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# ASSESSING THE IMPACT OF SLEEP QUALITY AND DURATION ON PHYSICAL PERFORMANCE IN MILITARY CADETS: A CROSS-SECTIONAL STUDY

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## ABSTRACT

**Background:** Sleep plays essential role in restoring both cognitive and physical performance, up to now its particular impact within military populations remains unknown. Military cadets often go through demanding schedules and high-stress environments that can compromise both sleep quality and duration. Research has shown that insufficient or poor-quality sleep is associated with declined physical performance, affecting endurance, strength, and coordination. Yet, Maximum existing studies have focused on the general population, offering little awareness into the unique challenges faced by cadets. The strict nature of military training may increase the bad effects of sleep deprivation. Understanding the connection between sleep and performance in this context is crucial for improving training outcomes and decreasing the risk of injury. This study pursues to assess how variations in sleep quality and duration influence physical performance among military cadets. The results could notify the development of targeted strategies to magnify sleep hygiene and overall readiness in military training programs.

**Objective:** Assess the impact of sleep quality and duration on physical performance in military cadets, inspect how inequality in sleep patterns affect physical fitness levels and overall performance.

**Methodology:** A cross-sectional study was conducted involving military cadets to Inspect the Connection between sleep and physical performance. A total of 169 military cadets were included in the study as the sample size. Participants completed the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Hygiene Index to assess their sleep quality and duration. Physical activity levels were judged using the International Physical Activity Questionnaire (IPAQ). Statistical analyses were performed by SPSS version 29 to Find out the Connection between sleep variables and physical performance effects. The data was analyzed by using statistical technique chi square test.

**Result:** The results of the study demonstrated a statistically significant relationship between sleep patterns and physical performance among cadets. The correlation analysis revealed that poor sleep hygiene and quality—measured using SHI and PSQI—were positively linked with decreased physical activity levels measured via

IPAQ. The highest correlation was noted between stress before bed and poor sleep hygiene (73.3%), and between trouble staying awake and poor sleep quality (58%). A chi-square test confirmed these relationships were statistically significant, as p-values for all hypotheses were less than 0.05, leading to the rejection of the null hypothesis. This indicates a meaningful association between sleep quality, duration, and physical performance. The strongest associations were observed in the age group 21–23 years, non-smokers, and unmarried cadets, with the majority showing poor sleep quality and high physical activity. The findings emphasize the need to improve sleep hygiene to enhance physical performance among military cadets.

**Conclusion:** This study comes to the conclusion that military cadets' physical performance is adversely affected by both inadequate sleep duration and poor sleep quality. Reduced strength, endurance, reaction time, and recuperation—all essential components of military training and preparedness—were linked to sleep deprivation. The results highlight how crucial it is to incorporate regulated sleep schedules, environmental changes, and instruction about good sleep hygiene into military training programs. Specific sleep-related interventions may improve mental and physical function while lowering the risk of damage. To guarantee peak performance and operational efficacy in military environments, sleep should be seen as an essential part of cadet health, in addition to physical training and a healthy diet.

## INTRODUCTION

Sleep is essential part of human health, affecting both cognitive and physical functioning. Among military personnel, insufficient sleep is a prevalent issue due to operational requirements and training schedules. Research emphasize that chronic sleep restriction can reduce endurance, strength, and motor skills. Understanding sleep's role in physical performance is crucial for optimizing military readiness and lowering injury risk [1]. Military personnel regularly face physically and mentally challenging environments, which makes realizing optimal sleep is Crucial for maintaining peak performance [2]. Sleep duration is another key variable linked to performance, with both short and unnecessarily long sleep linked to reduced physical capacity. Many cross- sectional studies have confirmed that 79 hours of sleep per night is ideal for maintaining physical function. Cadets who persistently sleep less than 6 hours are shown to have reduced performance in timed runs and muscular endurance tests. Such trends are clear across several countries and military training environments, indicating a strong association. Therefore, assessing sleep duration in military settings can offer awareness into operational effectiveness and training outcomes [3]. Military training environments often negotiate sleep, potentially affecting cadets' performance and readiness. For that reason, Comprehension this association is crucial for developing strategies to improve cadet well-being and efficacy [4].

Sleep deprivation is a significant global issue, influencing approximately 35% of adults who report not getting enough rest. This issue is particularly common among high-performance and high-stress groups, such as military personnel [5]. Research demonstrates that between 20% and 30% of military personnel endure from insufficient sleep quality, which can negatively affect both their physical abilities and cognitive functioning [1]. The United States, sleep deprivation is a recognized problem among military personnel. A study has disclosed that almost 60% of U.S. Army soldiers experience inadequate sleep, which adversely effects their physical preparedness and operational effectiveness [2]. In Asia, the problem of sleep deprivation among military personnel is progressively alarming, as research from nations such as China and South Korea disclosed remarkable sleep shortages. In China, approximately 40% of military members indicate they do not get enough sleep, a situation that is linked to diminished physical performance and enlarged stress during training

exercises [6]. These outcomes underscore the vital requirement for better sleep management approaches in military organizations worldwide, especially in Asia, where sleep habits are shaped by a Composite of cultural and environmental impact [7]. The research disclosed a remarkable occurrence of insufficient sleep quality among military recruits in Jordan, with around 80% achieving scores above 5 on the Pittsburgh Sleep Quality Index, which mark poor sleep health. The average reported sleep duration was round about 6 hours per night, falling short of the suggested 7 to 9 hours, and just about one-third of male recruits indicated they slept for less than 5 hours. There was also a frequent insufficiency of proper sleep hygiene, considered in an average Sleep Hygiene Index score of 21, specifically among male recruits. Usual harmful habits included consuming caffeine or tobacco late in the day, engaging in physical activity near bedtime, and having comfortless sleeping conditions. However, recruits normally own a good level of sleep knowledge, despite the fact that only two-thirds accepted that sleep deprivation could result in significant health issues. Female recruits reveal better sleep hygiene and prolonged sleep durations compared to their male counterparts. Poor sleep quality was Especially related to older age, smoking habits, and inadequate sleep hygiene practices. The findings emphasize the necessity for focused interventions aimed at improve sleep behaviors and awareness among military personnel [8].

Sleep deprivation among military cadets frequently often with both physical and cognitive symptoms. Typical indicators include heightened fatigue, irritability, and Decreased attention span, all of which can badly influence performance in physical training and operational responsibilities [9]. Military cadets having poor sleep quality often indicate excessive daytime sleepiness and reduced motivation. Research require Reserve Officers' Training Corps (ROTC) tactical athletes established that only 7.4% averaged the recommended ≥7 hours of sleep per night, with 27.8% announcing excessive daytime sleepiness. Extensive sleep durations were Linked with higher motivation levels and better cognitive processing speed performance. These findings recommend that inadequate sleep may diminish both alertness and drive in military trainees. Addressing sleep insufficiency could enhance overall performance and readiness [10]. Poor sleep quality among military personnel has been connected with a higher frequency of anxiety disorders. An observational study involving military officers and soldiers from distant boundaries of China found that diminish sleep quality was a notable predictor for the occurrence of anxiety symptoms. Participants with sleep insufficiency were at higher risk of generalized anxiety disorder. These findings emphasize the Crucial role of sleep in preserving mental health within military populations. Addressing sleep problems may serve as a precautionary measure against anxiety disorders [11]. Inadequate sleep may outcome in deterioration reaction times and a decline in motor

coordination, growing the likelihood of physical accidents and injuries for cadets engaged in demanding activities [12]. Physiologically, inadequate sleep effect muscle recovery and endurance, leading cadets to experience a decrease in physical performance, characterized by decline stamina and reduced strength [13]. Research indicates that insufficient sleep quality and inadequate duration lead to decline recovery times, which in turn extends muscle fatigue and decreased overall physical performance [14]. Chronic sleep distress may lead to hormonal imbalances, including increased cortisol levels, which can adversely impact physical performance and elevate the risk of injuries [15]. The existance of these symptoms emphasize the crucial importance of sleep management within military training settings to make sure the well-being and operational planning of cadets [16].

In military cadets, sleep quality and inadequate sleep duration have a considerably adverse effects on physical performance. A deficiency of sleep outcomes in decreased reaction times, lower aerobic capacity, and reduced muscular strength, all of which are crucial for performing demanding military duties [12]. In addition to its direct physical impacts, inadequate sleep interferes with metabolic and hormonal functions Crucial for recovery and performance. A lack of sleep impact glucose metabolism, decline the secretion of growth hormone, and increased cortisol levels these

elements combined inhibit muscle repair, and immune function. The cognitive and emotional effects of insufficient sleep can compromise teamwork, leadership, and mental persistency in high- pressure environments, emphasizing the importance of sleep management in increasing military performance [17].

This study highlights the essential importance of both sleep quality and duration in ensuring peak physical performance in military cadets. Inadequate sleep is associated to decreased in strength, endurance, and reaction time elements that are important for military preparedness and operational effectiveness [12]. Considering the strict requirements of cadet training, it is crucial to consider sleep as essential element of physical conditioning [2]. Physiological distress resulting from sleep deprivation, such as hormonal imbalances and inhibit recovery, worsen performance deficiencies. These outcomes not only diminish physical performance but also increase the risk of injury and illness, endanger the long-term health and operational effectiveness of cadets [18]. Sleep must be considered as a first concern, alongside nutrition and training, within military wellness strategies [14]. In the end, encouraging healthy sleep practices within military settings can increase the physical and mental performance of cadets, reduce the risk of injuries, and enhance training results. Future action and policies ought to include sleep education and alterations to schedules to encourage better sleep hygiene among cadet groups [1].

## METHODOLOGY

### Study Design

The study was an observational Cross-sectional study.

