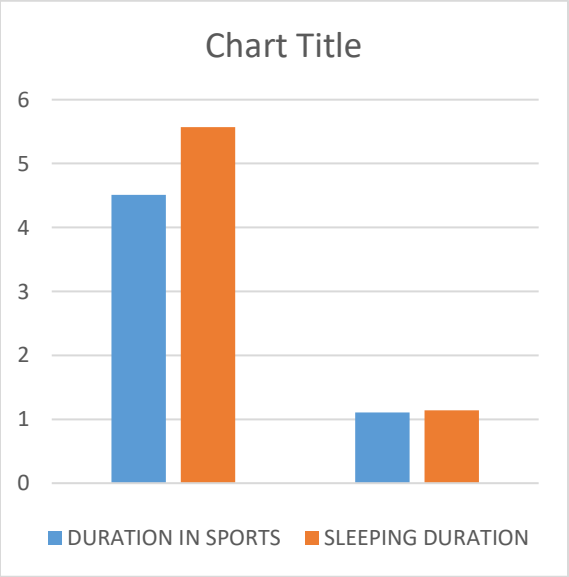


Table No. 2 presents important descriptive statistics for two key variables, "Duration in Sports" and "Sleeping Duration," within Group A of the study. These variables shed light on the athletes' experience in their respective sports and their average sleeping duration per night during the study period. The descriptive statistics are represented as means (averages) along with their respective standard deviations (SD), providing valuable insights into the central tendency and variability of the data.For the variable "Duration in Sports," the mean duration is calculated to be 4.54 years, suggesting that, on average, the athletes in Group A have been actively participating in their sports for approximately 4.54 years. The standard deviation of 1.107 years indicates that the duration of sports participation varies around the average by approximately 1.107 years. This variation suggests that the athletes' experience levels in their respective sports are somewhat dispersed, with some athletes having more years of experience, and others having fewer years. On the other hand, the variable "Sleeping Duration" reveals the average number of hours the athletes in Group A sleep per night during the study period. The mean sleeping duration is calculated to be 5.57 hours, indicating that, on average, the athletes slept for approximately 5.57 hours per night during the study period. The standard deviation of 1.136 hours suggests that the sleeping habits of the athletes are somewhat dispersed, with some athletes sleeping more hours per night and others sleeping fewer hours.

TABLE NO 3: Pittsburgh Sleep Quality Index (PSQI)

VARIABLES	MNEA±SD
PSQI	7.44±4.701

Table No. 3 presents the results of the Pittsburgh Sleep Quality Index (PSQI) for the study participants.

The PSQI is a widely used self-reported questionnaire that assesses sleep quality and

disturbances over a 1-month period. The table includes the mean (average) PSQI score and the corresponding standard deviation (SD).The mean PSQI score of 7.44 indicates the participants' average sleep quality during the 1-month period. A higher PSQI score suggests poorer sleep quality, while a lower score indicates better sleep quality. In this study, the athletes' average PSQI score was 7.44, which implies a moderate level of sleep disturbances and challenges in maintaining optimal sleep patterns.The standard deviation of 4.701 reveals the variation in PSQI scores among the participants. A larger standard deviation suggests greater diversity in the data points, indicating that some athletes experienced more severe sleep disruptions (higher PSQI scores) than others, who may have enjoyed relatively better sleep (lower PSQI scores). This variability underscores the individual differences in sleep quality experienced by collegiate athletes during the tournament period.

Interpreting the PSQI results is essential in understanding the overall sleep quality of the collegiate athletes and its potential impact on their well-being and athletic performance. Poor sleep quality can negatively affect physical recovery, cognitive function, mood, and stress levels, potentially influencing athletes' overall performance during tournaments.

