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Research Article

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Effects of Restricted use of Modern Technology before Bed - Time on Psychological and Athletic Performance among University Athletes

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Introduction

Sleep plays a vital role in good health and well-being throughout our life. Getting enough sleep at the right times can help protect our mental health, quality of life and safety. In children and teens sleep also helps in growth and development. Getting enough quality sleep at right times help us function well throughout the day [1]. People who are sleep-deficient are less productive at work, colleges and especially in the sports they practice. After several nights of losing sleep our ability to function suffers [2].Lack of sleep may lead to micro sleep. Micro sleep refers to brief moments of sleep that occur when you are normally awake.

University athletes aged 17-21 years require 6-8 hours of sleep per day [3]. The process of sleep is regulated by an interaction between 3 main factors: a homeostatic factor, an endogenous circadian factor, and a behavioral factor. Exercises demanding more endurance, like time to exhaustion on ergo meter treadmill walking are more strongly affected by sleep deprivation. Extended sleep has been associated with parameter such as sprints.

Sleep deprivation also causes psychological distress such as altered mood swings and cognitive dysfunctioning especially in endurance sports where attention is very much needed.

Use of modern technology before sleep has been related to delayed bedtimes and less time spent in bed, reduction of sleep duration and impaired school performance the next day as well as insomnia. Furthermore smartphone ownership is related to later bedtimes and more modern technology use in bed before sleep compared with ownership of a conventional mobile phone [4].

There were only few studies cited for the correlation of sleep with mood alterations, cognition and athletic performance. One of the recent study quoted that 4 weeks of restricted use of modern technology 2 hours before bed-time showed no effects on mood alterations, attention and athletic performance. Therefore, this study was extended to 6 weeks of interventional period to show significant difference and positive correlation between sleep, mood alterations, attention and athletic performances.

Aim

The study aims to assess whether there is any effect on the Mood Alteration, Cognitive Function and Athletic Performance between the control and experimental group during and after 6 weeks of restricted use of modern technology two hours before bed-time.

Objectives

- To find out whether the selected subjects where morning athletes or evening athletes.
- To find out the significance between experimental and control group on mood states, Attention and athletic performance.
- To find out if there is difference on the mood states, attention and athletic performance with the experimental group.
- To find out if there is difference on the mood states, attention and athletic performance with the control group.

Hypothesis

Six weeks of restricted modern technology use will cause significant differences in mood alterations, cognitive functioning and athletic performances in the experimental group compared to the control group.

Sleep and performance

Sleep is considered to be vital for an in individuals physical and psychological performance. Many interdependent factors such as alterations in training schedules, daily diet, travelling across time zones influence performance along with sleep. In recent studies it has been inferred that sleep deprivation, deteriorates the cognitive ability, degradation in psychomotor task and leads to partly losing the complete physical ability of athlete.

Sleep very well relates athletic performance, cognitive performance and mood alterations. Adequate sleep is paramount to athlete recovery and performance. Sleep efficiency is defined as a percentage score calculated by incorporating movement and physiological measures over the sleep duration as determined by the BSU [1]. Sleep has been regarded a biological necessity for the athlete irrespective of the sports and gender. Recent studies show that team sports athletes are at high risk of poor sleep during and after competition [2]. Naps, sleep extension and sleep hygiene appears advantageous to performance. For the competitive athlete, many factors may negatively impact his or her sleep, resulting in compromised athletic performance [3]. Insufficient sleep among athletes may be due to scheduling constraints and the low priority of sleep relative to other training demands. Insufficient sleep affects domains of athlete performance (speed+endurance), neuro-cognitive function (attention +memory) and mood alternatives [4].Therefore sleep monitoring assist in the optimisation of performance for athletes.

It is suggested that core body temperature is what drives the sleep wake cycle rhythms. The circadian rhythm that is sleep wake cycle in humans takes 24 hours to complete. Sleep wake cycle is one of the most important biological functions, the internal clock of the physiological processes are influenced by external indicators of time that is zeitgebers (alarm clocks, morning ritual, regular meal time and bed time), which is under voluntary control to a certain degree [5]. "Early Birds" and "Night Owls" show very significant differences in times of peak metabolism, body temperature and performance. Night owls have the maximum efficiency later evening in a day whereas early birds reach their peak in the mornings. Within an individual consistent pattern emerge considering physiological and psychological measurements. Physiological arousal is lowest in the early morning hours and increases as the day progresses, decreases slightly in the afternoons.

Sleep and athlete

Athletes in the age of 17-25 require 7-8 hours of sleep daily. Delta sleep decreases as one ages which is also the same case for the athletes. A trained athlete will have an increased delta sleep that is good quality sleep compared to non-athlete. Gender differences were not found in sleep quality and quantity [6]. Aerobic exercises increases delta sleep whereas strength training reduces sleep latency and have increases delta sleep mostly in the first sleep cycle on exercise nights. Time when exercise is done in a day greatly influences sleep as much as the nature of the sports and exercise does4. Intensity of exercise affects time of the day when exercise occurs. Another important factor with relationship to sleep and the athletes is the "Chronotype" of the subjects involved, that is early birds vs night owls. It is very well seen that late evening exercise impairs sleep quality and delays sleep onset rather early evening exercises increases sleep quality and depth of sleep [7]. There are changes in sleep pattern for both morning and evening athlete. A late evening exercise may exhibit great change in a morning person, which leads to fatigue. The interval between the exercise period and the athlete retiring to bed should also be a vital consideration. On the most cases the early morning or late evening distinctions are not important as looking at the time between exercise completion and lights out [8]. Daily Diet should also be considerable factors such as caffeine intake before competitions may affect the sleep wake cycle significantly. For most of the athletes, irrespective of the sports and gender, for the sudden shift of time zone is a major disruptor of the sleep wake cycle. The other rhythms like mood, perceived exertion, insulin production, metabolic rate are significantly affected by travelling across time zones and several days of adjustments are required [9]. Sleep patterns had a great effect with chronotype of the athlete. Eveningness athletes were related to greater sleep needs, less time in bed compared to the ideal sleep needs. They were greatly associated with sleep debts. There was no sex difference found for morningness – eveningness score. A morning athlete may exhibit good sleeping patterns and thus are not deprived which helps in increased athletic, cognitive performances and positive mood alterations [10]. Morningness athletes reach their peak in the mornings.

Sleep and athletic performance

Sleep is considered critical to human physiological and cognitive function. Sleep loss is a common occurrence prior to competition in athletes which has significant impact on athletic performance [11]. Many studies reported that sleep deprivation has a significant sports specific reduction in athletes. Sleep extension helped in increased sprint time, shooting accuracy and along with difference in profile of mood states scores that is increased vigor, decreased fatigue. Thus, optimal sleep is beneficial in reaching peak athletic performance. If competition time and performance rhythm are mismatched there is a significant disturbance in the athletic performance. Exercise depletes energy, fluids, and breaks down muscle. Hydration and the right fuel are only part of training and recovery. What athletes do in the moments during and immediately after competition also determines how quickly their bodies rebuild muscle and replenish nutrients. This helps maintain endurance, speed, and accuracy. Some research suggests that sleep deprivation increases levels of stress hormone, cortisol [12]. Sleep deprivation has also been seen to decrease production of glycogen and carbohydrates that are stored for energy use during physical activity. In short, less sleep increases the possibility of fatigue, low energy, and poor focus at game time. It may also slow recovery post-game.

Elite athletes can't spare even fractions of a second to react to a play unfolding in front of them. Sleep deprivation is known to reduce reaction times significantly. Even a single all-nighter can reduce reaction times by more than 300%, not to mention recovering takes several days. Studies have shown even a surprisingly low level of fatigue can impair reaction times as much, as legally drunk. It's surprising to hear that being awake for 22 hours straight can slow your reaction time more than four drinks can [13]. Clearly, there are physiological differences between being intoxicated and being fatigued; however, if an athlete wouldn't reasonably expect to have peak reaction times after being drunk, they can't expect to perform their best on less than a full night's sleep either.

Whether you're at the top of your game or in the game for the fun of it, getting the proper amount of sleep is necessary to face the word with your best foot forward. Sleep will help you on the road to good fitness, good eating, and good health.

