



RESEARCH ARTICLE

Athletes' Sleep Quality: Performance Study in Football Clubs Aged 13-15 Years

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Abstract

The athlete's stamina supports sports performance, but stamina is supported by various things, one of which is the quality of the athlete's sleep during recovery. This study aims to determine the effect of sleep quality on football performance. The method used in this research is descriptive quantitative with a correlational approach. The sampling technique used was purposive sampling with several considerations, including football school students aged 13-15 years actively participating in football school activities and students are permitted to take part in research from a total population of 10 students consisting of 2 students aged 13 years, six students aged 14 years and two students aged 15 years. The research instruments are PSQI to determine sleep quality and GPAI to assess performance. Based on calculations and data analysis, an average PSQI score of 4.1 was obtained, and the average GPAI score for the criteria included SE 3.4, DM 3.1, and SP 3.6. Based on the correlation value calculation, it was found that there was a negative correlation with a moderate strength of -0.502 for PSQI and SE. In contrast, the correlation value between PSQI, DM, and SP had weak strength and was also harmful to SE at -0.305 but positive for SP, namely 0.255. Conclusion: The influence of sleep quality on football performance has a significant relationship, but the level of influence is at a medium or even low level.

Keywords

Sleep Quality, Performance, Football, Young Athletes

INTRODUCTION

Various factors influence athletes' performance, i.e., 1). Exercise. One of the exercises that influences performance is intensive Training. Intensive Training, including high-intensity aerobic sessions and speed endurance, improves competition performance and benefits athletes in team sports such as football and basketball (Bangsbo, 2015). 2). Elite athletes' performance may be slightly but maybe significantly impacted by nutrition, nutrients, and dietary supplements (Maughan et al., 2018). Nutritional interventions such as carbohydrates, tryptophan, valerian, and melatonin can influence the quality and quantity of sleep in elite athletes, potentially improving their performance (Halson, 2014). 3). Genetics,

cognitive abilities influenced by genetic polymorphisms, have been shown to influence competitive performance in athletes, indicating a relationship between cognitive function and athletic success (Gineviciene et al., 2022). Genetic variants can influence mental and emotional processes, particularly serotonergic pathways and athletic performance tendencies (Peplonska et al., 2019). Mental health symptoms and disorders in elite athletes impair performance (Reardon et al., 2019). Mental health is the leading resource for athletes regarding their performance and development, so interventions are needed to monitor and maintain athletes' mental health (Schinke et al., 2018). Sleep deprivation negatively impacts athletic performance, whereas extended sleep time improves athlete performance, with effects

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dependent on the local timing of performance (Thun et al., 2015).

Decision-making, task execution speed, and accuracy are all impacted by poor sleep quality (Troynikov et al., 2018). Sleep quality improves mental health (Scott et al., 2021), and good mental health influences performance and development (Schinke et al., 2018). Sleep quality reflects a person's satisfaction with their sleep time so that the individual does not show signs of fatigue but remains fresh and relaxed. This matter is characterized by the absence of restlessness, lethargy, and apathy, as well as the absence of dark circles around the eyes, swelling of the eyelids, eyes that do not feel sore, optimal concentration, freedom from headaches, and a lack of habit of yawning or feeling sleepy constantly continuously (Tentero et al., 2016). Sleep quality is also essential for healthy sleep and has been proven to affect health. People who sleep poorly tend to experience worse mental, cognitive, or physical health problems. Sleep quality can be even more important than sleep duration in some aspects of health, such as overall health, emotional distress, and risk of hypertension. The National Sleep Foundation Scientific Advisory Council recommends 8–10 hours of adolescent sleep (Surani et al., 2015). Quality sleep is considered essential for adequate exercise performance. Although the beneficial effects of sleep on recovery and athletic performance have been proven, many athletes do not have good quality sleep (García Castrejón, 2015). Sleep parameters correlate with the performance of Australian Football League athletes (Facer-Childs et al., 2020). Performance is a person's success in completing a task. The success of young athletes is greatly influenced by adequate quantity and quality of sleep. Today's young athletes have significant time responsibilities for school activities and homework, practice schedules, social interactions with friends, and sometimes part-time jobs. For this reason, sleep is often neglected in favor of other activities (Riederer, 2020).

