

ISLAMIC RELIGIOUS ACTIVITY, CIRCADIAN RYTHMS AND STUDENT ACHIEVEMENT

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Abstract

Apparently, the research the relationships between Islamic religious activity, circadian rhythms, and academic achievement, is in students, The aim of this research was to perform an Islamic activity intervention toward studerts' circadian rythms in early day among the university students, Eficiency on a variety of tasks has been show to follow the body's daily circadian rhythm. The university day favors the academic achievement of the morning active student whose temperature cycle peaks early in the day and discriminates against the student with later rhythm. T test of data from 66 students in guidance counseling departement found a significant relationship between time of maximum alertness using islamic religious activity and grade averages p ($t= 15,649$; $P= 0.000$). The morning-active students with Islamic activity (rending, writing and understanding qur'an) had higher academic achievement than those who are not. The finding has implications for modifying the daily university schedule. the findings also suggest that Islamic religious activity, as positive intervention to improve students circadian rythm.

INTRODUCTION

The human body is subject to a multitude of annual, monthly, and daily rhythms. Studies to identify, catalog, or determine the effects of these rhythms have mainly dealt with school students, adults, or infants because of their accessibility. The study of body rhythms in college-aged persons has been very limited perhaps due to the difficulty encountered in obtaining adequate samples. However, as will be shown, certain body rhythms, if present in students, could have an impact on academic achievement and the college's daily schedule. The objective of this preliminary study was to attempt to shed some light on the potential importance of body rhythms for education.

One of the first daily or circadian rhythms to be identified was the rise of body temperature during the day. Repeated studies over the past century have established the body's temperature cycle as vascillating from a low about 2 a.m. to a peak in late afternoon to a rapid drop again with the onset of sleep. Other studies have related human performance efficiency on a variety of tasks as following the rise and fall of the individual's daily temperature pattern (2,7,9).

The importance of these, established circadian rhythms for educational practice is the focus of the present study.

The university day in Yogyakarta has typically started around 7:00 a.m. and ended about 6:00 p.m. The schedule accommodates the work world and in earlier days allowed the students to be at home in time to help with chores around the farm or store. The schedule has become so ingrained for educators that little thought has been given to its modification.

Sleep is a blessing from God. Humans spend around one third of their lives sleeping. Sleep is essential for the performance of important daily acts such as speech, memory, and original or flexible thinking. At the end of a busy day human body looks forward to relaxing and restoring its energy for the next day.

It is known that melatonin, a hormone with a high level of concentration at night and low levels during daytime, regulates the circadian rhythm.² However, there are other factors that activate or inhibit the internal body clock and several studies have demonstrated that light on the eye's retina is a more powerful influence on human circadian rhythms.

As light that is radiated from the sun travels through the atmosphere, some shorter wavelengths of light, such as violet and blue, are absorbed by gas molecules and then scattered all around the sky. This gives the sky a blue appearance. According to Mark Rea, director of the Lighting Research Center, our daily rhythms are in fact blue sky detectors, and he notes, "Blue sky is ideal for stimulating the circadian system because it's the right color and intensity, and it's 'on' at the correct time for the right duration, the entire day."³

Researchers have used light for jet-setters, sleep-troubled patients, and shift workers to their body sleep problems. Moreover, they claim the dogma that the 24-hour biological clock is set by light alone is a misconception that many scientists have believed for years.⁴ Steven Lockley of Brigham and Women's Hospital, a Harvard research and teaching affiliate says, "The visual system in humans is most sensitive to green light, but when we exposed twelve healthy young men and women to the same amount of either green or blue light, their 24-hour rhythms shifted twice as much with blue than with green."⁵ After exposure to blue light, their body clocks were rearranged by three hours, whereas the effect of green light was a change of about 1.5 hours. So, if your eyelids get heavy around 11 p.m., 6.5 hours of exposure to blue light will keep you up until 2 a.m. Since television and computer screens produce blue light, watching them too much at night may inappropriately affect the sleep cycle.⁶ However, if a change in shift makes you sleepless at 4 a.m., proper blue light therapy might help you sleep three hours longer.