### Sampling Technique

It was a non-probability convenience sampling technique

### Outcome Measures

The three outcome Measure tool is used in this research study. Pittsburgh Sleep Quality Index, Sleep Hygiene Index & International Physical Activity Questionnaire.

### Data Analysis

Statistical analyses were performed by SPSS version 29 to Find out the Connection between sleep variables and physical performance effects. The data was analyzed by using statistical technique chi square test.

### Ethical Considerations

Ethical approval for this study was obtained from the institutional review board of Indus University. All participating military cadets were fully informed about the objectives, procedures, and voluntary nature of the research before any data collection took place. Participation was entirely voluntary, and cadets were assured that they could withdraw from the study at any point without any penalty or impact on their training status. Written informed consent was obtained from each participant prior to their inclusion. The anonymity and confidentiality of all participants were strictly preserved throughout the study. Data were collected and handled in a secure and controlled environment, ensuring that it was used exclusively for academic and research purposes. The study posed no physical, psychological, or academic risk to the cadets, and their participation did not interfere with any aspect of their military training. No conflicts of interest were declared by the researcher or the supervising faculty.

## Reliability

In this study, three standardized questionnaires were used to assess sleep hygiene, sleep quality, and physical activity levels among military cadets: the Sleep Hygiene Index (SHI), the Pittsburgh Sleep Quality Index (PSQI), and the International Physical Activity Questionnaire (IPAQ). Reliability testing was conducted using Cronbach's Alpha to measure the internal consistency of each scale. The SHI demonstrated good reliability with a Cronbach's Alpha of 0.854 across its 13 items, indicating strong internal consistency and suitability for assessing sleep hygiene behaviors. However, the PSQI showed poor reliability with a Cronbach's Alpha of 0.20 across its 18 items, suggesting limited consistency among its components in this specific population. Similarly, the IPAQ yielded a Cronbach's Alpha of 0.36 across its 7 items, indicating poor internal reliability for measuring physical activity levels among the cadets. Overall, while the SHI proved to be a dependable tool in this context, the lower reliability scores of the PSQI and IPAQ suggest the need for caution when interpreting results derived from these instruments or for considering modified or alternative tools in future research.

## RESULT AND FINDINGS

### Introduction

This chapter presents the statistical analysis of the study's dependent and independent variables, focusing on their relationships. It includes data visualization, descriptive statistics, correlation, and chi-square analysis. Diagnostic tests such as reliability, normality, homogeneity, and multicollinearity were also performed to ensure data validity. Results were interpreted to accept or reject hypotheses. The chapter concludes with a summary of key findings and their implications**.**

## DATA VISUALIZATION

**Chart 1: Age-wise population:** Showing break-up of population w.r.t. age brackets of respondents.

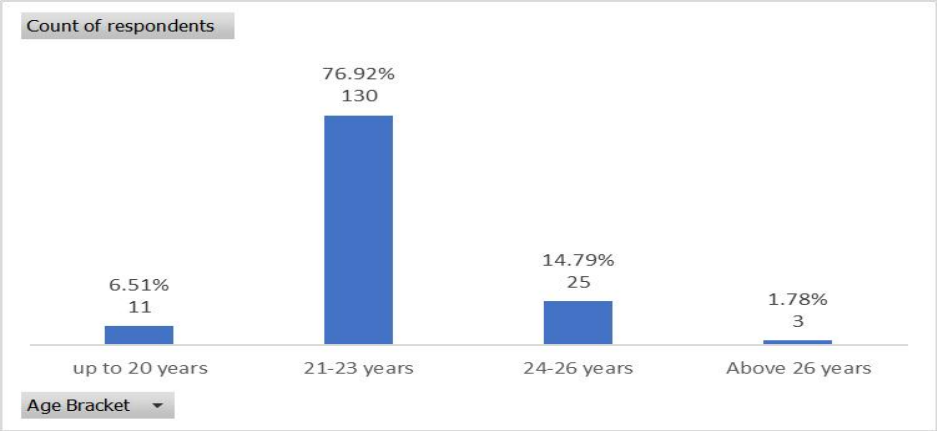


Chart-01 showing that One-hundred and sixty-nine respondents have examine for research consist with four (04) age-brackets i.e., 11 respondents (6.5% of population) having age bracket of up to 20 years old, 130 respondents (76.92% of population) having age bracket of 21-23 years old, 25 respondents (14.79% of population) having age bracket of 24-26 years old and 03 respondents (1.78% of population) having age bracket of above 26 years old.

**Chart 2: Smoking-status-wise Population:** Showing break-up of population of respondents w.r.t. count of smoking-status-wise population.

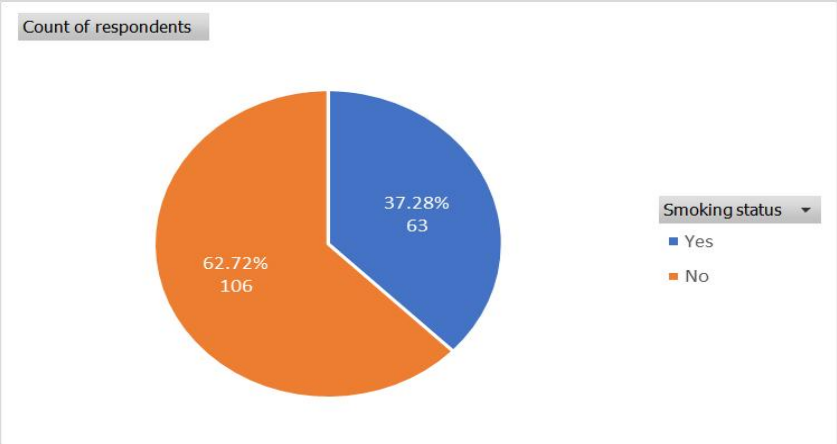


Chart-2 showing that One-hundred and sixty-nine respondents have examine for research consist with two (02) smoking-status i.e., 63 respondents (37.28% of population) are smokers and 106 respondents (62.72% of population) are non-smoker.

**Chart 3: Marital-status-wise population:** Showing break-up of population w.r.t. marital status of respondents.

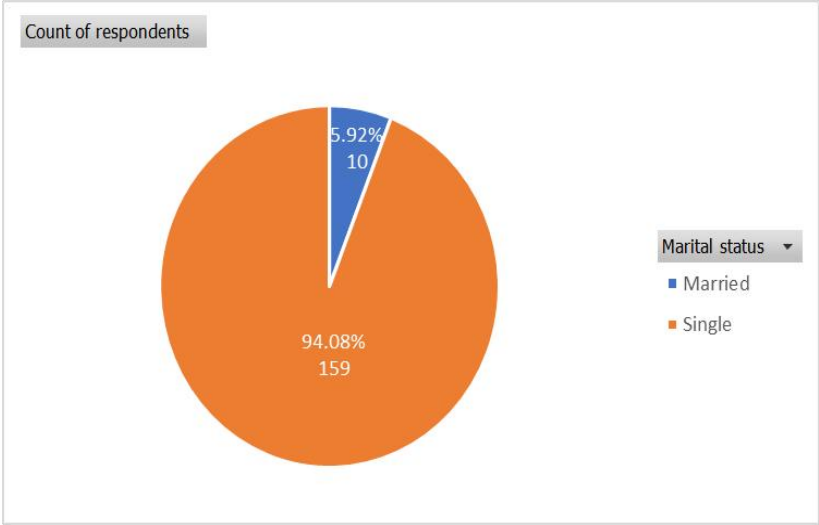


Chart-03 showing that One-hundred and sixty-nine respondents have examine for research consist with two (02) marital status i.e., 10 respondents (5.92% of population) are married and 159 respondents (94.08% of population) are single.

**Chart 4: Weight-wise Population:** Showing break-up of population of respondents w.r.t. count of weight-wise population.

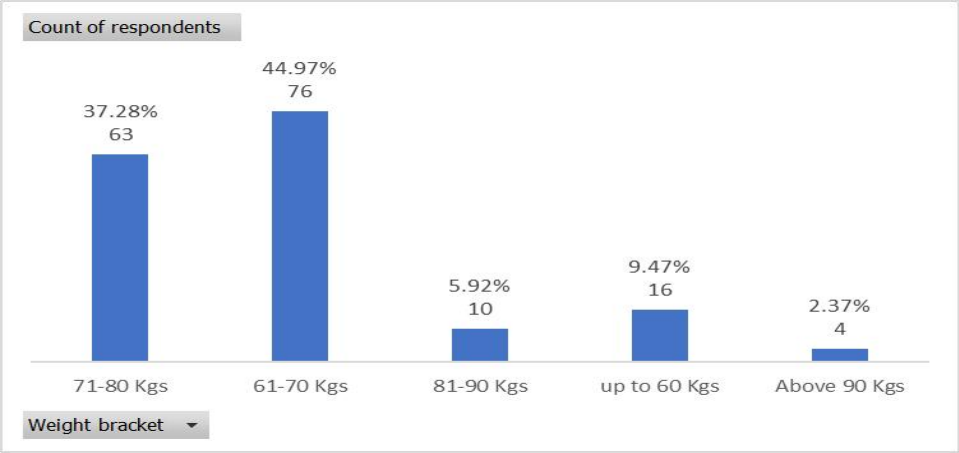


Chart-4 showing that One-hundred and sixty-nine respondents have examine for research consist with five (05) weight-brackets i.e., 63 respondents (37.28% of population), 76 respondents (44.97% of population), 10 respondents (5.92% of population), 16 respondents (9.47% of population) and 04 respondents (2.37% of population).

