

Sleep deprivation effects on performance



**ASSIGN
BUSTER**

Abstract

Sleep is an important bodily function that enhances learning and problem-solving skills and helps a person pay attention and make decisions. The lack thereof sleep, sleep deprivation, can cause actual harm to the body such as taking longer to complete tasks, have a slower reaction time and causes more mistakes. The purpose of this study is to determine how sleep deprivation among collegiate level athletes affects their sport performance, such as their concentration and coordination. This study will be taken from a convenience sample of current Temple University Division 1 basketball players. These student-athletes will participate in the following questionnaires and tests to determine the effect of sleep deprivation on sport performance. They will answer the Physical Activity Readiness Questionnaire (PAR-Q) to measure the ability to participate in any kind of physical activity. They will be tested with the Alternate Hand Wall Toss test to measure coordination, specifically hand eye coordination. The Concentration Test (VISMEN-PLAN) will measure the student athlete's concentration through tasks. The results for this study are to be determined. Results from this study would provide better understanding as to how lack of sleep affects sleep performance and maybe able to implement better time management programs for people at the collegiate level, interested in professional sport.

Literature Review

The effects of sleep deprivation is covered in a variety of literature. It is arguably the most common behavior of all humans and animals. With it

being the most common thing, it is surprising that the deprivation of sleep is not spoken about on a more serious level. This general population problem can be applicable among babies, teens, adults, the elderly, and college students to name a few. Student-Athletes range this population and have trouble handling being adults and college students, and high-performance athletes as well. For them, sleep should be a natural behavior where muscles become very relaxed and the mind does slightly as well. This study is made to find how sleep deprivation amongst Student-athletes, specifically playing Division I basketball, alters performance. Interactions with the environment become reduced and it becomes time for the body to recover from exhaustive and damaging exercises among athletes (Youngstedt). More studies have been done on athletes' cognitive function while playing, which has come easier to researchers than the physical downfalls of sleep deprivation (Youngstead).

For the most part, humans understand the broad reasons of why we need sleep to conserve energy, restore it and for information processing according to (Alholha). That study concluded that inadequate sleep leads to decreased performance, inadequate alertness, and deterioration in health (Alholha). This would affect humans in the workplace, especially in the medical field where that study took place. Residency programs have had to enact strict work restrictions because of errors related to their medical performance due to sleep deprivation.

In terms of performance attributes like attention, sleep plays a big role. In the span of 24 hours without sleep, the earliest stages of attentional modulation becomes impaired (Alholha). Inherently meaning that amount of

sleep deprivation can reduce or even eliminate early effects of selective attention on neural processing significantly.

Instead of testing the attribute of attention, memory and cognitive performance could be tested. This construct of assessing the effect of acute exercise on cognitive performance following sleep deprivation was introduced by (NHLBI). In control and experimental groups, young, active, healthy adults showed that sleep deprivation negatively affected performance on the Psychomotor vigilance task but did not affect memory performance (NHLBI). The PVT measures the speed at which the participant can respond to a visual stimulus. The average age of the adults studied in this experiment were 24. 7 in the control group and 25. 3 in the exercise group. There were no cognitive performance differences between the exercise and rested conditions and as stated before the memory task performance was not impaired due to sleep deprivation.

In terms of something along the lines of athletics, professional sailors incur severe sleep loss and demonstrate marked performance impairment when competing (Hurdiel, et al.). Performance is terribly altered in athletes suffering from sleep deprivation. Short term sleep deprivation was said to not be effective on anaerobic performance.

Methods

Participants

This study will include intercollegiate men's basketball players that currently play Division 1 basketball for the National Collegiate Athletic Association

(NCAA). These participants will come from Temple University's men's basketball team that currently has a roster of 15 men. These men range in ages from 19 to 23 years old. This sample has been selected by convenience sampling. The ability to use the players that already attend Temple University make the study easier to track, rather than selecting from different school where players would have to travel, and the rigor of the curriculum is not understood by the researchers. It is important to note that these are men, as their abilities should all around the same, whereas involving a mixture of samples of female and male, the concentration and coordination could vary and become a comparison between the two genders. Race is not a pertinent factor in this study, but it is smart to note that the Temple Men's basketball team is made up of 13 African American/Black males, 2 Caucasian/white males, and 1 Hispanic male. Individuals may be of any race or ethnicity, but it is pertinent that they are male for this study. Participants with a reported history of mental disabilities, mood disorders or not in the adequate physical health will be excluded from this study. There is no other exclusion criteria.

Measures

The first item being measured is pertinent to this entire study as the study surround athletes. It is the PAR-Q, the Physical Activity Readiness Questionnaire (Kent, 1992). The construct being measured in this questionnaire is the ability to participate in any kind of physical activity. The questionnaires has a total of 7 " yes" or " no" questions, asking about pain, problems, or use of medication. A sample question would be, " In the past month, have you had chest pain when you were not doing physical activity?"

If an individual answer “ yes” to one or more questions, then they should speak to a doctor before continuing with this study. If the answers were all “ no” then they are ready to move on with the study and physical activity. Each question should be taken seriously and answered honestly in order for it to be reliable and have high validity.

The second item being measured would be Coordination, specifically hand eye coordination. The measure is called the Alternate Hand Wall Toss test (Wood, 2008). This test includes minimal equipment, involving a tennis ball, a smooth and solid wall, marking tape, and an optional stopwatch. The tape is marked 3 feet away from the wall and the individual has to make as many successful catches as possible within the 30 second time period. The items include the ratings ranging from the lowest, poor, fair, average, good, to the highest excellent. The scores can range to any number of completed catches. Based on the score, the individual is given a rating. A poor rating is given if there are less than 15 catches made. For fair, 15-19 catches, average, 20-29 catches, good, 30-35 catches, and excellent, over 35 completed catches. The test should be given a couple times, with 3 being ideal for the best validity and reliability as the data can be skewed depending on how the individual is performing.