TABLE NO 4: DASS 21

VARIABLES	MNEA±SD
DASS 21 STRESS	52.81±13.155
DASS 21 ANXIETY	50.98±13.130
DASS 21 DEPRESSION	52.82±13.394

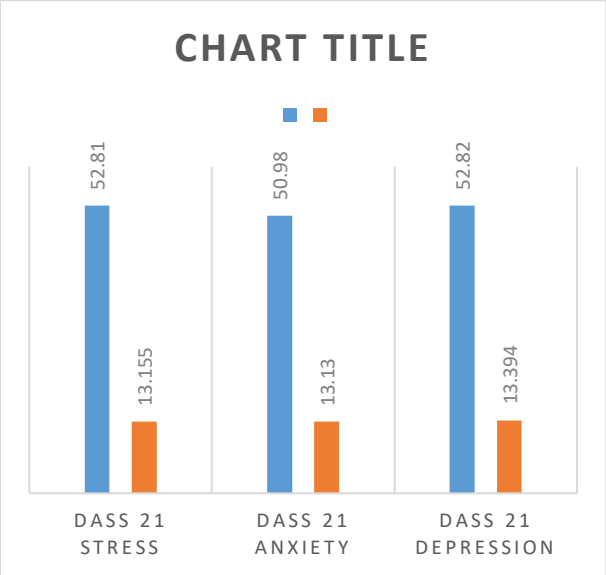


Table No. 4 provides insightful results from the Depression, Anxiety, and Stress Scale (DASS-21) for the study participants.

The DASS-21 is a widely used self-report questionnaire designed to assess the severity of depression, anxiety, and stress symptoms in individuals. The table includes the mean (average) scores and their corresponding standard deviations (SD) for each subscale of the DASS-21: Stress, Anxiety, and Depression. The mean DASS-21 Stress score of 52.81 suggests the average severity of stress symptoms experienced by the study participants during the tournament period. A higher score indicates higher levels of perceived stress. With an average stress score of 52.81, the findings suggest that the collegiate athletes experienced a moderate level of stress during the study. Stress can significantly impact an athlete's mental and physical well-being, potentially affecting their performance and overall health.

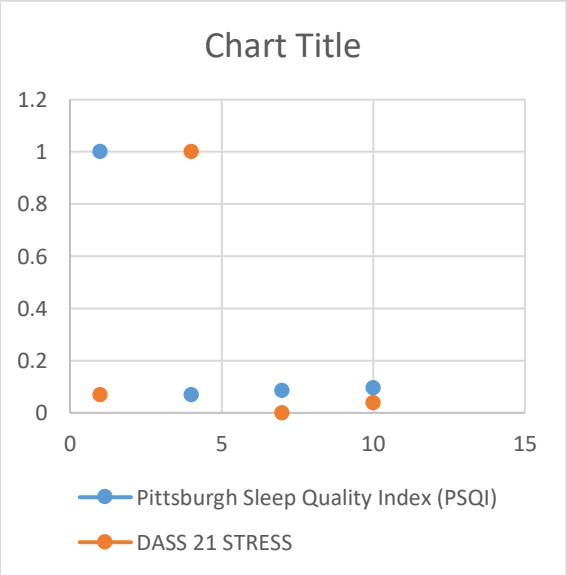
Similarly, the mean DASS-21 Anxiety score of 50.98 indicates the average severity of anxiety symptoms among the study participants. Higher scores imply higher levels of perceived anxiety. In this case, the average anxiety score of 50.98 suggests a moderate level of anxiety experienced by the athletes during the tournament period. Anxiety can impair an athlete's focus, decision-making, and performance on the field, making it crucial to address and manage anxiety symptoms to optimize athletic performance.