If you tell an athlete you had a treatment that would reduce the chemicals associated with stress that would naturally increase human growth hormone, which enhances recovery rate, which improves performance, they would all do it. Sleep does all of those things.

Sleep is crucial to the body's physiological, biochemical, and cognitive restoration. Cheri Mah, a researcher at Stanford, conducted a sleep-extension study with the university's men's basketball team. After maintaining a normal sleep schedule for 4 weeks to establish a baseline, players from the team went through a 7-week sleep extension period. Over this time, the players obtained as much nighttime sleep as possible, with 10 hours being the goal. The results measures of athletic performance specific to basketball were recorded after every practice including a timed sprint and shooting accuracy. Subjects demonstrated a faster timed sprint following sleep extension [14]. Shooting accuracy improved, with free throw percentage increasing by 9% and 3-point field goal percentage increasing by 9.2%. Improvements in specific measures of basketball performance after sleep extension indicate that optimal sleep is likely beneficial in reaching peak athletic performance. Similar performance improvements after sleep extension have been seen in tennis players, swimmers, weightlifters, and more.

Sleep and psychology of the athlete

It is seen that anxiety performance relationships is found to be positive on a higher side. Anxiety is one of the key factor that the sport psychologists often emphasis with the athletes and coaches. In recent studies, it is inferred that poor sleepers have more frequent awakenings, less total sleep time as they scored higher on the measures of trait anxiety [14]. Several authors have reported that excitement and anxiety about an upcoming competition often diminishes the athletes daily sleep time. For the best performance outcome in a competition, maintaining proper emotional feelings before a competition is found to be very vital [15]. When sleep is deprived mood alterations in an athlete affects motivation, concentration, and willingness to give an overall effort in an upcoming competition and finally athletic performance may be compromised .It is inferred from various studies that reduced night sleep diminish mood and motivation which leads to increased negative thoughts and outcomes of failures to the athlete. State anxiety has very high influences on athlete's performance.

Sleep loss impairs judgement. Studies have shown motivation, focus, memory, and learning to be impaired by shortened sleep. Without sleep, the brain struggles to consolidate memory and absorb new knowledge. Past studies have shown that sleep loss impairs the frontal lobe of the brain and has negative effects on decision-making such as sensitivity to risk-taking, moral reasoning and inhibitions.

On the field, one study has shown that MLB players show decreased plate discipline as the season progresses. Meaning the number of times a batter swings at a ball outside of the strike-zone increases. While common logic would predict that plate discipline would improve over the season – as players had more practice and at-bats – the opposite was shown to be true. MLB players consistently showed better judgement at the beginning of the season than at the end. The suspected cause was mental fatigue during an arduous 162 game season [16]. A team that recognizes this trend and takes steps to slow or reverse it – by enacting fatigue-mitigating strategies, especially in the middle and late season, for example – can gain a large competitive advantage over their opponent. (Scott Kutscher, M.D.,) There's a big relationship between psychiatric and psychological problems and sleep. So people who are depressed or have anxiety often have trouble with sleep as part of those disorders. Difficulty sleeping is sometimes the first symptom of depression. Studies have found that 15 to 20 percent of people diagnosed with insomnia will develop major depression [17]. While sleep research is still exploring the relationship between depression and sleep, studies have shown that depressed people may have abnormal sleep patterns.

Sleep problems may, in turn, contribute to psychological problems. For example, chronic insomnia may increase an individual's risk of developing a mood disorder, such as depression or anxiety. In one major study of 10,000 adults, people with insomnia were five times more likely to develop depression. Four lack of sleep can be an even greater risk factor for anxiety. In the same study, people with insomnia were twenty times more likely to develop panic disorder [18]. Another study showed that insomnia is a reliable predictor of depression and many other psychiatric disorders, including all types of anxiety disorders.

Sleep and mood alterations

Determining the psychobiological profile of an athlete is important for defining the work to be performed in each phase of the competition. Profile of mood states help administering mood alterations of an athlete; especially pre competition. It is inferred from several studies that most of the athletes experience medial level of trait anxiety with increased vigor domain pre competition [19]. The period during the sports season can significantly alter psychobiological variables that are low vigor, day time sleepiness at the end of the season and poor sleep quality at the beginning of the season. Thus, mood alternative and anxiety have a positive relationship with sleep and performance of the athlete. Almost 70% of the athlete experience poor sleep pre competition due to increased anxiety. The negative moods of fatigue and tension were both significantly co-related with pre competition relative to sleep quality.

Studies have shown that even partial sleep deprivation has a significant effect on mood. University of Pennsylvania researchers found that subjects who were limited to only 4.5 hours of sleep a night for one week reported feeling more stressed, angry, sad, and mentally exhausted [20]. When the subjects resumed normal sleep, they reported a dramatic improvement in mood.

Not only does sleep affect mood, but mood and mental states can also affect sleep. Anxiety increases agitation and arousal, which make it hard to sleep. Stress also affects sleep by making the body aroused, awake, and alert [21]. People who are under constant stress or who have abnormally exaggerated responses to stress tend to have sleep problems. Sleep has also been documented as a determinant of mood observed increasing vigor and decreasing fatigue through an intervention of sleep extension in healthy college students [22]. Additionally, in a study of male collegiate basketball players, when players obtained as much extra sleep as possible, their various mood states were significantly improved [23]. Although these studies suggest the importance of getting adequate sleep for enhancing mood, there is not yet sufficient evidence on the relationship between sleep and mood states in athletes, especially for athletes with physical disability. People who have disorders of the spine or lower limbs are frequently awakened by pain or by the need to change position to prevent pressure ulcers. A recent study reported that male wheelchair basketball players are more likely than the general population to suffer from insomnia [24].

Sleep and cognitive performance

The domain of cognitive performance (that is attention and accuracy) has a significant positive relationship with sleep. Sleep is considered critical to cognitive function although its true function remains unclear [25]. Sleep servers a function of cognitive restitution particularly in maintenance of attentional mechanisms. Reduction of sleep quality could result in an autonomic nervous system imbalance. Thus sleep loss and reduced sleep quality will give rise to attentional problems. Circadian preference not only affects the sleep patterns but also give rise to attentional problems [26].

A person's quality of life can be disrupted due to many different reasons. One important yet underestimated cause for that is sleep loss. Working hours are constantly increasing along with an emphasis on active leisure. In certain jobs, people face sleep restriction. Some professions such as health care, security and transportation require working at night. In such fields, the effect of acute total sleep deprivation (SD) on performance is crucial [27]. Furthermore, people tend to stretch their capacity and compromise their nightly sleep, thus becoming chronically sleep deprived.

When considering the effects of sleep loss, the distinction between total and partial sleep deprivation is important. Although both conditions induce several negative effects including impairments in cognitive performance, the underlying mechanisms seem to be somewhat different. Particularly, results on the recovery from sleep deprivation have suggested different physiological processes. In this review, we separately consider the effects of acute and chronic partial sleep deprivation and describe the effects on cognitive performance [28]. The emphasis on acute sleep deprivation reflects the quantity of studies carried out compared with partial sleep deprivation. The general explanation relies on the two-process model of sleep regulation. Cognitive impairments would be mediated through decreased alertness and attention through lapses, slowed responses, and wake-state instability. Attentional lapses, brief moments of inattentiveness, have been considered the main reason for the decrease in cognitive performance during sleep deprivation [29]. According to these hypotheses, performance during sleep deprivation would most likely deteriorate in long, simple, and monotonous tasks requiring reaction speed or vigilance. In addition to the lapses and response slowing, considerable fluctuations in alertness and effort have been observed during sleep deprivation. The two most widely studied cognitive domains in sleep deprivation research are attention and working memory, which in fact are interrelated [30].

Executive processes of working memory play a role in certain attentional functions, such as sustained attention, which is referred to here as vigilance. Both attention and working memory are linked to the functioning of frontal lobes [31]. Since the frontal brain areas are vulnerable to sleep deprivation, it can be hypothesized that both attention and working memory are impaired during prolonged wakefulness.