**Chart 5: Height-wise Population Distribution:** Showing break-up of population w.r.t. height-brackets of respondents.

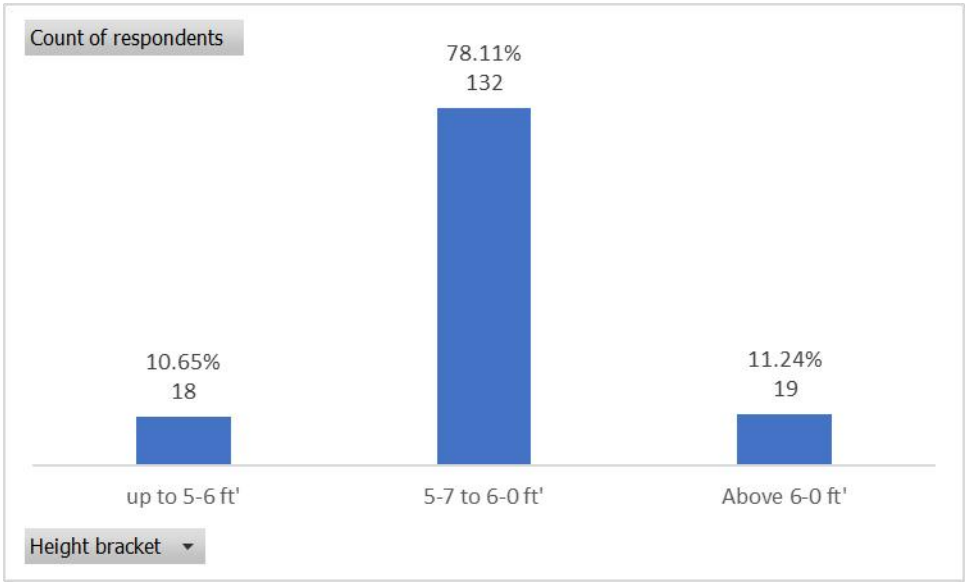


Chart-05 showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) age-brackets i.e., 18 respondents (10.65% of population) having height-bracket of up to 5-6 ft', 132 respondents (78.11% of population) having height-bracket of up to 5-7 to 6-0 ft' and 19 respondents (11.24% of population) having height-bracket of up to above 6- 0 ft'.

## DESCRIPTIVE STATISTICS

**Table 1: Descriptive Analysis of variables Scale:**

| DV Elements | N | Min. | Max. | Mean | SD | Variance | % |
|---|---|---|---|---|---|---|---|
| Age Bracket | 169 | 19 | 29 | | .521 | .272 | 53.0% |
| Smoking status | 169 | 1 | 2 | 1.37 | .483 | .234 | 68.3% |
| Marital status | 169 | 1 | 2 | 1.06 | .237 | .056 | 53.0% |
| Weight bracket | 169 | 1 | 5 | 2.47 | .838 | .703 | 49.3% |
| Height bracket | 169 | 1 | 3 | 2.01 | .469 | .220 | 66.9% |

Table 1 shows descriptive analysis of variables related to Assessing the impact of sleep quality and duration on physical performance in military cadets showing that each element shows how frequently respondents made assertive answers against these questions; results showing that respondents have highest age is 29, lowest age is 19 within average of 24.

| SHI | N | Min. | Max. | Mean | SD | Variance | % |
|---|---|---|---|---|---|---|---|
| SHI-01-I take daytime naps lasting two or more hours. | 169 | 0 | 4 | 2.59 | 1.104 | 1.219 | 64.8% |
| SHI-02-I go to bed at different times from day to day. | 169 | 0 | 4 | 2.40 | 1.059 | 1.122 | 59.9% |
| SHI-03-I get out of bed at different time from day to day. | 169 | 0 | 4 | 1.99 | 1.131 | 1.280 | 49.9% |
| SHI-04-I exercise to the point of sweating within 1 hour of going to bed. | 169 | 0 | 4 | 1.85 | 1.100 | 1.210 | 46.3% |
| SHI-05-I stay in bed longer than I should two or three times a week. | 169 | 0 | 4 | 2.22 | 1.265 | 1.601 | 55.5% |
| SHI-06-I use alcohol, tobacco, or caffeine within 4 hours of going to bed or after going to bed. | 169 | 0 | 4 | 1.62 | 1.431 | 2.048 | 40.4% |
| SHI-07-I do something that may wake me up before bedtime | 169 | 0 | 4 | 1.98 | 1.275 | 1.625 | 49.6% |
| SHI-08-I go to bed feeling stressed, angry, upset, or nervous. | 169 | 0 | 4 | 1.71 | 1.356 | 1.838 | 42.8% |
| SHI-09-I use my bed for things other than sleeping or sex | 169 | 0 | 4 | 2.49 | 1.145 | 1.311 | 62.3% |
| SHI-10-I sleep on an uncomfortable bed | 169 | 0 | 4 | 1.70 | 1.317 | 1.736 | 42.5% |
| SHI-11-I sleep in an uncomfortable bedroom | 169 | 0 | 4 | 1.85 | 1.305 | 1.702 | 46.2% |
| SHI-12-I do important work before bedtime | 169 | 0 | 4 | 2.23 | 1.234 | 1.524 | 55.8% |
| SHI-13-I think, plan, or worry when I am in bed. | 169 | 0 | 4 | 2.30 | 1.313 | 1.724 | 57.5% |

**Table 2: Descriptive Analysis of SHI Scale:**

Table 2 showing descriptive analysis of SHI related to Assessing the impact of sleep quality and duration on physical performance in military cadets'; study of each element showing how frequently respondents made assertive answers against these questions. SHI is the parameters to show the overall involvement of respondents in response to Observe the impact of sleep quality and duration on physical performance in military cadets study here and in the rest of documents as well; showing that 64.8% respondents have highest response for item "I take daytime naps lasting two or more hours." and 40.4% respondents have lowest response for item "I use alcohol, tobacco, or caffeine within 4 hours of going to bed or after going to bed."

**Table 3: Descriptive Analysis of PSQI Scale:**

| PSQI | N | Min. | Max. | Mean | SD | Variance | % |
|---|---|---|---|---|---|---|---|
| PSQI-01-Time to go to bed | 169 | 1 | 12 | 8.54 | 4.224 | 17.84 | 71.2% |
| PSQI-02-Minutes to take asleep | 169 | 5 | 50 | 18.46 | 10.293 | 105.95 | 36.9% |
| PSQI-03-Time to wake-up | 169 | 4 | 8 | 5.96 | .739 | .546 | 74.6% |
| PSQI-04-Duration of Sleep | 169 | 1 | 13 | 6.33 | 1.945 | 3.78 | 48.7% |
| PSQI-05-a-During the past month, how often have you had trouble sleeping because you: Cannot get to sleep within 30 minutes. | 169 | 0 | 3 | 0.90 | .968 | .936 | 30.0% |
| PSQI-05-b-Wake up in the middle of the night or early morning. | 169 | 0 | 3 | 1.12 | .983 | .967 | 37.5% |
| PSQI-05-c-Have to get up to use the bathroom | 169 | 0 | 3 | 1.18 | .947 | .897 | 39.3% |
| PSQI-05-d-Cannot breathe comfortably | 169 | 0 | 3 | 0.52 | .926 | .858 | 17.4% |
| PSQI-05-e-Cough or snore loudly | 169 | 0 | 3 | 0.50 | .832 | .692 | 16.8% |
| PSQI-05-f-Feel too cold | 169 | 0 | 3 | 0.51 | .810 | .656 | 17.2% |
| PSQI-05-g-Feel too hot | 169 | 0 | 3 | 1.13 | 1.100 | 1.209 | 37.7% |
| PSQI-05-h-Had bad dreams | 169 | 0 | 3 | 0.79 | .940 | .883 | 26.2% |
| PSQI-05-i-Have pain | 169 | 0 | 3 | 0.72 | .995 | .990 | 23.9% |
| PSQI-05-j-Other reason(s), please describe | 169 | 0 | 3 | 0.67 | .992 | .985 | 22.3% |
| PSQI-06-During the past month, how often have you taken medicine to help you sleep. | 169 | 0 | 3 | 0.52 | .894 | .799 | 17.4% |
| PSQI-07-During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity? | 169 | 0 | 3 | 0.64 | .910 | .827 | 21.3% |
| PSQI-08-During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done. | 169 | 0 | 3 | 0.76 | .947 | .896 | 25.4% |
| PSQI-09-During the past month, how would you rate your sleep quality overall? | 169 | 0 | 3 | 1.00 | .724 | .524 | 33.3% |

Table 3 showing descriptive analysis of PSQI related to Observe the impact of sleep quality and duration on physical performance in military cadets' study of each element showing how frequently respondents made assertive answers against these questions. PSQI is the parameters to show the overall involvement of respondents in response to assess the Observe the impact of sleep

quality and duration on physical performance in military cadet study here and in the rest of documents as well; showing that 74.6% respondents have highest response for item “Time to wake-up” and 64.8% respondents have lowest response for item “Cough or snore loudly”.

