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# EFFECT OF TYPE OF PHYSICAL ACTIVITY ON THE SLEEP PATTERN OF SPORT PLAYERS

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## ABSTRACT

***Background:*** Physical activity has been identified as a significant adjuvant in improving quality of life and lowering the cost of medicine. A positive effect has been seen on the mental and physical health of an individual influenced by physical activity and sleep. There is a scarcity of studies that determined the correlation between sleep patterns and physical activity among sports players. The present study is aimed to assess the association between physical activity and sleep among sports players.

***Methods:*** The present study was carried in Faridabad with a sample size of 133 sports players with age criteria between 18-25 years. The subjects were runners, shooters, and archers. WHO Questionnaire for physical activity was used to assess the physical activity of sports players. The Sleep Pattern was evaluated by using the "Pittsburgh Sleep Quality Index."

***Results:*** The study results revealed that all of the runners (100%) were having vigorous activity. 72.7% of archers had moderate activity, but 58.8% of shooters had sedentary activity. Most of the sports payers were having a fairly good quality of Sleep (P=0.65). No correlation was observed between the Global Physical Activity Questionnaire Score of the subjects with any Sleep Domain.

***Conclusion:*** The study concluded that among different sports players doing sedentary, moderate, or heavy physical activity were having good quality sleep. This means even a small amount of physical activity can contribute to good quality sleep.

***Keywords:*** Athletes Sleep quality, Physical inactivity, Sleep duration, Sleep apnea, Physical inactivity.

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## INTRODUCTION

In this modern era of industrialization and modern gadget, has influenced the lifestyle and physical activity of human being. Technology has made the individual more and more technophilic and physically inactive. In regards to global mortality, a sedentary lifestyle is considered to be a major risk factor [1]. Physical inactivity has a negative impact on health, both mental and physical health of an individual [2], according to a study conducted by ICMR three hundred ninety-two million population is inactive in India, which is overwhelming and alarming statics. Studies have suggested that pivotal relation between Cardiovascular diseases, diabetes, endometrial colorectal, ovarian cancers, and sedentary behavior, but still focus on physical activity, is deprioritized [3]. According to Chau (2013), sedentary behavior is a leading cause of mortality worldwide. Technological advancement, changing lifestyles, and sedentary job profiles have influenced man's health adversely [4].

Physical activity (PA) has been identified as a significant adjuvant in decreasing various biological and physiological risk factors of the body and thereby improving the quality of life and lowering the cost of medicine [5]. Mental and physical health is critically appraised and is proven by researchers to be influenced by physical activity and sleep from the last many decades [6]. "Centers for Disease Control and Prevention" has recommended seven to eight hours of sleep per night to maintain optimal health [7,8]. The "National Sleep Foundation" (NSF) reported the key factor for determining sleep quality as sleep latency, awakening more than 5 min, wake immediately after sleep onset, and efficiency of sleep among the population, which are healthy [8]. According to a survey conducted alongside a lack of sleep, there is also a lack of prescribed daily activity. This lack of activity is due to the non-prioritization of recreational or leisure activity in their schedule [9].

By "center for disease control and prevention and American College of Sports medicine," guidelines activity below METof 3.0-6.0 is moderate, and above 6.0 is a vigorous activity [10].

The interrelationship between Physical activity and sleep is established by various researchers and is considered an alternative and very effective approach to improving sleep. According to toYang (2012), sleep quality can be enhanced by exercise training in middle-aged men. The study recommended that moderate activity can act as a medium for improving sleep quality in apparently healthy individuals [11].

But still, there is a lack of insight regarding the types of athletic activity and its effect on sleep, so this study is conducted to give insight regarding the type of athletic activity and its impact on sleep patterns and sleepiness.