TABLE NO 5: PEARSON CORRELATION TEST

Correlations					
		Pittsburgh Sleep Quality Index (PSQI)	DASS 21 STRESS	DASS 21 Anxiety	DASS 21 Depression
Pittsburgh Sleep Quality Index (PSQI)	Pearson Correlation	1	.068	.086	.096
	Sig. (2-tailed)		0.005	0.001	0.001
	N	200	200	200	200
DASS 21 STRESS	Pearson Correlation	.068	1	.000	.038
	Sig. (2-tailed)	0.005		0.004	0.003

	N	200	200	200	200
DASS 21 Anxiety	Pearson Correlation	.086	.000	1	.049
	Sig. (2-tailed)	0.001	0.004		.005
	N	200	200	200	200
DASS 21 Depression	Pearson Correlation	.096	.038	.049	1
	Sig. (2-tailed)	0.001	0.003	.005	
	N	200	200	200	200

Table No. 5 presents the results of the Pearson correlation test, which aimed to explore the relationships between the Pittsburgh Sleep Quality Index (PSQI) and



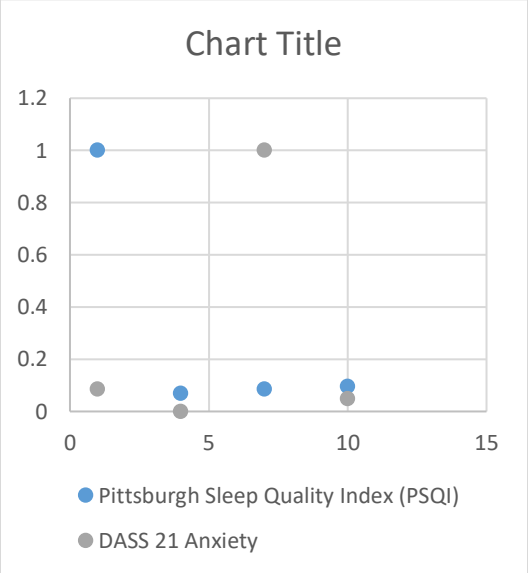
the Depression, Anxiety, and Stress Scale (DASS-21) subscales: Stress, Anxiety, and Depression. The Pearson correlation coefficient measures the strength and direction of the linear relationship between two variables, with values ranging from -1 to +1.

The correlations between the PSQI and each DASS-21 subscale are as follows:

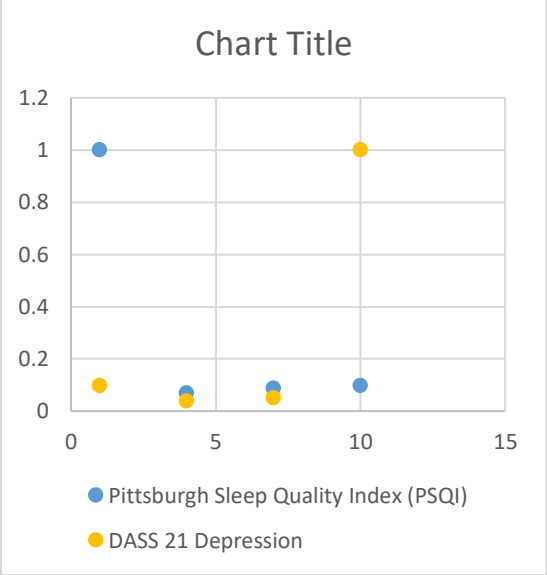
1. PSQI and DASS-21 Stress: The correlation coefficient of 0.068 indicates a weak positive correlation between sleep quality and stress levels. The p-value of 0.005 indicates that this correlation is statistically significant. However, the strength of the correlation is quite low, suggesting that there is only a minor relationship between sleep quality and stress levels experienced by the athletes during tournaments.

2. PSQI and DASS-21 Anxiety: The correlation coefficient of 0.086 indicates a weak positive correlation between sleep quality and anxiety

levels. The p-value of 0.001 indicates that this correlation is statistically significant. Like the correlation with stress, the strength of the relationship is relatively weak, implying that there is only a minor association between sleep quality and anxiety levels in the athletes.



3. PSQI and DASS-21 Depression: The correlation coefficient of 0.096 indicates a weak positive correlation between sleep quality and depression levels. The p-value of 0.001 suggests that this correlation is statistically significant. Similarly, the strength of the correlation is weak, indicating only a minor relationship between sleep quality and depression levels in the athletes.