The decrease in attention and working memory due to sleep deprivation is well established. Vigilance is especially impaired, but a decline is also observed in several other attentional tasks. These include measures of auditory and visuo-spatial attention, serial addition and subtraction tasks, and different reaction time tasks. After one night of sleep deprivation, no difference was observed between deprived and non-deprived subjects in simple reaction time, vigilance, or selective attention tasks in one study (Forest and Godbout 2000). Performance on the Wisconsin Card Sorting Test, a measure of frontal lobe function, also remained even (Binks et al 1999). According to the well-controlled studies, the less sleep obtained due to sleep restriction, the more cognitive performance is impaired.

Subjects those slept at home either 5 h or 8 h per night for 4 weeks and found no effect in a short task of logical reasoning (duration 5 min). Casement et al reported no change in working memory and motor speed in the group whose sleep was restricted to four hours per night for nine nights. In other sleep restriction studies, sleep deprivation cannot be considered chronic, since the length of the restriction has been 1–3 nights.

The recovery processes of cognitive performance after sleep loss are still obscure. In many sleep deprivation studies, the recovery period has either not been included in the protocol or was not reported. Recovery sleep is distinct from normal sleep. Sleep latency is shorter, sleep efficiency is higher, the amounts of SWS and REM-sleep are increased and percentages of stage 1 sleep and awake are decreased. The characteristics of recovery sleep may also depend on circumstances and some differences seem to come with. Evidence suggests that one sleep period (at least eight hours) can reverse the adverse effects of total sleep deprivation on cognition [32]. Thus, it is likely that the improvement was mostly caused by the recovery process (sleep) and not just the practice effect.

Sleep and technology

Nowadays as electronic medias and modern technologies are very portable and light weighted they are very easily taken to bed especially during bed-times which significantly delays the onset of sleep. Modern technology use before bed-time has been reported with delayed bed-times, reductions of sleep durations and impaired athletic performances the next day during the regular routine practice [33]. These kind of activities during bed-time leads to insomnia, sleep deprivation and many sleep problems in the college level athletes [33].

Symptoms of depression, anxiety, mood alterations are very well related to use of modern technologies such as video games and smart phones before bed-time. An interesting fact today with college level athletes, which is very well observed and inferred that smart phones ownerships is more related to later bed-times than conventional mobile phone users [34]. The light emission from the screens of the modern technologies affects significantly the melatonin secretion, increases arousal and delays the circadian rhythm [23]. Modern technology use in the late evenings, especially video games, increases arousal, and day time functioning in athletes [35].

The relationship between the use of modern technologies, athletic performance, cognitive performance and mood is significantly mediating sleep. In practice, youngsters have a multiple rather than single use of electronic medias every day [36]. An evening screen time of one hour or more is associated with a higher risk of sleep problem going to bed late and difficulty in walking up. Extended video gaming is also one essential factor to be considered which affects adolescents sleep. Prolonged gaming was related to a moderate reduction in sleep quality [37]. Thus, it is inferred that prolonged use of modern technology before bed-time may cause clinically significant disrupted sleep even used during normal bed-time.

Methods and Materials

This study was conducted in the Department of Arthroscopy and Sports Medicine at Sri Ramachandra Medical College and Research Institute, between May 2017 and May 2018. Subjects for the study were taken up from the Sri Ramachandra Medical College team. A total of 60 athletes from the university were included in the study.

Inclusion Criteria

- 17-21years
- University level athletes
- Both Team and Individual sport players

Exclusion Criteria

- Evening group athletes
- Travelling across time zone during interventional period,

- Athletes who were on sleep medication.
- Horne - Ostberg Morningness Eveningness questionnaire
- James A. Horne and Olov Ostberg
- Abbreviated Profile Of Mood States
- J.R Groove
- Number cancellation sheet
- 40 m Sprint Test

Figure 1: Getting Informed Consent

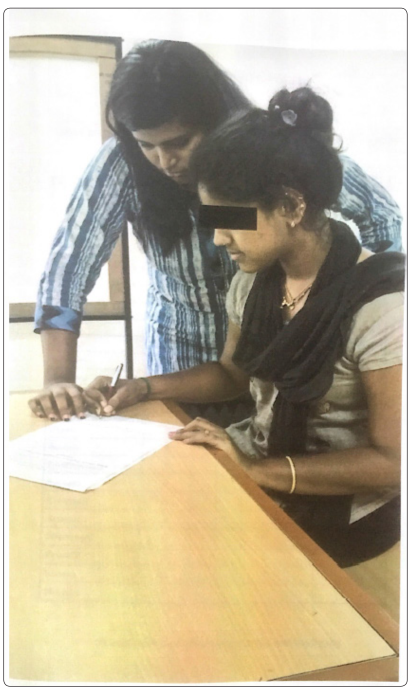
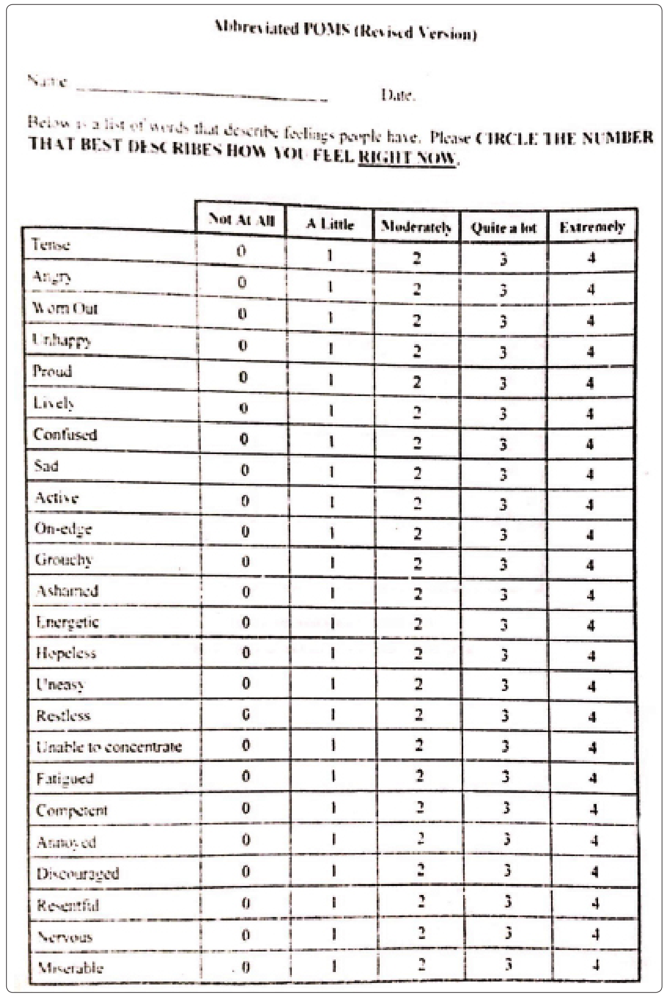


Figure 2: Explaining the Questionnaire



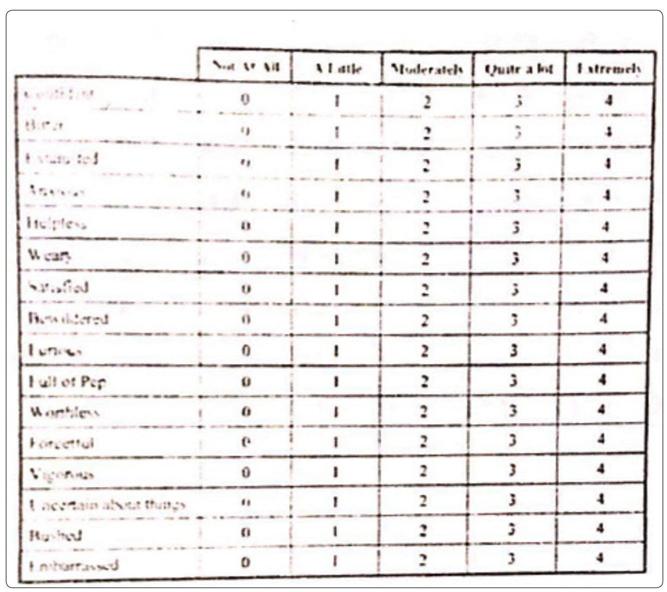
Abbreviated POMS (Revised Version)

Name ______________________ Date.

Below is a list of words that describe feelings people have. Please CIRCLE THE NUMBER THAT BEST DESCRIBES HOW YOU FEEL RIGHT NOW.