## METHODS

The present study was carried in Faridabad with a subject size of 133 sports players within 18 to 25 years of age. The subjects were runners, shooters, and archers. The data was collected regarding their physical activity with the help of WHO (2002) Global Physical Activity Questionnaire [12]. The Sleep Pattern was assessed by using the "Pittsburgh Sleep Quality Index" (2012). The "Pittsburgh Sleep Quality Index" (PSQI) is a subjective instrument to measure sleep patterns and sleep quality. It consists of seven domains: subjective sleep-quality, sleep-latency, sleep-duration,sleep-efficiency, sleep-disturbances, use of sleep medication, and daytime dysfunction in the last month. Scoring is based on a 0 to 3 scale, where 3 represents the negative expression on the Likert Scale, and 0 means positive response[13]. The statistical tests were applied which includes mean, standard deviation, Karl Pearson correlation for assessing the correlation between physical activity and Sleep Domains, ANOVA and Post Hoc test was applied to determine the significant differences in the sleep patterns of different sports players and their physical activity pattern by GPAQ, WHO. SPSS 22 version was used as a statistical tool.

## RESULT

The present study revealed the following results.

**Table 1:** Distribution of the subjects based on Physical Activity

| Physical activity | Sport players | | | Chi-Square |
|---|---|---|---|---|
| | Runner | Archers | Shooters | |
| | N (%) | N (%) | N (%) | 0.00 |
| Sedentary Activity | 0 (0) | 10 (27.7) | 20(58.8) | |
| Moderate Activity | 0 (0) | 26 (72.3) | 14(41.2) | |
| Vigorous Activity | 63 (100) | 0 (0) | 0(0) | |

Table 1 depicts the distribution of subjects based on physical activity among various sports players. Based on the Global Physical Activity Questionnaire categories, the data revealed that all the runners (100%) were having vigorous activity. 72.7% of archers had moderate activity, but 58.8% of Shooters had sedentary activity. The differences were statistically significant ($p<0.05$).

**Table2:** Distribution of Subjects based on Physical Activity and Sleep Domains

| Physical activity | Sleep domains | | | | chi Square |
|---|---|---|---|---|---|
| | Very Good (0) | Fairly Good (1) | Fairly Bad (2) | Very Bad (3) | |
| | N (%) | N (%) | N (%) | N (%) | |
| Sleep Quality | | | | | |
| Sedentary Activity | 19(63.3) | 11(36.7) | 0 | 0 | 0.65 |
| Moderate Activity | 22 (55) | 18 (45) | 0 | 0 | |
| Vigorous Activity | 40(63.5) | 23 (36.5) | 0 | 0 | |
| Sleep Latency | | | | | |
| Sedentary Activity | 14 (46.7) | 11 (36.7) | 5 (16.7) | 0 | 0.303 |
| Moderate Activity | 16 (40) | 10 (25) | 12 (30) | 2 (5) | |
| Vigorous Activity | 28 (44.4) | 25 (39.7) | 8 (12.7) | 2 (3.2) | |

| | | | | | |
|---|---|---|---|---|---|
| Sleep Duration | | | | | |
| Sedentary Activity | 10 (33.3) | 15 (50) | 4 (13.3) | 1 (3.3) | 0.32 |
| Moderate Activity | 18 (45) | 12 (30) | 4 (10) | 6 (15) | |
| Vigorous Activity | 25 (39.7) | 23 (36.5) | 11 (17.5) | 4 (6.3) | |
| Habitual Sleep Efficiency | | | | | |
| Sedentary Activity | 30 (100) | 0 | 0 | 0 | - |
| Moderate Activity | 40 (100) | 0 | 0 | 0 | |
| Vigorous Activity | 63 (100) | 0 | 0 | 0 | |
| Sleep Disturbance | | | | | |
| Sedentary Activity | 11 (36.7) | 17 (56.7) | 2(6.7) | 0 | 0.203 |
| Moderate Activity | 8 (20) | 32 (80) | 0 (0) | 0 | |
| Vigorous Activity | 20 (31.7) | 41 (65.1) | 2 (3.2) | 0 | |
| Sleep Medication | | | | | |
| Sedentary Activity | 30 (100) | 0 | 0 | 0 | - |
| Moderate Activity | 40 (100) | 0 | 0 | 0 | |
| Vigorous Activity | 63 (100) | 0 | 0 | 0 | |
| Daytime Dysfunction | | | | | |
| Sedentary Activity | 26 (86.7) | 4 (13.3) | 0 (0) | 0 (0) | 0.097 |
| Moderate Activity | 34 (85) | 2 (5) | 2(5) | 2 (5) | |
| Vigorous Activity | 57 (90.5) | 6 (9.5) | 0 (0) | 0 (0) | |