In summary, the correlation results show that there is a statistically significant but weak positive relationship between the Pittsburgh Sleep Quality Index (PSQI) and the DASS-21 subscales of Stress, Anxiety, and Depression in collegiate athletes during tournaments. While the correlations are statistically significant, the weak strength suggests that other factors may also play significant roles in influencing stress, anxiety, and depression levels in athletes.

DISCUSSION

This study aimed to investigate the relationship between sleep quality and psychological factors, including stress, depression, and anxiety levels, in collegiate

athletes during tournament periods. Collegiate athletes often face immense physical and mental demands during tournaments, making it crucial to understand how sleep quality impacts their mental health and athletic performance. Sleep quality and psychological well-being are closely interconnected, and addressing these factors can significantly influence athletes' overall well-being and sports success. The study employed standardized questionnaires to assess sleep quality, stress, depression, and anxiety levels among the athletes. Table No. 1 provided demographic descriptive statistics, revealing the average age, weight, and height of the athletes in Group A. This information allowed us to gauge the representativeness of the sample and understand potential demographic influences on the study's outcomes. Table No. 2 presented data on "Duration in Sports" and "Sleeping Duration" for the athletes. The mean duration of sports participation was 4.54 years, indicating the athletes' experience levels. Additionally, the average sleeping duration was 5.57 hours per night, providing insights into the athletes' sleep patterns during the tournament period.The results from Table No. 3, displaying the Pittsburgh Sleep Quality Index (PSQI), showed that the athletes had an average PSQI score of 7.44. This suggests a moderate level of sleep disturbances during the study period. Poor sleep quality can have adverse effects on athletes' physical recovery, cognitive function, mood, and stress levels, potentially impacting their ability to cope with the demands of competitive sports.Table No. 4 showcased the Depression, Anxiety, and Stress Scale (DASS-21) results, revealing the athletes' psychological well-being. The moderate levels of stress (52.81), anxiety (50.98), and depression (52.82) indicate potential challenges in managing mental health during the tournament period. These psychological factors can significantly

influence athletes' sports performance and overall well-being.

The most critical findings emerged from Table No. 5, which displayed the Pearson correlation test results between the PSQI and DASS-21 subscales. The weak positive correlations between sleep quality and stress (0.068), anxiety (0.086), and depression (0.096) levels indicate a minor relationship between these factors in the collegiate athletes. While statistically significant, these weak correlations imply that other variables may also play significant roles in influencing athletes' psychological well-being.The study's results shed light on the interconnectedness of sleep quality and mental health in collegiate athletes during tournaments. The moderate PSQI score indicates the need to address sleep disturbances to improve athletes' physical and mental recovery and optimize their sports performance. Similarly, the moderate levels of stress, anxiety, and depression call for comprehensive interventions to support athletes' psychological well-being and resilience during demanding tournament periods.

The weak correlations between sleep quality and psychological factors highlight the complexity of the relationship. While addressing sleep quality can have positive effects on mental health, other individual and situational variables may also contribute to athletes' psychological well-being. Thus, a holistic approach, encompassing various factors, is necessary to promote athletes' overall well-being and athletic success.

The study's implications extend beyond the context of collegiate sports. Poor sleep quality and psychological challenges are prevalent in various populations, and addressing these issues can have broad applications in promoting mental health and performance in different domains.

Limitations of the study include the cross-sectional design, which offers a snapshot of the relationships at a specific time, and self-report measures, which might be influenced by subjective biases. Future research could employ longitudinal designs and incorporate objective measures, such as actigraphy or physiological markers, to strengthen the study's findings.

CONCLUSION

In conclusion, the study underscores the significance of sleep quality and psychological well-being in the lives of collegiate athletes during tournaments. Addressing sleep disturbances and psychological challenges can foster a positive and conducive environment for athletes, enhancing their overall well-being and athletic performance. By recognizing the interplay between sleep quality and mental health, sports programs and support services can develop targeted interventions to support athletes' success on and off the field. Moreover, the study's findings have broader implications for understanding the importance of sleep and mental health in various populations and encouraging a holistic approach to overall well-being and performance.

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