**Table 4: Descriptive Analysis of IPAQ**

| IPAQ | N | Min. | Max. | Mean | SD | Variance | % |
|---|---|---|---|---|---|---|---|
| IPAQ-01-During the last 7 days, on how many days did you do vigorous physical activities like hea+AX17vy lifting, digging, aerobics, or fast bicycling? (Days) | 169 | 0 | 7 | 3.40 | 2.056 | 4.229 | 48.5% |
| IPAQ-02-How much time did you usually spend doing vigorous physical activities on one of those days? (Minutes) | 169 | 0 | 360 | 72.78 | 63.527 | 4035.672 | 20.2% |
| IPAQ-03-During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking (Days) | 169 | 0 | 7 | 3.00 | 2.056 | 4.226 | 42.9% |
| IPAQ-04-How much time did you usually spend doing moderate physical activities on one of those days? (Minutes) | 169 | 0 | 300 | 82.72 | 57.774 | 3337.785 | 27.6% |
| IPAQ-05-During the last 7 days, on how many days did you walk for at least 10 minutes at a time? (Days) | 169 | 0 | 7 | 5.11 | 2.391 | 5.715 | 73.0% |
| IPAQ-06-How much time did you usually spend walking on one of those days? (Minutes) | 169 | 0 | 240 | 78.82 | 57.142 | 3265.258 | 32.8% |
| IPAQ-07-During the last 7 days, how much time did you spend sitting on a week day? (Minutes) | 169 | 0 | 780 | 244.26 | 184.767 | 34138.884 | 31.3% |

Table 4 related to Observe the impact of sleep quality and duration on physical performance in military cadetss’ study of each element showing how frequently respondents made assertive answers against these questions. IPAQ is the parameters to show the overall involvement of respondents in response to assess the Observe the impact of sleep quality and duration on physical performance in military cadets study here and in the rest of documents as well; showing that 73.0% respondents have highest response for item “During the last 7 days, on how many days did you

walk for at least 10 minutes at a time?" and 20.2% respondents have lowest response for item "How much time did you usually spend doing vigorous physical activities on one of those days?".

**CORRELATION MATRIX**

Correlation is a statistical technique that ascertains whether and how strongly set of variables are related. In this research, correlation coefficient computed from the sample data measures the strength and direction (positive or negative) of a linear relationship between dependent and independent variables. If the value of the correlation coefficient is significant among the variable (s), we would have to go to evaluate the level of parity between the actual and expected results through Chi-square.

**Table 5: Correlation Analysis of SHI prevalence:**

Annexed table-01 is the Correlation Analysis of SHI assessment of depression shows the correlation between items of SHI prevalence of our research data. Directions of relations among has positive and negative impact for association Relationship between Observe the impact of sleep quality and duration on physical performance in military cadets' study. Results showing that "I go to bed feeling stressed, angry, upset, or nervous." has highest positive relationship to i.e. 73.3%, and the least relationship has found positive impact of item "I do important work before bedtime"
i.e. 44.3% is correlated positively with sleep hygiene.

| Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Sleep Hygeine |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.35 | 0.28 | 0.21 | 0.42 | 0.26 | 0.31 | 0.35 | 0.26 | 0.37 | 0.29 | 0.24 | 0.21 | 0.55 |
| 1.00 | 0.50 | 0.18 | 0.37 | 0.25 | 0.37 | 0.24 | 0.27 | 0.23 | 0.27 | 0.01 | 0.13 | 0.46 |
| 0.50 | 1.00 | 0.22 | 0.32 | 0.23 | 0.28 | 0.36 | 0.14 | 0.31 | 0.29 | 0.19 | 0.23 | 0.47 |
| 0.18 | 0.22 | 1.00 | 0.12 | 0.14 | 0.24 | 0.33 | 0.19 | 0.25 | 0.38 | 0.17 | 0.16 | 0.46 |
| 0.37 | 0.32 | 0.12 | 1.00 | 0.43 | 0.52 | 0.35 | 0.35 | 0.38 | 0.36 | 0.21 | 0.39 | 0.60 |
| 0.25 | 0.23 | 0.14 | 0.43 | 1.00 | 0.53 | 0.57 | 0.29 | 0.29 | 0.40 | 0.25 | 0.25 | 0.61 |
| 0.37 | 0.28 | 0.24 | 0.52 | 0.53 | 1.00 | 0.43 | 0.34 | 0.29 | 0.36 | 0.19 | 0.30 | 0.61 |
| 0.24 | 0.36 | 0.33 | 0.35 | 0.57 | 0.43 | 1.00 | 0.25 | 0.53 | 0.51 | 0.39 | 0.47 | 0.73 |
| 0.27 | 0.14 | 0.19 | 0.35 | 0.29 | 0.34 | 0.25 | 1.00 | 0.38 | 0.39 | 0.21 | 0.33 | 0.50 |
| 0.23 | 0.31 | 0.25 | 0.38 | 0.29 | 0.29 | 0.53 | 0.38 | 1.00 | 0.61 | 0.28 | 0.31 | 0.66 |
| 0.27 | 0.29 | 0.38 | 0.36 | 0.40 | 0.36 | 0.51 | 0.39 | 0.61 | 1.00 | 0.23 | 0.31 | 0.67 |
| 0.01 | 0.19 | 0.17 | 0.21 | 0.25 | 0.19 | 0.39 | 0.21 | 0.28 | 0.23 | 1.00 | 0.34 | 0.44 |
| 0.13 | 0.23 | 0.16 | 0.39 | 0.25 | 0.30 | 0.47 | 0.33 | 0.31 | 0.31 | 0.34 | 1.00 | 0.53 |
| 0.46 | 0.47 | 0.46 | 0.60 | 0.61 | 0.61 | 0.73 | 0.50 | 0.66 | 0.67 | 0.44 | 0.53 | 1.00 |

**Table 6: Correlation Analysis of PSQI prevalence:**

Annexed table-02 is the Correlation Analysis of PSQI assessment of physical activities shows the correlations between items of our research data. Directions of relations among has positive and negative impact for Observe the impact of sleep quality and duration on physical performance in military cadets. Results showing that "During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?" has highest positive relationship to i.e. 58.0%, and the least relationship has found positive impact of item "Time to go to bed" i.e. -20.0% is correlated negatively with Sleep quality state.

**Table 7: Correlation Analysis of IPAQ prevalence:**

Annexed table-03 is the Correlation Analysis of IPAQ assessment of physical activities shows the correlations between items of our research data. Directions of relations among has positive and negative impact for Observe the impact of sleep quality and duration on physical performance in military cadets. Results showing that "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?" has highest positive relationship to i.e. 65.4%, and the least relationship has found positive impact of item "During the last 7 days, how much time did you spend sitting on a week day? (Minutes)" i.e. 35.3% is correlated positively with physical activities prevalence.

| PSQI | Q1 | Q2 | Q3 | Q4 | Q5A | Q5B | Q5C | Q5D | Q5E | Q5F | Q5G | Q5H | Q5I | Q5J | Q6 | Q7 | Q8 | Q9 | DV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 1.0 | -0.1 | -0.2 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | 0.0 | 0.0 | -0.1 | -0.1 | -0.3 | -0.2 | -0.2 | -0.1 | -0.1 | -0.2 |
| Q2 | -0.1 | 1.0 | 0.1 | -0.1 | 0.4 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | -0.1 | 0.1 | 0.0 | 0.0 | -0.1 | 0.1 | 0.2 |
| Q3 | -0.2 | 0.1 | 1.0 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 |
| Q4 | 0.0 | -0.1 | 0.1 | 1.0 | 0.0 | 0.1 | 0.0 | -0.2 | -0.1 | -0.2 | 0.0 | -0.2 | 0.0 | -0.2 | -0.2 | -0.1 | -0.1 | 0.1 | 0.2 |
| Q5A | -0.1 | 0.4 | 0.1 | 0.0 | 1.0 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.1 | 0.0 | 0.1 | 0.2 | 0.0 | 0.2 | 0.4 |
| Q5B | -0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 1.0 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 |
| Q5C | -0.1 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 | 1.0 | 0.3 | 0.2 | 0.4 | 0.2 | 0.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.3 |
| Q5D | -0.1 | 0.1 | 0.0 | -0.2 | 0.2 | 0.2 | 0.3 | 1.0 | 0.5 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 |
| Q5E | -0.2 | 0.0 | 0.0 | -0.1 | 0.2 | 0.2 | 0.2 | 0.5 | 1.0 | 0.6 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.2 | 0.4 |
| Q5F | 0.0 | 0.1 | 0.0 | -0.2 | 0.2 | 0.2 | 0.4 | 0.4 | 0.6 | 1.0 | 0.3 | 0.5 | 0.6 | 0.3 | 0.5 | 0.4 | 0.4 | 0.2 | 0.5 |
| Q5G | 0.0 | 0.0 | -0.1 | 0.0 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 1.0 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 |
| Q5H | -0.1 | 0.1 | 0.0 | -0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.3 | 1.0 | 0.4 | 0.3 | 0.4 | 0.5 | 0.4 | 0.2 | 0.4 |
| Q5I | -0.1 | -0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.3 | 0.4 | 0.4 | 0.6 | 0.3 | 0.4 | 1.0 | 0.4 | 0.5 | 0.4 | 0.3 | 0.2 | 0.4 |
| Q5J | -0.3 | 0.1 | 0.0 | -0.2 | 0.0 | 0.1 | 0.1 | 0.4 | 0.4 | 0.3 | 0.2 | 0.3 | 0.4 | 1.0 | 0.4 | 0.5 | 0.4 | 0.2 | 0.3 |
| Q6 | -0.2 | 0.0 | 0.0 | -0.2 | 0.1 | 0.0 | 0.2 | 0.5 | 0.5 | 0.5 | 0.1 | 0.4 | 0.5 | 0.4 | 1.0 | 0.5 | 0.5 | 0.1 | 0.4 |
| Q7 | -0.2 | 0.0 | 0.0 | -0.1 | 0.2 | 0.1 | 0.2 | 0.4 | 0.4 | 0.4 | 0.1 | 0.5 | 0.4 | 0.5 | 0.5 | 1.0 | 0.4 | 0.3 | 0.6 |
| Q8 | -0.1 | -0.1 | 0.0 | -0.1 | 0.0 | 0.1 | 0.1 | 0.3 | 0.4 | 0.4 | 0.2 | 0.4 | 0.3 | 0.4 | 0.5 | 0.4 | 1.0 | 0.2 | 0.4 |
| Q9 | -0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.3 | 0.2 | 1.0 | 0.5 |
| DV | -0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.3 | 0.4 | 0.4 | 0.3 | 0.4 | 0.6 | 0.4 | 0.5 | 1.0 |

| IPAQ | Item-1 | Item-2 | Item-3 | Item-4 | Item-5 | Item-6 | Item-7 | Physical Activities |
|---|---|---|---|---|---|---|---|---|
| Item-1 | 1.00 | 0.41 | 0.55 | 0.45 | 0.39 | 0.11 | 0.19 | 0.65 |
| Item-2 | 0.41 | 1.00 | 0.30 | 0.43 | 0.26 | 0.33 | 0.15 | 0.54 |
| Item-3 | 0.55 | 0.30 | 1.00 | 0.49 | 0.42 | 0.19 | 0.09 | 0.59 |
| Item-4 | 0.45 | 0.43 | 0.49 | 1.00 | 0.34 | 0.34 | 0.17 | 0.60 |
| Item-5 | 0.39 | 0.26 | 0.42 | 0.34 | 1.00 | 0.47 | 0.26 | 0.62 |
| Item-6 | 0.11 | 0.33 | 0.19 | 0.34 | 0.47 | 1.00 | 0.20 | 0.49 |
| Item-7 | 0.19 | 0.15 | 0.09 | 0.17 | 0.26 | 0.20 | 1.00 | 0.35 |
| DV | 0.65 | 0.54 | 0.59 | 0.60 | 0.62 | 0.49 | 0.35 | 1.00 |