Table2 depicts the distribution of subjects based on Physical Activity and Sleep Domains. The data revealed that most of the sports payers were having a fairly good quality of Sleep (P=0.65). Regarding Sleep Latency, 30% of sports players doing moderate activity had bad sleep latency, but the differences were not statistically significant as compared to sedentary and vigorous physically active subjects (P=0.303). Regarding Sleep duration, 17.5% of sports players doing strenuous activity had less sleep duration, but the differences were not statistically significant as compared to sedentary and vigorous physically active subjects (P=0.32). All the sports payers had excellent Habitual Sleep efficiency. Most of the sports players were having a good sleep without disturbances (P=0.203). No player was taking sleep medicine.

**Table 3:** Mean values of the subject-based on Physical Activity and Sleep Parameters

| Sleep domains | Physical activity | | | ANOVA |
|---|---|---|---|---|
| | Sedentary Activity | Moderate Activity | Vigorous Activity | |
| | M ± SD | M ± SD | M ± SD | |
| Sleep Quality | 0.36 ± 0.49 | 0.36 ± 0.48 | 0.39 ± 0.48 | .663 |
| Sleep Latency | 0.70 ± 0.74 | 1 ± 0.96 | 0.74 ± 0.80 | .237 |
| Sleep Duration | 0.86 ± 0.77 | 0.95 ± 1.08 | 0.90 ± 0.91 | .933 |
| Habitual Sleep Efficiency | 0 | 0 | 0 | - |
| Sleep Disturbance | 0.7 ± 0.59 | 0.8 ± 0.40 | 0.71 ± 0.52 | .639 |
| Sleep Medication | 0 | 0 | 0 | - |
| Daytime Dysfunction | 0.13 ± 0.34 | 0.3 ± 0.79 | 0.09 ± 0.29 | .129 |
| GPAQ Score | 338.5 ±149.30 | 1241.12 ±233.59 | 2781.095 ±946.96 | 0.00 |

Table 3 stated the mean values of the subjects based on physical activity and sleep domains assessed by the "Pittsburgh Sleep Quality Index" (2012) [13]. No significant difference was observed between sleep domains with subjects having sedentary, moderate, and vigorous physical activity. The mean values of GPAQ Score of Sedentary-Activity subjects (338.5 + 149.30), Moderate-Activity subjects (1241.12 + 233.59) and Vigorous-Activity subjects (2781.095 + 946.96) were significant statistical difference was observed among each other (P<0.01).

**Table 4:** Correlation of Physical Activity and Sleep parameters

| Pearson Correlation | | GPAQ Score | Sleep Quality | Sleep Latency | Sleep Duration | Sleep Disturbance | Daytime Dysfunction |
|---|---|---|---|---|---|---|---|
| GPAQ Score | Pearson Correlation | 1 | | | | | |
| | Sig. (2-tailed) | | | | | | |
| Sleep Quality | Pearson Correlation | .028 | 1 | | | | |
| | Sig. (2-tailed) | .745 | | | | | |
| Sleep Latency | Pearson Correlation | .015 | .252** | 1 | | | |
| | Sig. (2-tailed) | .866 | .003 | | | | |
| Sleep Duration | Pearson Correlation | .013 | -.022 | -.031 | 1 | | |
| | Sig. (2-tailed) | .885 | .804 | .721 | | | |
| Sleep Disturbance | Pearson Correlation | .099 | .204* | .238** | -.195* | 1 | |
| | Sig. (2-tailed) | .257 | .018 | .006 | .024 | | |
| Daytime Dysfunction | Pearson Correlation | -.040 | .224** | .108 | .063 | .287** | 1 |
| | Sig. (2-tailed) | .650 | .009 | .217 | .468 | .001 | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | |