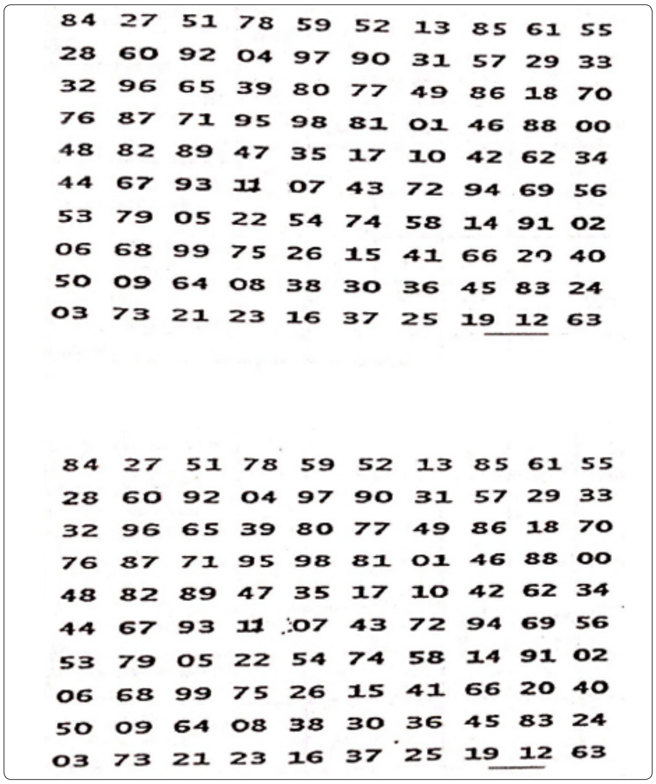
	Not At All	A Little	Moderately	Quite a lot	Extremely
Tense	0	1	2	3	4
Angry	0	1	2	3	4
Worn Out	0	1	2	3	4
Unhappy	0	1	2	3	4
Proud	0	1	2	3	4
Lively	0	1	2	3	4
Confused	0	1	2	3	4
Sad	0	1	2	3	4
Active	0	1	2	3	4
On-edge	0	1	2	3	4
Grouchy	0	1	2	3	4
Ashamed	0	1	2	3	4
Energetic	0	1	2	3	4
Hopeless	0	1	2	3	4
Uneasy	0	1	2	3	4
Restless	0	1	2	3	4
Unable to concentrate	0	1	2	3	4
Fatigued	0	1	2	3	4
Competent	0	1	2	3	4
Annoyed	0	1	2	3	4
Discouraged	0	1	2	3	4
Resentful	0	1	2	3	4
Nervous	0	1	2	3	4
Miserable	0	1	2	3	4

Figure 3: Profile of Mood States (Page 1)



	Not At All	A Little	Moderately	Quite a lot	Extremely
[illegible]	0	1	2	3	4
[illegible]	0	1	2	3	4
Exhausted	0	1	2	3	4
Anxious	0	1	2	3	4
Helpless	0	1	2	3	4
Weary	0	1	2	3	4
Satisfied	0	1	2	3	4
Bewildered	0	1	2	3	4
Furious	0	1	2	3	4
Full of Pep	0	1	2	3	4
Worthless	0	1	2	3	4
Forgetful	0	1	2	3	4
Vigorous	0	1	2	3	4
Uncertain about things	0	1	2	3	4
Bushed	0	1	2	3	4
Embarrassed	0	1	2	3	4

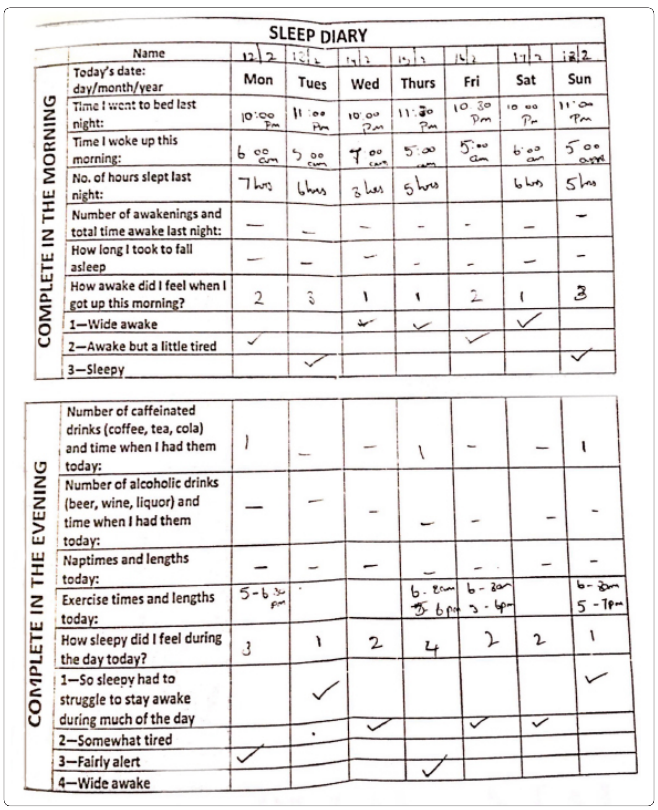
Figure 4: Profile of Mood States (Page 2)



84	27	51	78	59	52	13	85	61	55
28	60	92	04	97	90	31	57	29	33
32	96	65	39	80	77	49	86	18	70
76	87	71	95	98	81	01	46	88	00
48	82	89	47	35	17	10	42	62	34
44	67	93	11	07	43	72	94	69	56
53	79	05	22	54	74	58	14	91	02
06	68	99	75	26	15	41	66	20	40
50	09	64	08	38	30	36	45	83	24
03	73	21	23	16	37	25	19	12	63

84	27	51	78	59	52	13	85	61	55
28	60	92	04	97	90	31	57	29	33
32	96	65	39	80	77	49	86	18	70
76	87	71	95	98	81	01	46	88	00
48	82	89	47	35	17	10	42	62	34
44	67	93	11	07	43	72	94	69	56
53	79	05	22	54	74	58	14	91	02
06	68	99	75	26	15	41	66	20	40
50	09	64	08	38	30	36	45	83	24
03	73	21	23	16	37	25	19	12	63

Figure 5: Number Cancellation Sheet to Assess Attention



SLEEP DIARY

	Name	12/2	13/2	14/2	15/2	16/2	17/2	18/2
COMPLETE IN THE MORNING	Today's date: day/month/year	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
	Time I went to bed last night:	10:00 pm	11:00 pm	10:00 pm	11:30 pm	10:30 pm	10:00 pm	11:00 pm
	Time I woke up this morning:	6:00 am	5:00 am	7:00 am	5:00 am	5:00 am	6:00 am	5:00 am
	No. of hours slept last night:	7 hrs	6 hrs	3 hrs	5 hrs		6 hrs	5 hrs
	Number of awakenings and total time awake last night:	–	–	–	–	–	–	–
	How long I took to fall asleep	–	–	–	–	–	–	–
	How awake did I feel when I got up this morning?	2	3	1	1	2	1	3
	1—Wide awake			✓	✓		✓	
	2—Awake but a little tired	✓				✓		
	3—Sleepy		✓					✓
COMPLETE IN THE EVENING	Number of caffeinated drinks (coffee, tea, cola) and time when I had them today:	1	–	–	1	–	–	1
	Number of alcoholic drinks (beer, wine, liquor) and time when I had them today:	–	–	–	–	–	–	–
	Naptimes and lengths today:	–	–	–	–	–	–	–
	Exercise times and lengths today:	5-6.30 pm			6-8am 5-6pm	6-8am 5-6pm		6-8am 5-7pm
	How sleepy did I feel during the day today?	3	1	2	4	2	2	1
	1—So sleepy had to struggle to stay awake during much of the day		✓					✓
	2—Somewhat tired			✓		✓	✓	
	3—Fairly alert	✓			✓			
	4—Wide awake							

Figure 6: Sleep Diary

Experimental Protocol

Study protocol was approved by the Institutional Ethical Review Committee of Sri Ramachandra Medical College and Research Institute, Chennai. Informed written consent was collected from the study participants in this chapter selection of the subject, selection of the variables, administration of the tests, collection of data and statistical procedure used will be explained.