Many studies have proven and strengthened the relationship between sleep quality, mood, and exercise performance (Andrade et al., 2016). Poor sleep quality in elite athletes, such as soccer players, can reduce athletic performance (Jorquera-Aguilera et al., 2021). Sleep deprivation negatively impacts athletic performance, neurocognitive function, and

physical health (Simpson et al., 2017). In this study, the sample used was football school students aged 13-15 years because this age is early maturity and has better anthropometric and physical performance than players with late and average maturity (Yang & Chen, 2022). Besides, this age is the most senior. At football school Baraccuda, if the results of this research are significant, then it can serve as an example for juniors.

Not many studies have researched the influence of sleep quality on football performance, especially for ages 13-15 years—meanwhile, a study conducted by (Penggali et al., 2021) correlated sleep quality with the performance of football athletes. The performance referred to in this study was fitness performance. In contrast, the study conducted by the author correlated sleep quality with appearance performance using the GPAI instrument to determine whether there was an effect. Indeed, an athlete has to maintain physical and mental fitness by having good quality sleep, as in the studies mentioned above. However, apart from that, the author often finds that many football athletes, even professional football athletes, often smoke and drink, but when in competitions, their performance is good even though, according to (Leonel et al., 2020), smokers have twice the risk of experiencing sleep disorders, including insomnia, and are more dissatisfied with the quality of their sleep. According to (He et al., 2019), alcohol use is associated with low sleep quality but not with sleep duration in life Daily.

MATERIALS AND METHODS

Participant

The research design used is quantitative research, which involves collecting and analyzing numerical data (Sharma et al., 2023). The approach used in this research is a correlation approach. The correlation approach is research that studies the relationship between two or more variables (Lestari et al., 2023). Participants in this research were football school Baraccuda students aged 13-15 years who actively participated in football school activities and received permission from the trainer to take part in the research, a total of 10 samples consisting of 2 students aged 13 years, six students aged 14 years and two students aged 15 years old. Purposive sampling is the sample strategy employed. Purposeful sampling is "a technique for

determining research samples with certain considerations with the aim of making the data obtained more representative" (Delta Septya Rahayu dan Nurul Iman, 2022). Some considerations include 1) age 13-15 years, 2) actively participating in football school activities, and 3) getting permission from the trainer to participate in research.

Before the research, the author prepared what was needed, such as a research permit, PSQI, and GPAI instruments. The author interviewed his football school advisor regarding his profile and achievements during the research. The author coordinated with the trainer to select samples using purposive sampling techniques, including students who actively participated in football school activities and students aged 13-15 years whom the trainer permitted to participate. As a result, research showed that the samples obtained were around 10. Then, the sample was conditioned by the author to fill out the PSQI questionnaire, after which the author prepared a 2x2 goal and a 30x15 field for the implementation of GPAI, assisted by one of the football school coaches. After completing the research, the author processed the data by finding the average of the PSQI and GPAI results; then, the author correlated the PSQI and GPAI data.

This study followed ethical standards and received approval from the Institute for Research and Community Service, Universitas Pendidikan Indonesia, with Letter Number B-298/UN40.D/PT.01.02/2024. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Research Instruments

The instruments used in this research were PSQI and GPAI. The instruments used in this research were PSQI and GPAI. PSQI (Pittsburgh Sleep Quality Index) is a questionnaire with 18 questions to determine your sleep patterns and quality during the last month (Deng et al., 2020). The components of the PSQI are seven items, including subjective sleep quality, sleep latency, sleep duration, efficiency of sleep habits, sleep

disorders, use of sleeping pills, and daytime dysfunction. Component scores range from 0 (no difficulties) to 3 (severe difficulties), and when summed, produce a global score that ranges from 0 to 21. A score >5 indicates significant sleep disturbance (Dietch et al., 2016). GPAI (Game Performance Assessment Instrument) aims to assist teachers and coaches in observing and recording players' performance behavior during the game. Four game types can use this instrument, which identifies observable components of game performance: invasion sports, net and wall, target games, and field and hitter (González-Víllora et al., 2015). Researchers modified the soccer game from (González-Víllora et al., 2015). Four against 4, without a goalkeeper, the field measures 30 × 15 m and uses a small goal. The goal used is 2x2, and no one is allowed to guard the goal. Playing time is two halves of 4 minutes with 3-minute intervals. The assessment criteria for this research include the following:

- a. Execution skill: Students pass the ball accurately until it reaches the intended recipient.
- b. Decision-making: Students make the right decision when passing (i.e., passing to an unmarked teammate to create a goal-scoring opportunity).
- c. Support: The student attempts to move into position to receive a pass from a teammate (i.e., looking for space to create a chance).