The third item being measured would be concentration. The measure is called the Concentration Test (VISMEN-PLAN) (Tombaugh 1996). The test is carried out online whether the subject uses a PC, cell phone, or tablet. The individual must remember the highest number of series in the most precise way possible while being aware of the auditory stimuli. This test should take 60-70 seconds to complete. This test evaluates cognitive abilities such as,

<https://assignbuster.com/sleep-deprivation-effects-on-performance/>

visual memory, short term memory, response time, working memory, and processing speed.

Procedures

To begin this study, participants will be chosen through a convenience sample. The Temple University basketball team would be contacted in order to participate in this study. From there, the players will be told to record 7-9 hours of sleep per night for 2 nights and complete a physical health questionnaire, an Alternate Hand Wall Toss test, and a Concentration test so a baseline is there for a point of comparison. After such tests are completed the 15 participants will be told during their off season (after post season) to record less than 11 hours of sleep between 2 nights. They will be instructed to perform those 3 tasks once again so there will be a comparison. The Physical Health Questionnaire will take place in the Men's Basketball facility media room, the Alternate Hand Wall Toss test will take place in the practice gym, and the Concentration Test will take place in Temple's Resnick center where there is limited distractions and it is a place where they get majority of their work done.

Discussion

Student athlete basketball players sport performance in connection with concentration and coordination are affected negatively by sleep deprivation. It is expected that after being deprived of sleep, these student athletes will not perform to the best of their ability. Their concentration on the tasks they have to do will be altered. The concentration task will be hard for them as they have lost lots of sleep and may think more about sleep than the task at

hand. Their coordination when performing activities will also be faulty. While performing the hand eye ball test, their muscles may be weaker, their reaction time, may be a little slower than usual, and they might have a more impaired thought process towards the task. Their baseline tests will most likely be the highest score throughout this experiment.

This experiment is focusing on the correlation between sleep deprivation and sport performance. This correlational design should have strong external validity because of what it is studying. Yes, this study is being done with athletes but sleep deprivation alters something in everyone's everyday life. Concentration is a huge component to sport performance but also performance in general. How well people concentrate on day to day tasks, including students and employees as well. This experiment could be influenced by day to day activities of the athletes that may already impair their performance. Focus on other life events could play a role into their performance as well.

An ideal study would include constant surveillance of the athletes during a specified period where the experimenter could visually see any possible confounding variables that could hinder performance. A completely controlled environment would be of great use to this experiment. Another aspect to think about involving sleep deprivation and performance would be to compare the results between male and female athletes. Female athletes may have an advantage because there is literature explaining the bonus of females being able to multitask better and work cognitively under pressure as oppose to males. The results of this experiment show that activity of sleep is vital to the function of athletes and more so the entire population. Integral

bodily functions begin to deteriorate what sleep is deprived and it is something that should be taken with care and seriousness. The population, especially in colleges, should be educated on the importance of sleep and the effects it could have on physical and mental performance.

References

- Abrams, R. M., MD. (2015). Sleep deprivation. *Obstetrics and Gynecology Clinics*, 42 (3), 493-506. doi: 10. 1016/j. ogc. 2015. 05. 013
- Alhola, P., & Polo-Kantola, P. (2007). Sleep deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment*, 3 (5), 553-567. Retrieved from [https://www. ncbi. nlm. nih. gov/pubmed/19300585](https://www.ncbi.nlm.nih.gov/pubmed/19300585)
- Hurdiel, R., Van Dongen, Hans P A, Aron, C., McCauley, P., Jacolot, L., & Theunynck, D. (2014). Sleep restriction and degraded reaction-time performance in figaro solo sailing races. *Journal of Sports Sciences*, 32 (2), 172-174. doi: 10. 1080/02640414. 2013. 815359
- Lesyk, J. J. The nine mental skills of successful athletes. Retrieved from [https://www. sportpsych. org/nine-mental-skills-overview](https://www.sportpsych.org/nine-mental-skills-overview)
- NHLBI. Sleep deprivation and deficiency. Retrieved from [https://www. nhlbi. nih. gov/health-topics/sleep-deprivation-and-deficiency](https://www.nlm.nih.gov/health-topics/sleep-deprivation-and-deficiency)
- *Physical activity readiness questionnaire* (2006). (3rd ed.) Oxford University Press. Retrieved from [http://www. oxfordreference. com/view/10. 1093/acref/9780198568506. 001. 0001/acref-9780198568506-e-5280](http://www.oxfordreference.com/view/10.1093/acref/9780198568506.001.0001/acref-9780198568506-e-5280)
- Wiggins, E., Mottarella, M., Good, K., Eggleston, S., & Stevens, C. (2018). 24-h sleep deprivation impairs early attentional modulation of

neural processing: An event-related brain potential study.

Neuroscience Letters, 677 , 32-36. doi: 10. 1016/j. neuulet. 2018. 04.

022

- Xu, H., Shen, H., Wang, L., Zhong, Q., Lei, Y., Yang, Z., . . . Hu, D. (2018). Impact of 36 h of total sleep deprivation on resting-state dynamic functional connectivity. *Brain Research*, 1688 , 22-32. doi: 10. 1016/j. brainres. 2017. 11. 011