**Table 8: Correlation Analysis of Dependent variables:**

| DVs Prevalence | Sleep Hygiene prevalence | Sleep quality prevalence | Physical Activities Prevalence |
|---|---|---|---|
| Sleep Hygiene prevalence | 1.00 | 0.09 | 0.03 |
| Sleep quality prevalence | 0.09 | 1.00 | 0.00 |
| Physical Activities Prevalence | 0.03 | 0.00 | 1.00 |

Table 8 about correlation Analysis of which shows the correlations between all items of questionnaire of our research data. Directions of relation among all variables are correlated positive with all items for relationship, Observe the impact of sleep quality and duration on physical performance in military cadets. Sleep hygiene has correlated with 9.00% correlation over sleep quality, and vice versa. Similarly, Sleep hygiene has correlated with 3.00% correlation over physical activities and vice versa. Moreover, sleep quality has 0.00 corelated with physical activities and vice versa.

**CHI-SQUARE**

Is a statistical measure which compares the actual and expected results leading to accept or reject null hypothesis. We reject the null hypothesis if the chi-square value is greater than the critical value. If you reject the null hypothesis, you can conclude that your data are significantly different from what you expected. Here we assume five (05) null hypotheses are as under to assess:

- HO1: There is no significant relationship between age groups and impact of sleep quality and duration on physical performance in military cadets' study.

- HA1: There is significant relationship between age groups and impact of sleep quality and duration on physical performance in military cadets' study.
- HO2: There is no significant relationship between smoking and impact of sleep quality and duration on physical performance in military cadets' study.
- HA2: There is significant relationship between smoking and impact of sleep quality and duration on physical performance in military cadets' study.
- HO3: There is no significant relationship between marital status and impact of sleep quality and duration on physical performance in military cadets' study.
- HA3: There is significant relationship between marital status and impact of sleep quality and duration on physical performance in military cadets' study.
- HO4: There is no significant relationship between weight and impact of sleep quality and duration on physical performance in military cadets' study.
- HA4: There is significant relationship between weight and impact of sleep quality and duration on physical performance in military cadets' study.
- HO5: There is no significant relationship between height and impact of sleep quality and duration on physical performance in military cadets' study.
- HA5: There is significant relationship between height and impact of sleep quality and duration on physical performance in military cadets' study.

**Table 9: Case Processing Summary:**

| | Valid | | Missing | | Total | |
|---|---|---|---|---|---|---|
| | N | Percent | N | Percent | N | Percent |
| Age Bracket * Sleep Hygiene state | 169 | 100% | 0 | 0% | 169 | 100% |
| Age Bracket * Sleep quality state | 169 | 100% | 0 | 0% | 169 | 100% |
| Age Bracket * Physical Activities state | 169 | 100% | 0 | 0% | 169 | 100% |
| Smoking status * Sleep Hygiene state | 169 | 100% | 0 | 0% | 169 | 100% |
| Smoking status * Sleep quality state | 169 | 100% | 0 | 0% | 169 | 100% |
| Smoking status * Physical Activities state | 169 | 100% | 0 | 0% | 169 | 100% |
| Marital status * Sleep Hygiene state | 169 | 100% | 0 | 0% | 169 | 100% |
| Marital status * Sleep quality state | 169 | 100% | 0 | 0% | 169 | 100% |
| Marital status * Physical Activities state | 169 | 100% | 0 | 0% | 169 | 100% |
| Weight bracket * Sleep Hygiene state | 169 | 100% | 0 | 0% | 169 | 100% |
| Weight bracket * Sleep quality state | 169 | 100% | 0 | 0% | 169 | 100% |
| Weight bracket * Physical Activities state | 169 | 100% | 0 | 0% | 169 | 100% |
| Height bracket * Sleep Hygiene state | 169 | 100% | 0 | 0% | 169 | 100% |
| Height bracket * Sleep quality state | 169 | 100% | 0 | 0% | 169 | 100% |
| Height bracket * Physical Activities state | 169 | 100% | 0 | 0% | 169 | 100% |

Table 9 shows that each element has no exclusion, and each element has assessed with filled parameters.

**Table 10: Chi-Square Tests:**

| Test Element | Pearson Chi-Square | p-value | Result |
|---|---|---|---|
| Age Bracket * Sleep Hygiene state | 13.810 | 0.129 | Null hypothesis rejected |
| Age Bracket * Sleep quality state | 7.962 | 0.241 | Null hypothesis rejected |
| Age Bracket * Physical Activities state | 5.206 | 0.518 | Null hypothesis rejected |
| Smoking status * Sleep Hygiene state | 5.577 | 0.134 | Null hypothesis rejected |
| Smoking status * Sleep quality state | 0.666 | 0.717 | Null hypothesis accepted |
| Smoking status * Physical Activities state | 1.009 | 0.604 | Null hypothesis rejected |
| Marital status * Sleep Hygiene state | 9.325 | 0.025 | Null hypothesis rejected |
| Marital status * Sleep quality state | 0.718 | 0.698 | Null hypothesis rejected |
| Marital status * Physical Activities state | 1.636 | 0.441 | Null hypothesis rejected |
| Weight bracket * Sleep Hygiene state | 5.716 | 0.930 | Null hypothesis rejected |
| Weight bracket * Sleep quality state | 6.793 | 0.559 | Null hypothesis rejected |
| Weight bracket * Physical Activities state | 5.615 | 0.690 | Null hypothesis rejected |
| Height bracket * Sleep Hygiene state | 12.571 | 0.050 | Null hypothesis rejected |
| Height bracket * Sleep quality state | 4.795 | 0.309 | Null hypothesis rejected |
| Height bracket * Physical Activities state | 8.687 | 0.069 | Null hypothesis rejected |

Table 10 showing that each element has greater chi-square value than of p-value; resulting that each HO have rejected hence concluded the assertiveness of all alternative hypothesis and stated that have significant impact on Association Relationship between the impact of sleep quality and duration on physical performance in military cadets except relation of gender with mental status.

## DIAGNOSTIC ANALYSIS

Diagnostic analyses in research are to be performed to check that all conditions for application of statistical analysis have verified or not with a substantial degree of accuracy. In this research we have checked (i) reliability and (ii) multicollinearity of all independent variables.

## RELIABILITY:

Reliability of a questionnaire as a survey instrument ensures the accuracy of measures by assessing its internal consistency. There are different methods available to evaluate the internal consistency of the questionnaire. As we used SPSS, Cronbach alpha was used to assess reliability. Cronbach's alpha is a measure of internal consistency, which describes how closely related a set of items are as a group. It is a measure of scale reliability having a statistical standard that Cronbach's alpha of
0.70 and up 0.79 has acceptable internal consistency, 0.80 and up to 0.89 is good and 0.90 and above considered as excellent internal consistency.

**Table 11: Case Processing Summary:**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 169 | 100 |
| | Excluded [a] | 0 | 0 |
| | Total | 169 | 100 |

Table 11 shows that each element has no exclusion, and each element has assessed with filled parameters.

**Table 12: Reliability Statistics:**

| Cronbach's Alpha | Cronbach's Alpha | N of sub-scales |
|---|---|---|
| SHI | 0.854 | 13 |
| PSQI | 0.207 | 18 |
| IPAQ | 0.363 | 7 |
| Overall | 0.324 | 38 |

Table 12 shows that Cronbach's Alpha of three (03) scales; SHI questionnaire is 0.854 with thirteen (13) items which show good reliability of SHI questionnaire; PSQI questionnaire is 0.20 with eighteen (18) items which show poor reliability of PSQI questionnaire and PSQI questionnaire is 0.36 with seven (07) items which show poor reliability of IPAQ questionnaire to use it in this research. Overall Cronbach's Alpha of all three (03) scales is 0.324 with thirty-eight (38) items which show poor reliability of using all questionnaires as whole.

**MULTICOLLINEARITY:**

In statistical research, Multicollinearity is known as a situation in which two or more explanatory variables in a model are highly linearly related. Multicollinearity is denoted by variance inflation factor (VIF). If VIF is greater than ten, there is severe collinearity in that specific variable and research results would perturb. In contrast If VIF is less than 10, there is no collinearity, and data is acceptable for performing the statistical analyses.