Table 4 depicts that there was no correlation between Global Physical Activity Questionnaire Score [12] of the subjects with any Sleep Domain. When compared within the Sleep Domain, a strong positive correlation

was observed between Sleep-Quality and Sleep-Latency ($p<0.01$), Sleep-Quality and Sleep-Disturbances ($P<0.05$) and Sleep-Quality and Daytime-Dysfunction ($P<0.01$). On the other hand, a strong negative correlation was observed between Sleep-Disturbance and Sleep-Duration ($P<0.01$) and a strong positive correlation between Sleep-disturbances and Daytime-Dysfunction ($P<0.01$).

## DISCUSSION

The present study determines that most of the sports players concerning their physical activity have a good quality of sleep. It was also assessed that there was no correlation between GPAQ scores of a subject with any sleep domain, that determine that even lesser of physical activity influence sleep pattern positively. Also, our results suggest that even mild dosage to moderate dosage of physical activity has a positive effect on sleep time and sleep efficiency and sleep onset and latency. This study indeed emphasized the need for physical activity as even a small amount of work out is leading to overwhelming improvement in sleep parameters which is vital for athletes. However, these results are lacking in robustness, and additional studies are needed to confirm these findings. There were numerous studies which have individually assessed the sleep pattern in athletes. A study conducted by Fullaga, 2015 revealed that athletes had a better quality of sleep, and the sleep duration was more than 8 hours than sedentary control subjects. He recommended moderate activity can help in preventing sleep apnea [14]. Another study has given a similar result done on 800 elite South African athletes, also reported good sleep, and stated that only 11% of athletes were having a sleep less than 6 hours [15]. When it comes to physical activity, according to the "center for disease control and prevention and American College of Sports medicine" guidelines, physical activity between MET of 3.0-6.0 is moderate, and above 6.0 is a vigorous activity[10]. A study conducted by Yang (2012) stated that sleep quality might be enhanced by exercise training in middle-aged men. Similar results were reported in a study conducted on adolescent athletes, showed a positive correlation of vigorous exercise on sleep quality, sleep duration, and better sleep pattern [16].

The results also revealed that males doing sedentary activity have a negative correlation with sleep and sleep-related disorders. On the other hand, a review was done by Kredlow, 2015 concluded that there was a very slight beneficial effect of physical activity on sleep quality, duration of sleep, sleep-efficiency, rapid eye movement sleep. No strong relationship was seen between regular exercise and sleep. Similar results were stated by the present study [17]. There is the various proposed mechanism which explains how sleep is influenced by physical activity are according to Uchida et al. (2012) they have proposed that due in body temperature, cytokine release, and CNS fatigue exercise have a positive effect on sleep compared to sedentary counterpart. The present study covered three sports with different physical activities. Most of the studies are on athletes but not on different sports players [18].

## CONCLUSION

The study concluded that no correlation was observed between physical activity, as seen in various forms of sports and sleep. The type of physical activity does not affect any domain of sleep. The subjects with vigorous, moderate, or sedentary physical activity were having good quality sleep. It means even a slight amount of physical activity can contribute to good quality sleep.

### DECLARATION

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Author's Contribution: Dr. Preeti Saini – Conceptualization, Data Collection, and Manuscript Preparation

Dr.Mahak Sharma – Conceptualization, Statistical Analysis and Manuscript Preparation

### ABBREVIATIONS

ICMR – Indian Council of Medical Research
PA – Physical Activity
NSF – National Sleep Foundation
WHO – World Health Organisation
GPAQ - Global Physical Activity Questionnaire
PSOI - Pittsburgh Sleep Quality Index

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