To reduce the impact of synthetic light on our biological system, lighting manufacturers have been developing dynamic lighting control led by computer based systems. For example, to perk people in the morning, the lamp increases the blue light concentration. After lunch, it again produces more blue light to counter afternoon sleepiness. In Europe, such systems have already been installed in some places including some hospitals, business offices, town halls and traffic-control centers.

Daytime sleep in Prophetic tradition

If we turn our attention to the life of the Prophet Muhammad, (peace and blessings be upon him) we see how he successfully set an example for his Companions. It was the practice of the Prophet and his Companions not to sleep after the dawn prayer, the first of the five daily prayers, as it is a time of blessing. He would read some parts from the Qur'an and reflect on the universe and its Creator at a time when concentration is at its peak and the mind is clear of daily worries. Once dawn broke, the Prophet would pray and then speak with people who stayed behind for some time. Therefore, some of the early Muslims disliked the idea of sleeping immediately after dawn because being awake encouraged. In his Risale-i Nur collection, Bedi'üzzaman Said Nursi explains the three types of daytime sleep as follows:

The first is “ghaylula.” This is from pre-dawn to forty minutes or so after the sun has risen, the time when prayer is lawful but reprehensible. Sleep at this time is contrary to the practices of the Prophet, since according to hadiths, it leads to a decrease in one’s livelihood and to its being unfruitful. The time most appropriate for preparing to labor for one’s sustenance is when it is cool. When this time has passed, lethargy descends. It has been established through numerous experiences that just as this is detrimental to that day’s labor and indirectly to one’s livelihood, so also is it the cause of unfruitfulness.

The most important is “qaylula,” which is in accordance with the Sunna of the Prophet. It is from mid-morning to just past noon. This sleep is part of the Sunna since it allows a person to rise at night to pray. So also in the Arabian Peninsula to rest from work at noon when it is intensely hot is the custom of the people and of the area, so has further strengthened this Practice of the Prophet. This sleep increases both life and sustenance. For half an hour’s qaylula sleep is the equivalent of two hours’ sleep at night. Recently, this type of sleep or nap has been strongly advised for health and for enhancing daily performance. Researcher found they would sleep for twenty-six minutes, which boosted their performance by 34% and their alertness by 54%. “9 He explains that the pilots were able to improve their performance significantly, and he adds that the effects of a short nap of less than a half hour lasted for two to three hours. Similar research shows that in this way you can make yourself more alert, reduce stress, and improve cognitive functioning, which means more patience, less stress, better reaction time, increased learning, and more efficiency.

Sleep and wakefulness are intimately related states, with mutual influences (Ramos Platon, 1996). The present work focuses on the effects of sleep over wakefulness. And Islamic religious activity in the early hours in university during wakefulness. Regarding the question about sleep function, or why do we sleep, there is still not a definitive answer. Among others, sleep is important for cognitive restitution. It influences information processing, learning and memory consolidation (e.g., Lavie, 1996). Therefore a certain *amount* of sleep is needed to adequate wakefulness. Sleep deprivation seems to impair particularly cognitive functions related to the prefrontal cortex, such as flexible and divergent

thinking; dealing with novelty and unexpected; verbal fluency; novel responses and suppression of routine answers (Horne, 2000).

Besides the amount (or hours of sleep), the *timing* is also vital for adequate daytime functioning. The sleep-wake cycle is a circadian rhythm, which is spontaneously generated by the organism, with a periodicity, in the adult, of about 1 day (cf., e.g., Minors & Waterhouse, 1981). Therefore, we tend to maintain relatively stable schedules. Since the sleep-wake cycle is in harmony with other inner circadian rhythms, for example, deep body temperature and cellular mitoses, therefore, abrupt shifts of sleep-wake schedules lead to internal dissociation among circadian rhythms, which may imply undesirable effects such as, attention deficits and concentration difficulties, which is very common in shift work and rapid travels across multiple time zones (DCSC, 1990). Some studies in undergraduates indicated that irregularities of 2-4 hours in the sleep-wake schedules are associated with higher fatigue, deterioration of mood and performance (Taub and Berger, 1973, 1974), and that students with irregular sleep-wake schedules had excessive daytime, comparing to regular colleagues (Manber et al., 1996).