**Table-13: Multicollinearity Values:**

| Model: Dependent Variable: | |
|---|---|
| Age Bracket | 1.116 |
| Smoking status | 1.075 |
| Marital status | 1.135 |
| Weight bracket | 1.192 |
| Height bracket | 1.152 |

a. Dependent Variable: SHI, PSQI and IPAQ

Table-13 shows that VIF of all five (05) components are <10 which shows there is no collinearity and data is acceptable for performing the statistical analyses.

**NORMALITY TEST:**

Normality Test determines whether sample data has been drawn from a normally distributed population. Here we are using the Shapiro-Wilk Test to assess the normality; where value of the Shapiro-Wilk test is greater than 0.05, it assumes the data is normal.

**Table-14: Normality of Age Variable:**

| Age bracket | | Shapiro-Wilk Statistic | Sig. | Remarks |
|---|---|---|---|---|
| Sleep Hygiene state | up to 20 years | 0.906 | 0.217 | |
| | 21-23 years | 0.816 | 0.000 | |
| | 24-26 years | 0.848 | 0.002 | |
| | Above 26 years | 0.750 | 0.000 | |
| Sleep quality state | up to 20 years | 0.793 | 0.008 | |
| | 21-23 years | 0.645 | 0.000 | |
| | 24-26 years | 0.762 | 0.000 | |
| | Above 26 years | 0.750 | 0.000 | |
| Physical Activities state | up to 20 years | 0.625 | 0.000 | |
| | 21-23 years | 0.656 | 0.000 | |
| | 24-26 years | 0.598 | 0.000 | |
| | Above 26 years | 0.750 | 0.000 | |

Table-14 shows that each dimension of results has derived from a normal distributed population for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.

**Table-15: Normality of smoking Variable:**

| Smoking status | | Shapiro-Wilk Statistic | Sig. | Remarks |
|---|---|---|---|---|
| Sleep Hygiene state | No | 0.804 | 0.000 | |
| | Yes | 0.857 | 0.000 | |
| Sleep quality state | No | 0.681 | 0.000 | |
| | Yes | 0.689 | 0.000 | |
| Physical Activities state | No | 0.670 | 0.000 | |
| | Yes | 0.615 | 0.000 | |

Table-15 shows that each dimension of results has derived from a normal distributed population for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.

**Table-16: Normality of marital status Variable:**

| Marital status | | Shapiro-Wilk Statistic | Sig. | Remarks |
|---|---|---|---|---|
| Sleep Hygiene state | Single | 0.828 | 0.000 | |
| | Married | 0.820 | 0.025 | |
| Sleep quality state | Single | 0.678 | 0.000 | |
| | Married | 0.794 | 0.012 | |
| Physical Activities state | Single | 0.647 | 0.000 | |
| | Married | 0.717 | 0.001 | |

Table-16 shows that each dimension of results has derived from a normal distributed population for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.

**Table-17: Normality of weight Variable:**

| Weight bracket | | Shapiro-Wilk Statistic | Sig. | Remarks |
|---|---|---|---|---|
| Sleep Hygiene state | up to 60 Kgs | 0.831 | 0.007 | |
| | 61-70 Kgs | 0.809 | 0.000 | |
| | 71-80 Kgs | 0.852 | 0.000 | |
| | 81-90 Kgs | 0.890 | 0.172 | |
| | Above 90 Kgs | 0.729 | 0.024 | |
| Sleep quality state | up to 60 Kgs | 0.484 | 0.000 | |
| | 61-70 Kgs | 0.719 | 0.000 | |
| | 71-80 Kgs | 0.663 | 0.000 | |
| | 81-90 Kgs | 0.594 | 0.000 | |
| | Above 90 Kgs | 0.630 | 0.001 | |
| Physical Activities state | up to 60 Kgs | 0.729 | 0.000 | |
| | 61-70 Kgs | 0.660 | 0.000 | |
| | 71-80 Kgs | 0.639 | 0.000 | |
| | 81-90 Kgs | 0.366 | 0.000 | |
| | Above 90 Kgs | 0.863 | 0.272 | |

Table-17 shows that each dimension of results has derived from a normal distributed population for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.

**Table-18: Normality of height Variable:**

| Height bracket | | Shapiro-Wilk Statistic | Sig. | Remarks |
|---|---|---|---|---|
| Sleep Hygiene state | up to 5-6 ft' | 0.788 | 0.001 | |
| | 5-7 to 6-0 ft' | 0.813 | 0.000 | |
| | Above 6-0 ft' | 0.873 | 0.016 | |
| Sleep quality state | up to 5-6 ft' | 0.775 | 0.001 | |
| | 5-7 to 6-0 ft' | 0.647 | 0.000 | |
| | Above 6-0 ft' | 0.778 | 0.001 | |
| Physical Activities state | up to 5-6 ft' | 0.584 | 0.000 | |
| | 5-7 to 6-0 ft' | 0.669 | 0.000 | |
| | Above 6-0 ft' | 0.536 | 0.000 | |

Table-18 shows that each dimension of results has derived from a normal distributed population for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.

**HOMOGENEITY TEST:**

In the test of homogeneity, we select random samples from each subgroup or population separately and collect data on a single categorical variable.

**Table 19: Homogeneity Test:**

| | | Levene Statistic | Sig. |
|---|---|---|---|
| Age Bracket | Sleep Hygiene state | 0.554 | 0.646 |
| | Sleep quality state | 1.212 | 0.307 |
| | Physical Activities state | 0.881 | 0.452 |
| Smoking status | Sleep Hygiene state | 0.006 | 0.939 |
| | Sleep quality state | 0.530 | 0.468 |
| | Physical Activities state | 2.801 | 0.096 |
| Marital status | Sleep Hygiene state | 0.033 | 0.857 |
| | Sleep quality state | 1.037 | 0.310 |
| | Physical Activities state | 2.587 | 0.110 |
| Weight bracket | Sleep Hygiene state | 0.438 | 0.781 |
| | Sleep quality state | 2.098 | 0.083 |
| | Physical Activities state | 3.770 | 0.006 |
| Height bracket | Sleep Hygiene state | 3.876 | 0.023 |
| | Sleep quality state | 0.843 | 0.432 |
| | Physical Activities state | 4.237 | 0.016 |

Table 19 shows that population of all elements for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets. Here p-value is more than 0.05 in all SHI, PSQI and IPAQ assessment; hence homogeneity assumption of the variance is met; have a mean that spread of data within each combination of factors should be roughly the same.

**Discussion of Results**

This chapter presented a detailed discussion about the statistical tests performed in this research to assess the developed hypotheses that based on how extensively Assertiveness to the impact of sleep quality and duration on physical performance in military cadets study as dependent variable are influenced by a set of independent variables Extensively, this research has segmented into three (03) scales i.e. SHI, PSQI and IPAQ aiming to make this research as multi-dimensional assessment of deep insight of reasons of assertiveness to Observe the impact of sleep quality and duration on physical performance in military cadets.

In the first section, a brief introduction of this chapter presents which analyses to be performed and later-on be discussed. Organization of sections of chapter is also discussed here in this section. In the second section, data visualization has presented all factors.

In the third section, descriptive statistics analyze dependent and independent variables. It includes some basic descriptive statistical tools i.e., count of observations, range, mean, maximum value, minimum value, and percentiles of assertiveness to Observe the impact of sleep quality and duration on physical performance in military cadets. Results showing that respondents have highest age is 29, lowest age is 19 within average of 24. In SHI assessment, result showing that Observe the impact of sleep quality and duration on physical performance in military cadets study here and in the rest of documents as well; showing that 64.8% respondents have highest response for item “I take daytime naps lasting two or more hours.” and 40.4% respondents have lowest response for item “I use alcohol, tobacco, or caffeine within 4 hours of going to bed or after going to bed.”. In PSQI results showing that 74.6% respondents have highest response for item “Time to wake-up” and 64.8% respondents have lowest response for item “Cough or snore loudly”. In IPAQ, results showing that 73.0% respondents have highest response for item “During the last 7 days, on how many days did you walk for at least 10 minutes at a time?” and 20.2% respondents have lowest response for item “How much time did you usually spend doing vigorous physical activities on one of those days?”.

In the fourth section, Correlation Analysis shows the correlations between scales on prevalence with positive and negative impact of sleep quality and duration on physical performance in military cadets. SHI based assessment results showing that “I go to bed feeling stressed, angry, upset, or nervous.” has highest positive relationship to i.e. 73.3%, and the least relationship has found positive impact of item “I do important work before bedtime” i.e. 44.3% is correlated positively with sleep hygiene. PSQI based assessment showing that “During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?” has highest positive relationship to i.e. 58.0%, and the least relationship has found positive impact of item “Time to go to bed” i.e. -20.0% is correlated negatively with Sleep quality state. IPAQ based results showing that “During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?” has highest positive relationship to i.e. 65.4%, and the least relationship has found positive impact of item “During the last 7 days, how much time did you spend sitting on a week day? (Minutes)” 35.3% is correlated positively with physical activities prevalence. Overall analysis of which shows the correlations between all items of questionnaire of our research data. Directions of relation among all variables are correlated positive with all items for relationship, Observe the impact of sleep quality and duration on physical performance in military cadets. Sleep hygiene has correlated with 9.00% correlation over sleep quality, and vice versa. Similarly, Sleep

hygiene has correlated with 3.00% correlation over physical activities and vice versa. Moreover, sleep quality has 0.00 corelated with physical activities and vice versa.
In the fifth section, Above table showing that each element has greater chi-square value than of p-value; resulting that each HO have rejected hence concluded the assertiveness of all alternative hypothesis and stated that have significant impact on Association Relationship between the impact of sleep quality and duration on physical performance in military cadets except relation of gender with mental status.
In the sixth section, diagnostic analysis has performed including reliability, multicollinearity normality and homogeneity.
Reliability tests shows that Above table shows that Cronbach's Alpha of three (03) scales; SHI questionnaire is 0.854 with thirteen (13) items which show good reliability of SHI questionnaire; PSQI questionnaire is 0.20 with eighteen (18) items which show poor reliability of PSQI questionnaire and PSQI questionnaire is 0.36 with seven (07) items which show poor reliability of IPAQ questionnaire to use it in this research. Overall Cronbach's Alpha of all three (03) scales is 0.324 with thirty-eight (38) items which show poor reliability of using all questionnaires as whole.
Multicollinearity is a situation in which two or more explanatory variables in a model are highly linearly related. Multicollinearity is denoted by variance inflation factor (VIF). Results show that VIF of all five (05) components are <10 which shows there is no collinearity and data is acceptable for performing the statistical analyses.
Normality Test determines whether sample data has been drawn from a normally distributed population. Here results shows that each dimension of results has derived from a normal distributed population for assessment of age factor have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets as value of the Shapiro-Wilk test is greater than 0.05 for all elements for all assessments.
Test of homogeneity denotes by levene's test and select random samples from each subgroup or population separately and collect data on a single categorical variable. Above table Above table shows that population of all elements for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets table shows that population of all elements for assessment of all factors have significant impact on Observe the impact of sleep quality and duration on physical performance in military cadets. Here p-value is more than 0.05 in all SHI, PSQI and IPAQ assessment; hence homogeneity assumption of the variance is met; have a mean that spread of data within each combination of factors should be roughly the same.