Selection of the Subjects

The purpose of this study was to compare experimental and control group athletes with improvements in mood alterations, cognition and athletic performance over 6 weeks of interventions. To achieve these purpose 100 athletes both male and female were selected. The athletes were the ones who are at least in moderate level of competing. Age range was set between 17 to 21 years.

Qualifying the Athlete Using Questionnaire

- Using Horne-Ostberg Morningness - Eveningness Questionnaire (MEQ) 100 university athletes will be assessed and classified into morning and evening type athletes, Only morning type athletes are taken into the study where they will be equally divided into interventional and control group. Interventional group are restricted with use of modern technology after 20:00 hrs if it is 22:00 hrs or two hours before going to sleep and control group were not restricted of any use of modern technology.
- Compliance will be monitored using sleep diary and phone conversations weekly thrice.
- Counseling about restricted sleep is done with a sleep diary. A sleep diary is a record of an individual's sleeping and waking times usually over a period of several weeks. It is self-reported or can be recorded by a care giver.

Nature of the Sample

After the using Horne-Ostberg Morningness - Eveningness Questionnaire (MEQ) the sample was further divided into Morningness (60) and Eveningness (40) athletes and the Morningness athletes were selected for the study. The sample constituted of 60 athletes totally with both the male and the female population whose age ranged from 17 to 21 years, with a mean age of 19.5. All of the athletes who were used for this investigation were at least a moderate level of competing with some achievement under them. These 60 athletes were included in the overall testing. The comparison of sleep with mood alterations, cognitive functioning and sprint between both experimental and control group were done.

Selection of Variables

The researcher reviewed the available scientific literature pertaining to the independent and dependent variables from books, internet, and journals and also through the discussion of the experts, feasibility of criteria, availability of instruments and equipment. The following variables were selected.

- Mood alterations
- Attention
- Athletic Performance

Pre Interventional Assessment

Before 6 weeks these pre-interventional assessments will be done:

- **Mood & Cognitive Function**

There are two psychological tools used to measure moods and attention. They are;

- ABBREVIATED POMS questionnaire a self-report questionnaire that consists of 40 item scales to measure total mood disturbances of athletes.
- Number cancelation test to measure attention and concentration
- **Athletic Performance**

Physical performance measured with a set of standardized tests such as 40 m sprint test to determine acceleration, maximum running speed and speed endurance depending on the distance run. The test involves running a single maximum sprint over a set distance, with time recorded.

Post Interventional Assessment

After every 3 weeks these post interventional tests will be done:

- **Mood & Cognitive Function**
- There are two psychological tools used to measure moods and attention. They are;
- ABBREVIATED POMS questionnaire a self-report questionnaire that consists of 40 item scales to measure total mood disturbances of athletes.
- Number cancelation test to measure attention and concentration
- **Athletic Performance**

Physical performance measured with a set of standardized tests such as 40 m sprint test to determine acceleration, maximum running speed and speed endurance depending on the distance run. The test involves running a single maximum sprint over a set distance, with time recorded.

Description of the Tools

All the participants in the research design were administered the four main assessment tools with the instructions, which is already described in the previous section.
- Horne Ostberg Mornigness-eveninngness questionnaire,
- Abbreviated Profile of mood states questionnaire,
- Number cancellation sheet and
- 40m Sprint test

The Horne-Ostberg morningness eveningness questionnaire:

The morningness–eveningness questionnaire (MEQ) is a self-asses ment questionnaire developed by researchers James A. Horne and Olov Östberg in 1976. Its main purpose is to measure whether a person's circadian rhythm (biological clock) produces peak alertness in the morning, in the evening, or in between. The original study showed that the subjective time of peak alertness correlates with the time of peak body temperature; morning types (early birds) have an earlier temperature peak than evening types (night owls), with intermediate types having temperature peaks between the morning and evening chronotype groups. The MEQ is widely used in psychological and medical research and has been professionally cited more than 3,000 times.

Instruction

Here are some questions try to decide according to the options there are no right or wrong answers provided as to which represent your way of acting or feeling. Then put a tick (√) in the appropriate to indicate your answer.

Scoring

Responses are made on a 3-point scale. Sum up the responses to all 19 items to yield the final composite score with a range from 40-50 to obtain Morningness athletes into the study.

Abbreviated Profile of Mood States Questionnaire:

This scale is a psychometric tool used to measure the total mood disturbances of the athletes; The Abbreviated POMS questionnaire by Robert Grove was used. This questionnaire contains 40 items in a 4 point scale.

Instruction

Here are some questions try to decide according to the options there are no right or wrong answers provided as to which represent your way of acting or feeling. Then put a tick (√) in the appropriate to indicate your answer.

Scoring

Robert Grove's Abbreviated POMS is a self-reporting scale. Items of the scale are in question from demanding information for each statement in any of the 4 point scale from not at all to extremely.

The items referencing not at all is a 0 point scale to extremely will be a 4 point scale. The scoring has to be reversed for some questions. Therefore higher the score on the scale, the greater is the level of Total mood disturbances and vice versa and vice versa.

Number Cancellation Test

Subjects were asked to strike through the number progressively from 1-50.Time taken to complete this task by the subjects was considered. The subjects (attention/ concentration) cognitive functioning was measured with respect to time taken in all the trails during the intervention process.

40 M Sprint Test

Speed tests are typically used solely to measure an athlete's linear speed capabilities. Track sprinters have been shown to accelerate continuously through at least 50m during a 100m sprint event. On the other hand, the average sprint distance in team sport athletes has been reported to be between 15-21m and rarely last more than 3-seconds.As a result, because team sport athletes perform shorter distance sprints compared to track athletes, it has been suggested that they may achieve maximum speeds within far shorter distances – perhaps as short as ≤41m.

Team sport athletes and physical education students achieved maximum speeds around 40m when performed from a static standing start and 29m from a flying-start. Thus it can be speculated that the 20m sprint does measure acceleration in team sport athlete. Nonetheless, this difference means there are implications with regards to what the 40m sprint test measures depending on the athlete being tested.

The test administrators must therefore consider their athletes before interpreting the results. Before the introduction of timing gates, speed tests were typically officiated using stop watches, though stopwatches are still useful and can be used as a reliable measure, the use of timing gates is highly recommended ,thus speed gates was used to measure the timings of the subjects as it is essential when a high degree of precision is required. Conducting the 40m sprint test may be a useful tool to determine the performance in such athletes.

Sleep Diary

A sleep diary is a record of an individual's sleep and wake timings along with the record of modern technology use before bed-time. It is self-reported to record about one's sleep patterns and habits.

Results

- The total number of subjects were 60 (n=60)
- Mean age of subjects was 21.2
- Subjects were both males and females
- There were 30 in experimental group and 30 in control group
- The mean height was 1.68 m
- The mean weight was 71.3 kg

Statistical Analysis

All statistical analysis was conducted using IBM SPSS statistics®. Independent T test was performed for difference in pre and post testing of profile of mood states, sprint and attention of both control and experimental group. Independent sample test of Levene's Test for Equality of Variances and T-test for Equality of Means helped us to find the significant differences (P-value) for all the parameters between the experimental and control group.

Experimental group

- Profile of Mood States-Testing 1,Testing 2,Testing 3 with descriptive statistics
- Attention-Testing 1,Testing 2,Testing 3 with descriptive statistics
- Sprint- Testing 1,Testing 2,Testing 3 with descriptive statistics

Control group

- Profile of Mood States- Descriptive statistics of Testing 1,Testing 2,Testing 3
- Attention- Descriptive statistics of Testing 1,Testing 2,Testing 3
- Sprint- Descriptive statistics of Testing 1,Testing 2,Testing 3

Experimental group:
Profile of Mood States

Table 1: Shows the mean, standard deviation and the significance of mood states between Pre and Post 3 weeks interventions -TESTING 1

Variable	Group	No of Subs	Mean	S D	Significance
Profile of Mood states	Pre-intervention	30	14.5	13.3	0.629
	Post 3 weeks	30	13.3	10.0	

There is no significant difference between the Pre-intervention and the Post 3 weeks PROFILE OF MOOD STATES test in the experimental group.