The assessment technique used is the scoring technique, where this scoring technique is on a scale from 1-5; the criteria include 5 = very effective performance (always), 4 = effective performance (usually), 3 = quite effective performance (sometimes), 2 = weak performance (rarely), 1 = feeble performance (never).

Statistical Analysis

Meanwhile, the data analysis used was IBM SPSS series 26 to find out the average PSQI and GPAI criteria scores and whether there was a correlation between PSQI and GPAI criteria scores. Correlation analysis uses Pearson correlation because Pearson correlation is more appropriate for analyzing the correlation between variables. The level of correlation between PSQI and GPAI in this study is -0.3, which means it is at a moderate level; this is to the table contained in (Shariff, 2019):

Table 1. Correlation Score Criteria

| Correlation coefficient | Strength Level |
|--------------------------------------|----------------|
| 1 | Perfect |
| $0.7 < r < 1$ or $-0.7 < r < -1$ | Strong |
| $0.3 < r < 0.7$ or $-0.3 < r < -0.7$ | Currently |
| $0 < r < 0.3$ or $0 < r < -0.3$ | Weak |
| 0 | Very weak |

RESULTS

Data Descriptions

The first step in this research data analysis was to look for statistical descriptions in the form of

average values and standard deviations from the PSQI and GPAI test instruments. A complete explanation can be seen in table 1 below:

Table 2. Statistical description of research instruments

| PSQI | M | SD | ICC | 95%CI |
|----------------------------|-------|-------|------|-----------|
| Subjective sleep quality | 4.76 | 1.20 | .821 | .819-.882 |
| Sleep latency | 3,33 | 1.57 | .843 | .801-.899 |
| Sleep duration | 4.82 | 1.70 | .807 | .789-.877 |
| Efficiency of sleep habits | 2,67 | 1.50 | .825 | .779-.886 |
| Sleep disorders | 3.44 | 1.92 | .860 | .817-.912 |
| Use of sleeping pills | 3.59 | 1.35 | .835 | .782-.920 |
| Daytime dysfunction | 3.80 | 1.62 | .827 | .790-.873 |
| GPAI | M | SD | ICC | 95%CI |
| Skill execution | 3.44 | 1.32 | .865 | .794-.829 |
| Decision making | 3.19 | 1.24 | .858 | .786-.944 |
| Support | 3.63 | 1.47 | .843 | .725-.938 |
| Total PSQI | 26.41 | 10.86 | .805 | .795-.956 |
| Total GPAI | 10.01 | 4.03 | .814 | .785-.896 |

Notes: CI = confidence interval; ICC = intraclass correlations; M = mean; SD = standard deviation;

Based on the calculation results in Table 2 above, the PSQI average is 26.41, the standard deviation is 10.86, and the intraclass correlation is 0.805, with a confidence interval range of 0.795-0.956. For GPAI, the total mean is 10.01, the standard deviation is 4.03, and the intraclass correlation is 0.814, with a confidence interval range of 0.785-0.896.

Data Normality Test

The normality test determines the next testing stage. If the data is average, then the linearity test is required for the Pearson Correlation test. The Shapiro-Wilk normality test was run using SPSS 26 for Windows. Table 2 displays the data for the normality test in question

Table 3. Normality test

| | Group | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|------|---------|---------------------------------|----|-------|--------------|----|------|
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| PSQI | Group A | .233 | 5 | .200* | .884 | 5 | .329 |
| | Group B | .300 | 5 | .161 | .833 | 5 | .146 |
| GPAI | Group A | .231 | 5 | .200* | .943 | 5 | .685 |
| | Group B | .213 | 5 | .200* | .963 | 5 | .826 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on Asymp.Sig for the Shapiro Wilk test results shown in Table 2 above with values much more significant than 0.05, further analysis is possible because the data is usually distributed.

Results of Hypothesis Testing

Based on the data normality test results, the next step is the ANOVA test, which is required for the next Pearson correlation test. Table 3 below presents the data in question:

Table 4. PSQI and GPAI between groups ANOVA test

| ANOVA Table | | | | | | | |
|-------------|----------------|--------------------------|----------------|----|-------------|-------|------|
| | | | Sum of Squares | df | Mean Square | F | Sig. |
| PSQI | Between Groups | (Combined) | 17.733 | 4 | 4.433 | 1.157 | .428 |
| | | Linearity | 4.417 | 1 | 4.417 | 1.152 | .332 |
| GPAI | Between Groups | Deviation from Linearity | 13.317 | 3 | 4.439 | 1.158 | .412 |
| | | Within Groups | 19.167 | 5 | 3.833 | | |
| Total | | | 36.900 | 9 | | | |