**Age-wise:**
Based on collected data, below are the deep insights for entire research. Showing break-up of population w.r.t. age-wise prevalence of sleep hygiene, sleep quality and physical activities among respondents.

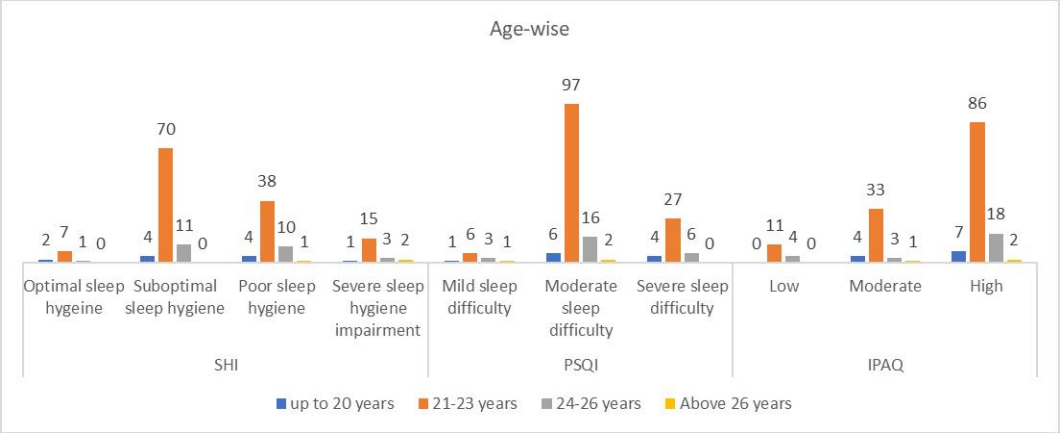


Chart showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) questionnaires along with four (04) states of SHI, three (03) states of PSQI and three (03) states of IPAQ dispersed with four (04) age brackets to define severity of sleep hygiene, sleep quality and physical activities i.e., 15 respondents (71.42% of population have severe-sleep hygiene) are pertains to age bracket of 21-23 years, 27 respondents (72.97% of population have severe-sleep difficulty) are pertains to age bracket of 21-23 years and 86 respondents (76.10% of population have high-physical activities) are pertains to age bracket of 21-23 years.

**Smoking-wise:**

Based on collected data, below are the deep insights for entire research. Showing break-up of population w.r.t. smoking-status-wise prevalence of sleep hygiene, sleep quality and physical activities among respondents.

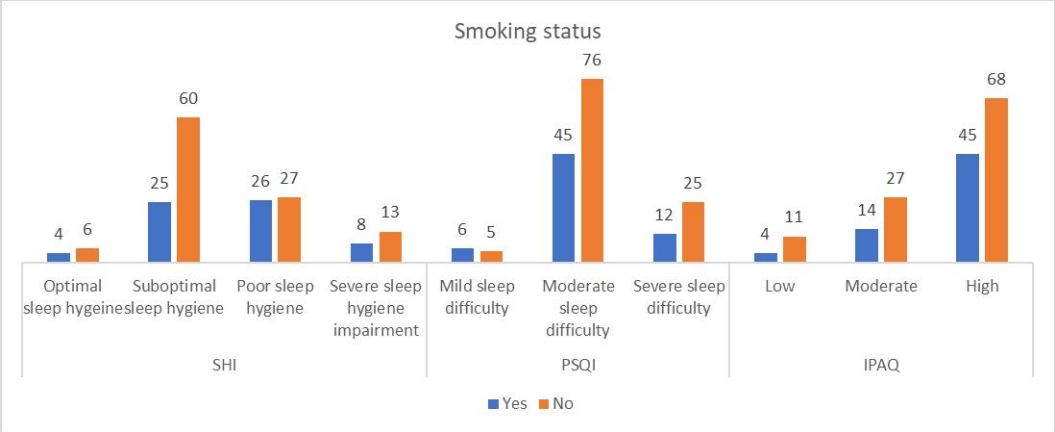


Chart showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) questionnaires along with four (04) states of SHI, three (03) states of PSQI and three (03) states of IPAQ dispersed with two (02) smoking-status to define severity of sleep

hygiene, sleep quality and physical activities i.e., 13 respondents (61.90% of population have severe-sleep hygiene) are non-smokers, 25 respondents (67.56% of population have severe-sleep difficulty) are non-smokers and 68 respondents (60.17% of population have high-physical activities) are non-smokers.

**Marital-status-wise:**

Based on collected data, below are the deep insights for entire research. Showing break-up of population w.r.t. marital-status-wise prevalence of sleep hygiene, sleep quality and physical activities among respondents.

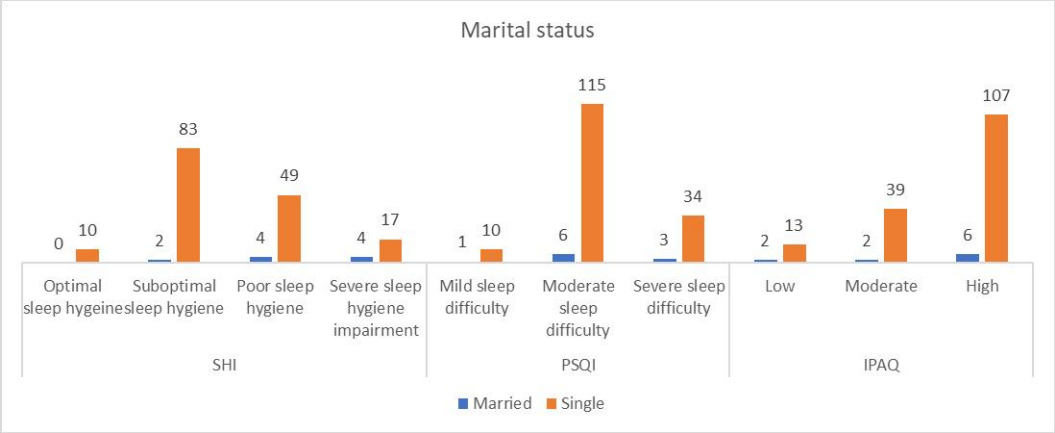


Chart showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) questionnaires along with four (04) states of SHI, three (03) states of PSQI and three (03) states of IPAQ dispersed with two (02) marital-status to define severity of sleep hygiene, sleep quality and physical activities i.e., 17 respondents (80.95% of population have severe-sleep hygiene) are non-married, 34 respondents (91.89% of population have severe-sleep difficulty) are non-married and 107 respondents (94.69% of population have high-physical activities) are non- married.

**Weight-wise:**

Based on collected data, below are the deep insights for entire research. Showing break-up of population w.r.t. weight-wise prevalence of sleep hygiene, sleep quality and physical activities among respondents.

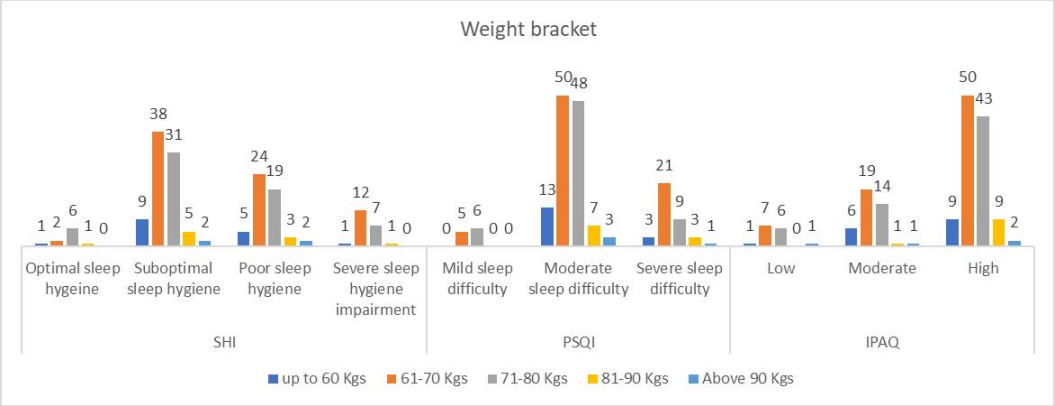


Chart showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) questionnaires along with four (04) states of SHI, three (03) states of PSQI and three (03) states of IPAQ dispersed with five (05) weight-status to define severity of sleep hygiene, sleep quality and physical activities i.e., 12 respondents (57.14% of population have severe-sleep hygiene) have weight-bracket of 61-70 Kgs, 21 respondents (56.75% of population have severe- sleep difficulty) have weight-bracket of 61-70 Kgs and 50 respondents (44.24% of population have high-physical activities) have weight-bracket of 61-70 Kgs.