As for the other human characteristics, there are normal variations in the sleep-wake patterns and circadian rhythm characteristics (Becker, 2001). With respect to sleep durations, the majority of the populations needs to sleep about 8 hours to feel well during the day. However, some people need more than 9 hours, the called long sleepers, and others feel well with less than 6 hours of sleep, the short sleepers. There are also inter-individual differences in the timing of the sleep-wake cycle, which have to do with the circadian rhythm. At the one hand, there are morning type people, that tend to be somnolent during the evening, enjoys going to bed and to wake up every early; they feel at their best in the morning (work, mood), and become increasingly tired across the day. At the other hand, evening type people like to go to bed and to wake up late, when possible; they do not functioning, well during the morning, become increasingly alert across the day and feel at their best in afternoon or at the evening. They have much higher tolerance to night work than others persons. The majority of people are intermediate type. Unfortunately, work and school schedules do not consider these inter-individual differences. In particular, school or university schedules are not usually adjusted to evening preferences. The conclusion is who enjoys to wake up every early are much better than their counterpart.

In what concerns the sleep-wake patterns of the university student, the entrance at the university is accompanied by many factors that may lead to changes in sleep habits, such as academic demands, new social opportunities, change in sleeping circumstances, diminution of parental or teacher guidance, erratic university schedules, part-time jobs (Carskadon & Davis, 1989), and increase night life (for instance, during academic examination). It is then understandable that, across the university years, many students may develop inadequate sleep patterns. Some sleep-wake difficulties most likely to be found in university students are: later sleep-wake schedules (e.g., Carskadon & Davis, 1989), or even the development of delayed sleep-phase difficulties (Lack, 1986); irregular sleep-wake schedules (e.g., Manber et al., 1996; Medeiros et al., 2001), which indicates inadequate sleep hygiene; insufficient sleep duration (Hick et al., 1989; Hick & Pellegrini, 1991); insomnia complaints (Giesecke, 1987). As indicated by the *International Classification of Sleep Disorders* (DCSC, 1990), such sleep-wake patterns are usually accompanied by undesirable daytime consequences: decrease levels of motivation, performance, concentration, attention, and humour, as well as

increase fatigue and somnolence (Sleepiness, the state of feeling drowsy, ready to fall asleep). Thus, it is reasonable to suppose that those university students that develop such sleep patterns may suffer consequence over their academic performance.

In general, despite the demonstrations about the important role of sleep for wakefulness, the study of the associations between sleep habits of students, circadian rhythm characteristics and academic performance, assessed in natural educational conditions, has received little attentions in the field of educations. The *aim* of the present work was to perform a research about the difference between sleep-wake patterns (and / or circadian rhythm characteristics), religious activity and academic achievement in university students.

We were able to locate a total of 17 journal articles reporting *results* about the associations of academic functioning with sleep-wake variables, in university students. It should be mentioned that not all of these studies addressed the relationship between sleep /circadian rhythm and academic performances as a main aim; some of them dealt with the subject only in part; others had clearly different scopes, but, even though, they were selected because they reported findings of interest for our aims.

Among researchers found 9 studies considered academic outcomes, i.e., university grades (e.g., results in testes or exams, grade point averages), and werenon-experimental studies. The most consistent findings were that lower academic results were associated with less sleep duration (Jean-Louis et al., 2001; 1996; Trockel et al., 2000), with later bedtimes/sleep onset (Medeiros et al., 2001;1996; Smith et al., 1989; Trockel et al., 2000) and with later rise times/ awakening times (Johns et al., 1976; Smith rt al., 1989; Trockel et al., 2000). Similarly, lower academic results were associated with evening orientation (medeiros et al., 2001; Smith et al., 1989). Congruent with these results, students with delayed sleep-phase problems, which imply later sleep-wake schedules, obtained lower mean grades than their colleagues (Lack, 1986)

Two articles about time of the day and academic (or related) performance were found. One of them was an interisting study about instructional and examination schedules, which ran on a small liberal arts college, were, contrarily to the usual, students had opportunity to choose their schedules. Mean grades of students attending afternoon and evening classes, that probably had later sleep-wake schedules than students in the morning classes (Skinner, 1985). On the other study about time of the day,students participated in a long-term memory test (speed of accesing information from long-term memory) at three times of the day: in the morning, in the afternoon, and in the evening. Throughout the day, performance of morning type students decreased, whereas performance over the day depends on the interaction between hour of the day and diurnal type of the individual.