Based on the results of the sig value. From the deviation from linearity, the result is 0.412, which means the value is >0.05, which means the

relationship between the two variables is considered linear

Table 5. Mean and Correlation Pearson

| Correlations | | | |
|--------------|---------------------|-------|-------|
| | | PSQI | GPAI |
| PSQI | Pearson Correlation | 1 | -.346 |
| | Sig. (2-tailed) | | .327 |
| | N | 10 | 10 |
| GPAI | Pearson Correlation | -.346 | 1 |
| | Sig. (2-tailed) | .327 | |
| | N | 10 | 10 |

The correlation value between PSQI and GPAI is -0.3, where this value is negative, which means that the greater the value of variable Y, the smaller the value of variable year. There is no significant relationship because the sig value of these two variables is 0.3, which is a value greater than 0.05 Based on the research results, it is known that the average PSQI score is 4.1, which means <5; if the PSQI value is <5, it means that the average sleep quality of the sample is good, while the average GPA score for the criteria is at a sufficient number, namely is at number 3. The Pearson correlation data processing results between PSQI and GPAI per criteria have a sig output. (2-tailed) <0.5, which means it is significant. The Pearson correlation value between PSQI SE (Skill Execution) and DM (Decision Making) has a negative coefficient value, namely -0.502 and -0.305, which means that the higher the PSQI score, the lower the execution and decision-making skills. Meanwhile, the person correlation coefficient value between PSQI and support is positive, namely 0.255, which means that the higher the PSQI score, the better the support. According to (Deng et al., 2020), an ICC (Intraclass Coefficient Correlation) value of less than 0.5 denotes low reliability, a value in the range of 0.5 to 0.75 indicates moderate reliability, a value in the range of 0.75 to 0.9 indicates good reliability, and values above 0.90 denote exceptional reliability.

For greater clarity, Figure 1 below shows a description of the correlation coefficient between variables as a Scatter Plot Graph.

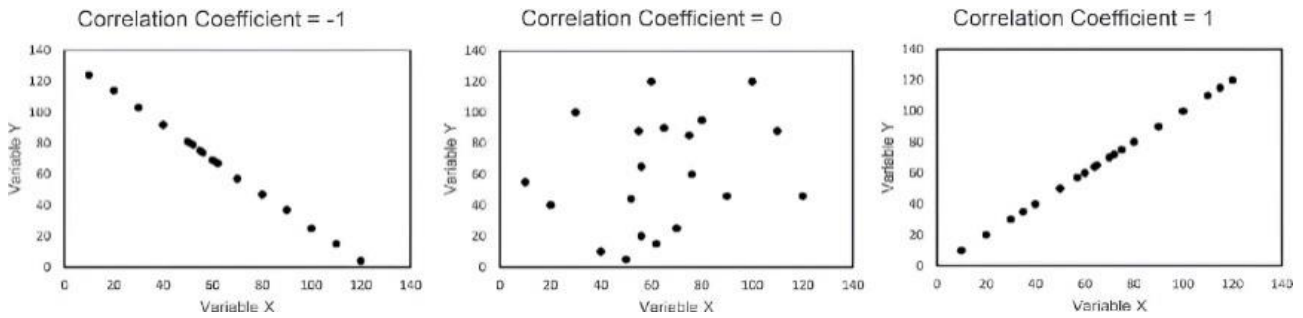


Figure 1. Correlation Coefficient PSQI and GPAI

DISCUSSION

Based on research results, the average PSQI score and GPAI score of football school students are at a good number; this is in line with research conducted by (Troynikov et al., 2018) that poor sleep quality can interfere with decision-making and accuracy in carrying out tasks and vice versa. Then, decision-making and accuracy of task implementation will also be good. The results of the study show that there is a significant relationship between sleep quality and football performance, but the level of correlation does not show a high level of correlation; the level of correlation between sleep quality and execution skills is medium, the level of correlation between sleep quality and decision making is low and the level of correlation between sleep quality and low-value support. This matter is based on the author's hypothesis that an athlete must maintain physical and mental fitness by getting good quality sleep every day to maintain his performance (Lengkana et al., 2020; Subarna et al., 2021). However, some athletes often smoke and even drink alcohol, which, according to (He et al., 2019; Leonel et al., 2020) interferes with sleep quality, but when playing on the field, the performance is good. Physical fatigue can hurt the technical and physical performance of soccer players. This condition can decrease technical skills such as passing, receiving the ball, shooting, and dribbling due to decreased motor coordination and increased mental fatigue. Fatigue can also reduce running speed, reaction, and physical endurance, increasing the risk of injury and disrupting mental concentration.