Table 2: Shows the mean, standard deviation and the significance of mood states between Post 3 weeks and Post 6 weeks -TESTING 2

Variable	Group	No of Subs	Mean	S D	Significance
Profile of Mood states	Post 3 weeks	30	13.3	11.3	0.14
	Post 3 weeks	30	11.6	9.2	

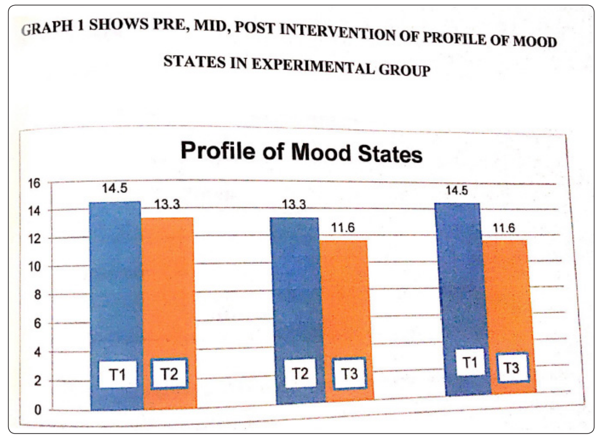
There is no significant differences between the Post 3 weeks and the Post 6 weeks PROFILE OF MOOD STATES test in the experimental group.

Table 3: Shows the mean, standard deviation and the significance of mood states between Pre-intervention and Post 6 weeks groups -TESTING 3

Variable	Group	No of Subs	Mean	S D	Significance
Profile of Mood States	Pre - intervention	30	14.5	13.3	0.228
	Post 6 weeks	30	11.6	9.6	

There is no significant differences between the Pre and the Post 6 weeks PROFILE OF MOOD STATES test in the experimental group.

Graph 1: Shows Pre, Mid, Post Intervention of Profile of Mood States In Experimental Group



T1: Testing 1, T2: Testing 2, T3: Testing 3

- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of profile of mood states within the experimental group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of Profile of Mood States within the experimental group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the Profile of Mood States within the experimental group.

Attention

Table 4: Shows the mean, standard deviation and the significance of Attention between Pre and Post 3 weeks intervention -TESTING 1

Variable	Group	No of Subs	Mean	S D	Significance
Attention	Pre	30	6.5	2.5	0.059
	Post 3 weeks	30	5.9	2.4	

There is no significant difference between the Pre and the Post 3 weeks ATTENTION test in the experimental group.

Table 5: Shows the mean, standard deviation and the significance of Attention between Post 3 weeks and Post 6 weeks -TESTING 2

Variable	Group	No of Subs	Mean	S D	Significance
Attention	Post 3 weeks	30	5.9	0.4	0.169
	Post 6 weeks	30	5.5	2.6	

There is no significant difference between the Post 3 weeks and the Post 6 weeks ATTENTION test in the experimental group.

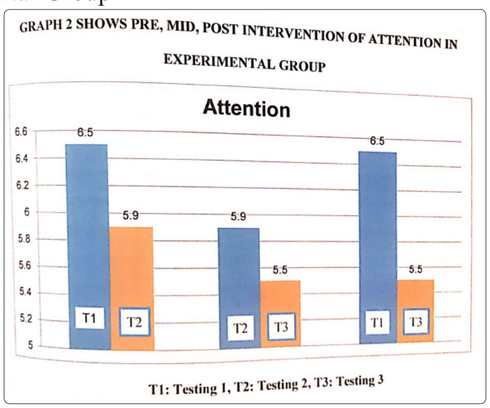
Table 6: Shows the mean, standard deviation and the significance of Attention between Pre-intervention and Post 6 weeks -TESTING 3

Variable	Group	No of Subs	Mean	S D	Significance
Attention	Pre - intervention	30	6.5	2.5	**0.020***
	Post 6 weeks	30	5.5	2.6	

***Significance- >0.05**

There is a significant difference between the Pre and the Post 6 weeks ATTENTION test in the experimental group.

Graph 2: Shows Pre, Mid, Post Intervention of Attention in Experimental Group



T1: Testing 1, T2: Testing 2, T3: Testing 3

From the above graph it is inferred;

- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of attention within the experimental group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of attention within the experimental group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the attention within the experimental group

Sprint

Table 7: Shows the mean, standard deviation and the significance of Sprint between Pre-intervention and Post 3 weeks -TESTING 1

Variable	Group	No of Subs	Mean	S D	Significance
Sprint	Pre - intervention	30	7.9	1.7	**0.80**
	Post 3 weeks	30	5.5	2.6	

There is no significant difference between the Pre and the Post 6 weeks SPRINT test in the experimental group.

Table 8: Shows the mean, standard deviation and the significance of Sprint between Pre-intervention and Post 6 weeks -TESTING 2

Variable	Group	No of Subs	Mean	S D	Significance
Sprint	Post 3 weeks	30	7.9	1.7	**0.019***
	Post 6 weeks	30	7.5	1.4	

Significance- >0.05*

There is a significant difference between the Post 3 weeks and the Post 6 weeks SPRINT test in the experimental group.

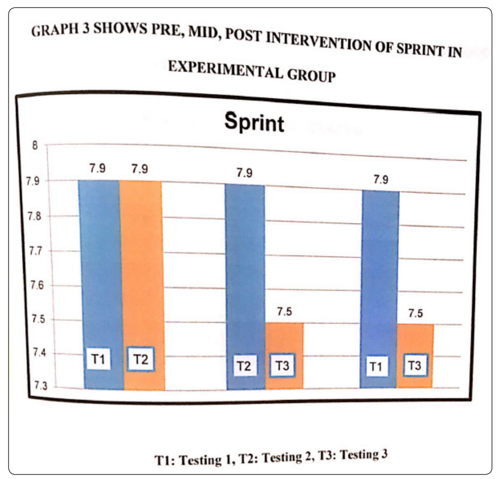
Table 9: Shows the mean, standard deviation and the significance of Sprint between Pre-intervention and Post 6 weeks -TESTING 3

Variable	Group	No of Subs	Mean	S D	Significance
Attention	Pre - intervention	30	7.9	1.7	**0.031***
Sprint	Post 6 weeks	30	7.5	1.6	

Significance- >0.05*

There is a significant difference between the Pre and the Post 3 weeks SPRINT test in the experimental group.

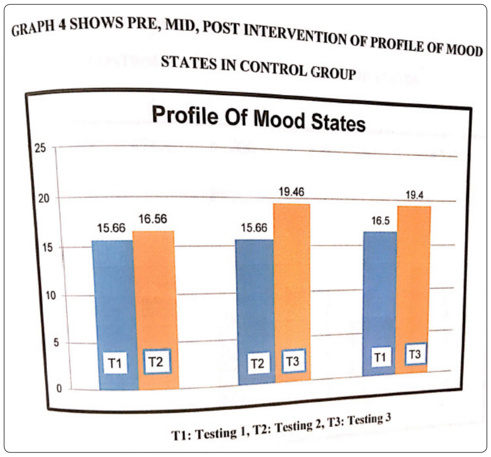
Graph 3: Shows Pre, Mid, Post Intervention of sprint in Experimental group



T1: Testing 1, T2: Testing 2, T3: Testing 3 From the above graph it is inferred

- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of sprint within the experimental group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of sprint within the experimental group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the sprint within the experimental group

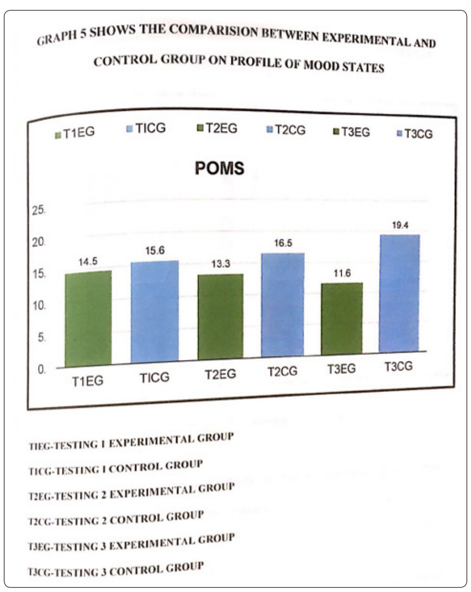
Graph 4: Shows Pre, Mid, Post Intervention of Profile of Mood States in Control Group