**Height-wise:**

Based on collected data, below are the deep insights for entire research. Showing break-up of population w.r.t. height-wise prevalence of sleep hygiene, sleep quality and physical activities among respondents.

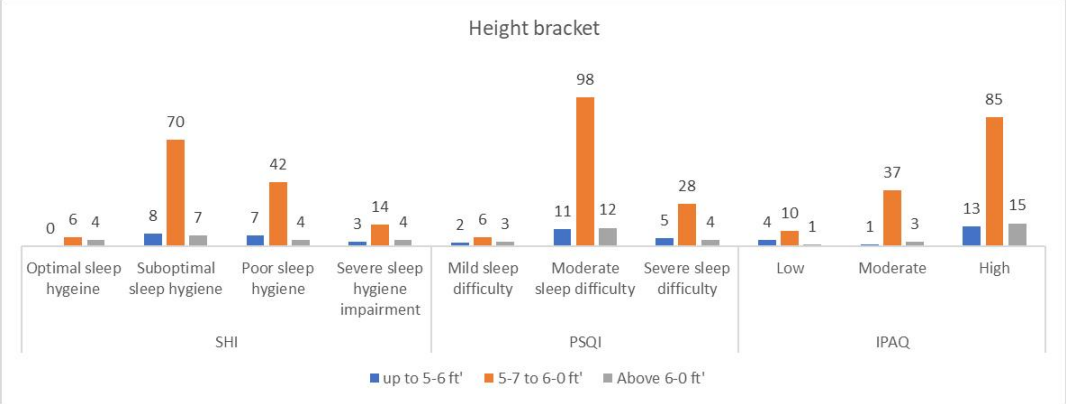


Chart showing that One-hundred and sixty-nine respondents have examine for research consist with three (03) questionnaires along with four (04) states of SHI, three (03) states of PSQI and three (03) states of IPAQ dispersed with three (03) height-status to define severity of sleep hygiene, sleep quality and physical activities i.e., 14 respondents (66.67% of population have severe-sleep

hygiene) have height-bracket of 5-7 to 6-0 ft', 28 respondents (75.67% of population have severe-sleep difficulty) have height-bracket of 5-7 to 6-0 ft' and 85 respondents (75.22% of population have high-physical activities) have height-bracket of 5-7 to 6-0 ft'.

**Study Limitations**

While the findings are insightful, several limitations must be acknowledged. The cross-sectional design restricts the ability to infer causality between sleep and physical performance. Longitudinal or interventional designs would provide stronger evidence on the directionality of these relationships.

The sample was derived using non-probability convenience sampling, which introduces selection bias and limits the generalizability of the results. Additionally, only male cadets were included, omitting potentially valuable insights on gender-based differences. The reliance on self-report measures—while practical—also introduces biases such as underreporting or overestimation due to social desirability or faulty recall.

Another limitation is the lack of objective physiological or performance data, such as actigraphy or GPS-based physical tracking, which would provide more precise measurements. The study also did not account for potentially confounding variables like nutrition, academic pressures, or psychological stress—all of which can independently affect sleep and performance outcomes.

The setting was restricted to two naval academies in Pakistan, further narrowing the external validity of the findings. As such, results may not apply to broader or international military populations with differing training protocols or cultural practices.

**Recommendations for Future Research**

Several recommendations are proposed to build upon the findings of this study. Future research should consider employing longitudinal or interventional designs to explore how sleep improvements impact physical performance over time. Randomized controlled trials involving sleep education programs, for instance, could assess the effectiveness of interventions.

Moreover, stratified random sampling would enhance sample representativeness and reduce bias. Gender inclusion is critical for expanding the applicability of findings, as male-only samples limit the understanding of broader trends. Integrating objective tools such as wearable sleep trackers and biometric performance indicators would substantially improve data accuracy. Future studies should also measure and statistically control for confounding factors such as stress levels, diet quality, caffeine use, and workload. Expanding research settings across different military institutions, regions, and environmental contexts would increase the study's generalizability and allow for cross-cultural comparisons. Collectively, these steps will foster a more holistic and precise understanding of the sleep- performance dynamic in military training environments.

**Conclusion**

This study makes a meaningful contribution to the understanding of how sleep quality, sleep hygiene, and physical activity interact to affect the health and performance of military cadets. Through comprehensive analysis using standardized tools across 169 participants, the research reveals critical demographic patterns and statistically significant associations between poor sleep and diminished well-being. The cadets most affected were young (21–23 years), unmarried, non-smoking, and in the mid- range weight (61–70 kg) and height (5'7"–6'0") categories. These individuals demonstrated a paradox of high physical activity coexisting with poor sleep hygiene and quality, underscoring the complex interplay of stress, performance pressure, and recovery demands in cadet life.

Although methodological limitations prevent causal assertions, the findings align with global evidence that emphasizes the need to treat sleep as a fundamental pillar of health in physically demanding environments. Recommendations arising from this research advocate for sleep hygiene education, training reform, and objective data tracking, all aimed at fostering a culture of wellness in military institutions.

By recognizing sleep as equally vital as diet and exercise, military organizations can safeguard the

long-term physical and mental resilience of their personnel. The study thus lays a robust foundation for further research and practical reforms geared toward holistic cadet development.

**REFERENCES**


1. Miller NL, Shattuck LG, Matsangas P. Sleep and fatigue issues in continuous operations: a survey of US Army officers. Behavioral sleep medicine. 2011 Jan 1;9(1):53-65.
2. Seelig AD, Jacobson IG, Smith B, Hooper TI, Boyko EJ, Gackstetter GD, Gehrman P, Macera CA, Smith TC, Millennium Cohort Study Team. Sleep patterns before, during, and after deployment to Iraq and Afghanistan. Sleep. 2010 Dec 1;33(12):1615-22.
3. Edgar DT, Gill ND, Beaven CM, Zaslona JL, Driller MW. Sleep duration and physical performance during a 6-week military training course. Journal of sleep research. 2021 Dec;30(6):e13393.
4. Mah CD, Mah KE, Kezirian EJ, Dement WC. The effects of sleep extension on the athletic performance of collegiate basketball players. Sleep. 2011 Jul 1;34(7):943-50.
5. World Health Organization. Global Health Estimates 2020: Disease burden by Cause, Age, Sex, by Country and by Region, 2000-2019. WHO; 2020. Geneva https://www. who. int/data/gho/data/themes/mortality and global-health-estimates/global-health-estimates-leadingcauses-ofdalys. Accessed December. 2022;19.
6. Li L, Wang YY, Wang SB, Li L, Lu L, Ng CH, Ungvari GS, Chiu HF, Hou CL, Jia FJ, Xiang YT. Sleep duration and sleep patterns in Chinese university students: a comprehensive meta-analysis. Journal of Clinical Sleep Medicine. 2017 Oct 15;13(10):1153-62.
7. Wang Y, Du J, Xiao L, Huang Y, Zhang R, Xu J, Xu S, Wang H, Su T, Tang Y. Changes in sleep quality among Chinese active service personnel: A cross- temporal meta-analysis, 2003-2019. Military Psychology. 2023 Jan 2;35(1):76-84.
8. Malkawi AM, Kremers SP, Meertens RM. Sleep health and its correlates among male and female military recruits in Jordan: a cross-sectional study. BMC Public Health. 2025 Feb 1;25(1):407.
9. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, DonCarlos L, Hazen N, Herman J, Katz ES, Kheirandish-Gozal L, Neubauer DN. National Sleep Foundation's sleep time duration recommendations: methodology and results summary. Sleep health. 2015 Mar 1;1(1):40-3.
10. Ritland BM, Simonelli G, Gentili RJ, Smith JC, He X, Oh H, Balkin TJ, Hatfield BD. Sleep health and its association with performance and motivation in tactical athletes enrolled in the reserve Officers' training corps. Sleep Health. 2019 Jun 1;5(3):309-14.
11. Wang Z, Chen B, Li W, Xie F, Loke AY, Shu Q. Sleep quality and its impacts on quality of life among military personnel in remote frontier areas and extreme cold environments. Health and quality of life outcomes. 2020 Dec;18:1-0.
12. Fullagar HH, Skorski S, Duffield R, Hammes D, Coutts AJ, Meyer T. Sleep and athletic performance: the effects of sleep loss on exercise performance, and physiological and cognitive responses to exercise. Sports medicine. 2015 Feb;45(2):161-86.
13. Belenky G, Wesensten NJ, Thorne DR, Thomas ML, Sing HC, Redmond DP, Russo MB, Balkin TJ. Patterns of performance degradation and restoration during sleep restriction and subsequent recovery: A sleep dose-response study. Journal of sleep research. 2003 Mar;12(1):1-2.
14. Grandner MA. Sleep, health, and society. Sleep medicine clinics. 2022 Jun 1;17(2):117- 39.
15. Haack M, Mullington JM. Sustained sleep restriction reduces emotional and physical well- being. Pain. 2005 Dec 15;119(1-3):56-64.
16. Good CH, Brager AJ, Capaldi VF, Mysliwiec V. Sleep in the United States military. Neuropsychopharmacology. 2020 Jan;45(1):176-91.
17. Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. The lancet. 1999 Oct 23;354(9188):1435-9.
18. Nelson KL, Davis JE, Corbett CF. Sleep quality: An evolutionary concept analysis. InNursing forum 2022 Jan (Vol. 57, No. 1, pp. 144-151).