An athlete's performance is determined by intense physical training good technique, and the body's ability to recover effectively. Rest is a critical factor in an athlete's physical and mental recovery after training or competition. In achieving optimal performance, a deep understanding of the

importance of rest in athlete recovery is very relevant (Hidayat et al., 2023; Mulya et al., 2021). Physical recovery involves healing muscles, connective tissue, and the nervous system after experiencing stress and fatigue during sports activities. Rest gives the body time to repair and regenerate, crucial for preventing ongoing injuries. The scientific literature highlights the critical role of rest in injury management and prevention of overtraining in athletes. In addition to recovering from physical damage, rest is also crucial in restoring energy and glycogen. Intense training can deplete energy and glycogen reserves in an athlete's muscles. Research by (Lengkana et al., 2024) shows that adequate rest allows the body to renew these energy reserves, essential for maintaining endurance and high performance. Athletes' recovery is not only related to physical aspects but also mental recovery. Fatigue conditions can affect concentration, focus, and decision-making. A literature review highlights that adequate rest plays a crucial role in recovering athletes' cognitive functions and mental aspects, ensuring optimal mental readiness for the next performance.

Rest also includes aspects of athletes' sleep patterns (Hidayat et al., 2022). Good recovery involves getting enough quality sleep. Lack of sleep can disrupt physical and mental recovery, potentially increasing the risk of injury. In this perspective, understanding the importance of rest includes knowing the benefits of adequate sleep for athlete recovery. Through this literature review, it is hoped that comprehensive insight can be obtained regarding the importance of rest in the athlete's recovery process. Physical and mental aspects in the context of athlete recovery are the main focus to improve understanding and optimize overall athlete performance (Razali et al., 2023). In an athlete's physical recovery, rest plays a central role. Physical recovery involves repairing muscles, connective tissue, and the nervous system after intensive sports

activities. Rest provides the necessary time to regenerate. They prevent excessive fatigue and support optimal physical recovery (Mulya et al., 2023). The importance of rest in injury management and prevention of overtraining was revealed in the research of (Weil et al., 2023). Adequate rest can facilitate injury healing and optimize recovery time, maintaining athlete health and preventing potential risks of overtraining. Rest provides time for the body to renew energy reserves depleted during sporting activities, ensuring the availability of sufficient energy to support the athlete's performance—the importance of rest in athletes' mental recovery. Mental fatigue can affect concentration, focus, and cognitive function. Rest provides an opportunity for mental recovery, maintaining the athlete's mental readiness for the next task and competition. Research by (Solet, 2018) confirms the role of good sleep as an integral part of rest. An adequate sleep pattern supports physical and mental recovery, strengthens the immune system, and increases endurance in athletes. Break time management and the influence of external variables, such as travel and time zone differences, are also deepened in the study (Gilley, 2023; Helvig et al., 2016). Awareness of this variability allows for appropriate rest timing, essential in optimizing athlete recovery in different situations. The results of this discussion underline the urgency of rest in athlete recovery from various perspectives. Implications include designing exercise programs that address rest time management, understanding the importance of sleep, and considering external variability. Practical recommendations include the coach's role in Developing a training schedule that aligns rest with training intensity, paying particular attention to injury management, and paying attention to the athlete's individual needs for optimal recovery. Overall, a deep understanding of the importance of rest can help achieve the balance necessary for consistent and optimal athlete performance. Therefore, effective fatigue management is critical to ensuring players remain at their best during matches (Dambroz et al., 2022). In conclusion, this study provides information regarding the influence of sleep quality on football performance. The research concluded that sleep quality has a significant influence on football performance, but the level of influence is not mostly low. The reason behind the low influence of sleep quality on football

performance is that every athlete has a different physique.

Conflict of Interest

The authors have declared no conflicts of Interest.

Ethics of the Research

This study followed ethical standards and received approval from the Institute for Research and Community Service, Universitas Pendidikan Indonesia, with Letter Number B-298/UN40.D/PT.01.02/2024.

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Author Contributions

Study Design, ISD and ASL; Data Collection, ISD, ASL and DD; Statistical Analysis, ASL and RR; Data Interpretation, ISD, ASL and RR; Manuscript Preparation, ASL, DD and RR; Literature Search, ISD, ASL, DD and RR. All authors have read and agreed to the published version of the manuscript.

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