T1: Testing 1, T2: Testing 2, T3: Testing 3 From the above graph it is inferred;

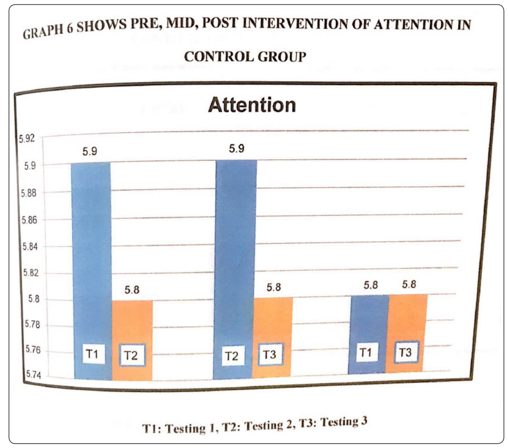
- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of Profile of Mood States within the control group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of Profile of Mood States within the control group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the Profile of Mood States within the control group

Graph 5: Shows the Comparision Between Experimental and Control Group on Profile of Mood States



Tieg-Testing 1 Experimental Group
T1cg-Testing i Control Group
T2eg-Testing 2 Experimental Group
T2cg-Testing 2 Control Group
T3eg-Testing 3 Experimental Group
T3cg-Testing 3 Control Group

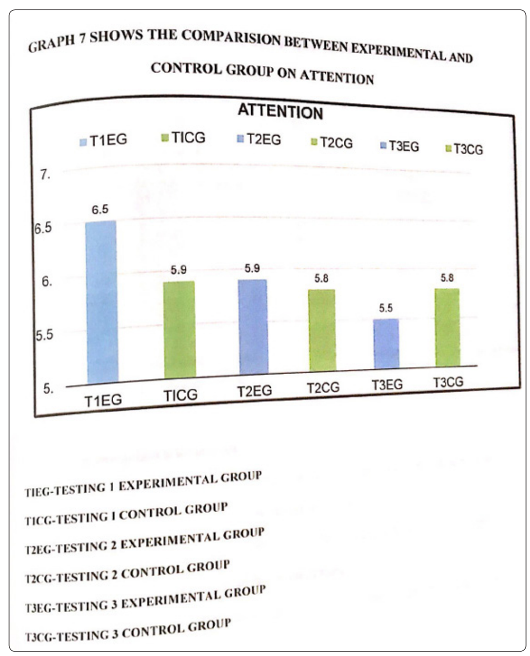
Graph 6: Shows Pre, Mid, Post Intervention of Attention in Control Group



T1: Testing 1, T2: Testing 2, T3: Testing 3 From the above graph it is inferred

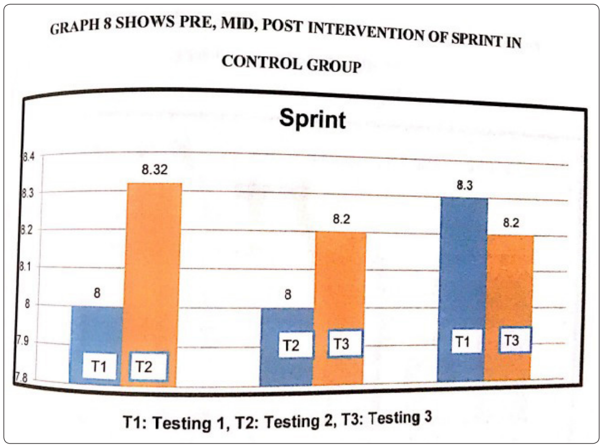
- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of attention within the control group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of attention within the control group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the attention within the control group

Graph 7: Shows the Comparision Between Experimental and Control Group on Attention



Tieg-Testing 1 Experimental Group
T1cg-Testing i Control Group
T2eg-Testing 2 Experimental Group
T2cg-Testing 2 Control Group
T3eg-Testing 3 Experimental Group
T3cg-Testing 3 Control Group

Graph 8: Shows Pre, Mid, Post Intervention of Sprint in Control Group

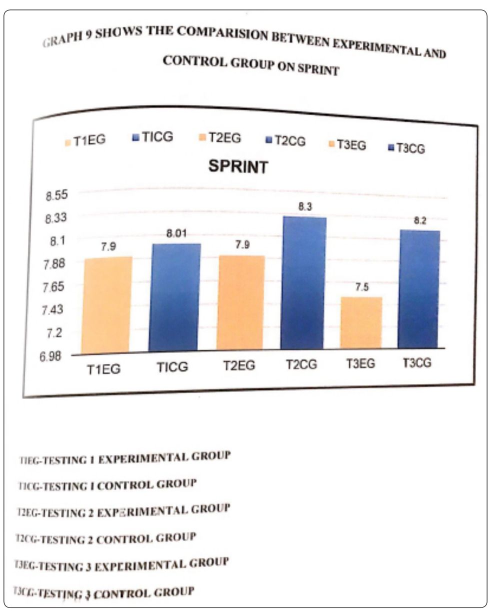


T1: Testing 1, T2: Testing 2, T3: Testing 3

From the above graph it is inferred

- In the Pre to Mid Intervention (T1-T2)(0-3 weeks) the results infer that there was no significant differences in the level of sprint within the control group
- To discuss about the Mid-Post Intervention (T2-T3) (3-6weeks) there is no significance changes in the levels of sprint within the control group.
- In the Post interventions (T1-T3)(0-6 weeks) there are no significant level changes in the sprint within the control group

Graph 9: Shows the Comparision Between Experimental and Control Group on Sprint



Tieg-Testing 1 Experimental Group
T1cg-Testing i Control Group
T2eg-Testing 2 Experimental Group
T2cg-Testing 2 Control Group
T3eg-Testing 3 Experimental group
T3cg-Testing 3 Control group

Discussions

Six weeks with restricted use of electronic media in the night affected sleep along with, attention and athletic performance in athletes significantly than the effect of the control condition. In light of studies showing that use of electronic media negatively impacts sleep pattern, our results were supporting [4]. To our surprise, average bedtime among the athletes in the weekdays and weekends was as early as 22:10 in the intervention group and 22:41 in the control group.

There is no significant difference in the Pre to Mid-Intervention of Profile of mood states, Attention and Sprint among the experimental group .Rather both Mid to Post intervention and Pre to Post intervention produced significant results in attention and sprint timings among the experimental group. An intervention with restricted use of electronic media two hours before bed-time for a period of 6 weeks thus proved the athletes beneficial in improving attention and athletic performance.

Still, the intervention also aimed to prevent mobile phone messages/ chatting after bedtime [10]. Being woken up at least occasionally by text messages, is in line with the latter concern, has been found to have a major impact on the quality of sleep among athletes. However, based on our results, a strict regulation, with the termination of use of electronic media two hours before bed-time, proved to be more appropriate in the present sample.

Athletes with no interventions (control group) did not show any significant changes among all the three testing. Unfortunately, research on sleep in athletes is scarce and, as far as we know, there exist only a few studies that report bedtime among athletes;

Our parental article showed the restricted use of e-media one hour before bed-time for 4 weeks interventional period [7]. They found that the athletes in the interventional group did not show much significant difference for the 4 week interventional period. (7)And thus our interventional time-period was extended to a period of 6 weeks. Our participants in the present study slept approximately 7-8 hours during weekdays and weekends. The use of tablets and laptops before bedtime has overall been associated with difficulties falling asleep and un-refreshing sleep [15]. On the other hand, some people might be stressed if they do not have access to their mobile phone or laptop. We should not forget that some might experience the use of electronic media (eg, to read or to listen to music) as calming [21].

Because the intervention affects sleep, which was our primary outcome, we could expect to see improvement also on the secondary outcomes (athletic performance, cognitive performance, or mood). However, secondary analyses exploring the effect on athletic performance and cognitive performance in the few participants who reported improved sleep showed larger increase in performance, with improvements in sleep.

The results provide some indication that improved sleep is associated with improvement in performances. Future research should study this topic further. The significant improvements in attention and sprint of the interventional group proved the study to be benefiting the athletes to enhance their performances [38,39].

Limitations

Despite of significant effects of the intervention, the sleep patterns and performance of the athletes are important to report. Some strengths and limitations should be mentioned.

- First of all, our study included both males and females and data were gathered from athletes practicing various sports. The generalizability to other athletes is therefore high.
- Secondly, sleep monitoring would be a better modality of monitoring during the intervention more than self-reporting sleep diaries.
- Nevertheless, the study gives us an over- view of the sleep habits among athletes, thereby giving some guidelines for future studies to improve sleep and performance in this population.
- Potential mechanisms other than earlier bedtime, for instance, lower arousal (measured with heart rate or saliva cortisol) or less light exposure before bedtime, could also be explored in future studies to increase our knowledge within this field.
- We recommend future studies to investigate the effects of different means of extending sleep in athletes

Conclusion

A good quantity of sleep with restricted modern technologies at least 2 hours before bed-time is associated with,

- Significant differences on cognitive functioning and sprint performances
- No Significant differences on level of Profile of Mood States

Acknowledgements

I certify that I have explained the nature and purpose of this study to the above named individual and I have discussed the potential benefits of this study participation. The questions the individual had about this study have been answered and we will always be available to address future questions

Date of obtaining consent:

Master Table I Shows the Pre Intervention of Control Group

SUBJECTS	SPRINT	ATTENTION	POMS
A1	8m6s	7m39s	37
A2	7m2s	6m21s	20
A3	6m15s	8m18s	12
A4	9m2s	5m06s	15
A5	8m6s	2m25s	18
A6	8m5s	10m29s	25
A7	6m46s	1m2s	47
A8	8m4s	2m3s	6
A9	8m7s	5m13s	15
A10	8m5s	6m45s	5
A11	8m22s	3m5s	24
A12	8m7s	6m42s	10
A13	8m7s	6m35s	16
A14	9m27s	7m45s	31
A15	8m34s	6m35s	10
A16	9m5s	10m4s	18
A17	7m2s	4m51s	5
A18	9m6s	5m5s	3
A19	8m4s	6m72s	13
A20	7m9s	8m41s	9
A21	8m3s	7m76s	2
A22	6m3s	10m11s	14
A23	6m2s	9m25s	15
A24	8m92s	8m67s	18
A25	10m01s	10m15s	21
A26	6m6s	2m4s	14
A27	6m52s	2m17s	18
A28	5m8s	3m32s	12
A29	7m5s	2m38s	9
A30	8m2s	2m25s	8

Master Table II Shows the Mid Intervention of Control Group

SUBJECTS	SPRINT	ATTENTION	POMS
B1	8m	5m1s5	17
B2	7m1s	6m2s	18
B3	7m45s	7m45s	9
B4	9m	5m04s	14
B5	8m5s	2m27s	26
B6	8m6s	10m3s	27
B7	6m5s	1m5s	50
B8	8m5s	3m22s	7
B9	8m71s	5m17s	17
B10	8m7s	6m5s	8
B11	8m33s	3m8s	26
B12	8m71s	6m45s	12
B13	8m71s	6m37s	18
B14	9m3s	7m55s	34
B15	8m36s	6m55s	11
B16	9m6s	10m6s	20
B17	7m4s	4m51s	6
B18	9m8s	5m5s	4
B19	8m9s	6m72s	15
B20	7m9s	8m41s	10
B21	8m5s	7m76s	3
B22	6m5s	10m11s	15
B23	6m2s	9m25s	15
B24	8m95s	8m69s	18
B25	10m2s	10m17s	21
B26	7m	2m15s	12
B27	8m	2m38s	18
B28	9m2s	2m4s	36

Master Table IIi Shows the Post Intervention of Control Group

SUBJECTS	SPRINT	ATTENTION	POMS
C1	8m7s	5m2s	21
C2	7m5s	6m29s	20
C3	7m45s	7m8s	11
C4	9m7s	5m1s	15
C5	8m5s	2m3s	28
C6	8m6s	10m35s	28
C7	6m5s	1m8s	52
C8	8m5s	3m25s	9
C9	8m77s	5m21s	19
C10	8m7s	6m1s	10
C11	8m37s	3m1s	27
C12	8m76s	6m47s	15
C13	8m75s	6m43s	21
C14	9m35s	7m57s	36
C15	8m39s	6m57s	15
C16	9m8s	10m67s	22
C17	7m7s	4m55s	8
C18	9m1s	5m55s	6
C19	8m1s	6m75s	17
C20	7m9s	8m45s	12
C21	8m7s	7m79s	7
C22	6m7s	10m18s	18
C23	6m1s	9m27s	19
C24	8m97s	8m71s	21
C25	10m27s	10m19s	25
C26	6m9s	2m	7
C27	7m2s	2s18s	18
C28	8m2s	2m	40
C29	8m8s	2m2s	14
C30	8m	2m39s	23

Master Table IV Shows the Pre Intervention of experimental Group

SUBJECTS	SPRINT	ATTENTION	POMS
A1	8m6s	7m39s	2
A2	7m2s	6m21s	10
A3	6m15s	8m18s	3
A4	6m1s4	6m14s	44
A5	7m8s	9m43s	10
A6	10m6s	7m37s	9
A7	7m5s	1m43s	26
A8	8m4s	3m38s	8
A9	8m7s	6m52s	6
A10	8m7s	9m22s	9
A11	8m5s	8m22s	21
A12	6m4s	4m44s	6
A13	7m7s	4m42s	12
A14	8m1s	6m11s	69
A15	7m1s	6m	12
A16	9m6s	2m18s	14
A17	8m16s	2m16s	14
A18	10m9s	7m12s	6
A19	7m8s	4m49s	18
A20	8m26s	6m1s	15
A21	8m4s	10m	10
A22	10m8s	6m15s	2
A23	8m5s	5m85s	17
A24	10m2s	9m72s	20
A25	6m23s	9m56s	12
A26	7m86s	8m75s	15
A27	8m23s	9m52s	22
A28	8m33s	10m22s	8
A29	5m9s	2m4s	15
A30	2m33s	6m8s	2

Master Table V Shows the Mid Intervention of Experimental Group

SUBJECTS	SPRINT	ATTENTION	POMS
B1	7m15s	2m2s	5
B2	6m1s	6m1s	6
B3	6m1s	6m49s	14
B4	6m2s	6m	38
B5	7m6s	9m4s	10
B6	11m6s	5m5s	2
B7	7m6s	4m52s	36
B8	8m2s	3m35s	7
B9	7m5s	7m2s	8
B10	8m31s	6m	6
B11	5m46s	7m3s	10
B12	6m28s	5m	11
B13	7m6s	4m4s	11
B14	7m41s	4m35s	14
B15	7m	6m	11
B16	9m6s	2m16s	13
B17	8m15s	2m14s	43
B18	10m8s	7m11s	6
B19	8m02s	4m3s	4
B20	8m25s	6m8s	5
B21	10m35s	8m02s	19
B22	8m23s	7m2s	18
B23	8m31s	4m39s	16
B24	10m1s	9m7s	18
B25	6m21s	9m54s	11
B26	7m85s	8m76s	15

B27	8m21s	9m5s	20
B28	8m31s	10m2s	7
B29	7m9s	2m12s	3
B30	7m3s	2m38s	14

Master Table VI Shows the Post Intervention of Experimental group

SUBJECTS	SPRINT	ATTENTION	POMS
C1	7m13s	1m15s	4
C2	6m	6m02s	4
C3	6m05s	6m4s	11
C4	5m4s	6m1s	33
C5	7m6s	4m15s	8
C6	11m2s	5m3s	1
C7	4m45s	7m2s	32
C8	8m	3m3s	4
C9	7m4s	5m3s	4
C10	8m2s	9m1s	7
C11	7m1s	5m	8
C12	6m25s	4m12s	9
C13	7m3s	4m35s	9
C14	7m23s	4m26s	11
C15	6m8s	5m8s	9
C16	8m25s	1m	11
C17	8m12s	2m12s	40
C18	8m02s	3m58s	3
C19	7m2s	4m	17
C20	8m23s	6m7s	3
C21	8m2s	8m4s	18
C22	8m3s	6m2s	19
C23	8m3s	4m35s	16
C24	10m	9m66s	18
C25	6m19s	9m53s	11
C26	7m2s	8m7s	12
C27	8m2s	9m44s	18
C28	8m3s	10m18s	5
C29	7m6s	2.ms	2
C30	7m1s	2m35s	1

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