Among the articles selected, two were controlled studies (manipulating variables) about the influence of sleep deprivation over performance in academic-related tasks. One of them found that sleep deprivation in medical students (4 hours or less of uninterrupted sleep per night while participating in scheduled in-house night call) did not influence short-term

and long term retention of newly learned medical material (Browne et al., 1994). On the interesting study by Pilcher and Walters (1997), sleep deprived students (1 night of sleep loss), comparing to a non-deprived control group (8 hrs sleep), performed significantly worse in a cognitive task (Watson-Glaser Critical Thinking Appraisal) but, suprisingly, they rated their estimated performance significantly higher than the non-deprived colleagues. The authors concluded that university students might not be aware of the extent to which sleep deprivation may negatively affects their ability to complete cognitive tasks.

The influence of children of Circadian Rhythm on the human body is a scientific fact. Our bodies display hundreds of these circadian rhythm; a few of the most important are sleep and wakefulness, body temperature, blood pressure, and the production of hormones and digestive secretions. Circadian rhythms are controlled by a biological clock in the brain, a tiny clump of cells known as the suprachiasmatic nucleus, or SCN. The SCN is strongly influenced by the daily change between sunlight and darkness, with morning sunlight promoting early wakefulness and darkness setting the stage for sleep.

You shall consistently observe the prayers, especially the middle prayer, and devote yourselves totally to God. (al-Qur'an – Chapter 2, Verse 238)

In essence, we are programmed by individuals' circadian rhythms to sleep at night and to be awake in the daytime. For most people, it is difficult to concentrate and maintain alertness between midnight and 7 a.m. and to sleep during the daylight hours. And it is hard to eat in the overnight hours, when our digestive system essentially shuts down.

According to Islam and Quran, the day has been reserved for all humanity to work and produce for their families, and the night has been reserved for quietude:

He is the One who designed the night to be a cover, and for you to sleep and rest. And He made the day a resurrection. (al-Qur'an Chapter 25, Verse 47)

Allah is He Who has made for you the night that you may rest in it and the day to give you light. Verily! Allah is gracious unto the people, but most people are unthankful. (al-Qur'an - Chapter 40, Verse 61)

A similar call is made in the following verses in al-Qur'an - Chapter 10, Verse 67; Chapter 28, Verse 73; Chapter 30, Verse 23.

There is also strong evidence of heightened solar activity during the day, and the sun continuously emits streams of charged particles, mostly electrons and protons, which travel at speeds from 400 to 700 meters per second. Even though the earth's magnetic field acts as a shield protecting us from such damage, some particles do escape and may affect the human or the surrounding universal energy. Because of the sun's large effect on the geomagnetic field and human behavior (Becker, 1990), Islam has prescribed men and women to work during the day and say prayer in the afternoon (and return back to work), and earn a peaceful rest during the night when such disturbances to the frequencies of these energy fields to humans are minimal.

Islam has thus reserved the longer obligatory worship during the mid-day when every Muslim is obligated to offer eight units of prayer, when morning prayer includes only two units and the evening prayer seven units. One wonders as to why the burden of long worship during the mid-day when most people are exhausted and want to return back to their respective work schedules. Some people do not even spare time for this prayer because of their busy work schedule.

In most cases, the office space, meetings with people, and the interaction with electronic machinery, all introduce weak electric and magnetic fields to our energy system. This can compromise our energy. Further, the air conditioning strips air of its electrical vitality, and the steel structure blocks earth's magnetic field. When our energy becomes weak, our thinking becomes cloudy and our productivity declines. We also become more sensitive to the 60 Hz. electrical activities from fluorescent lights and office equipment, and the high frequency magnetic fields from the computer (Payne, 1988).

As noted, these effects can be dramatic to plants, humans and animals. The afternoon prayer is thus a required and much needed act of obedience to Allah and assisting in bringing about a balance in one's energy fields. Nowadays, even doctors of stress management advise their patients to take a few minutes off their schedule every afternoon to quiet the mind to be more resourceful in the later part of the afternoon. Prayer does just that.

Another reason as to why the long worship during mid-day is because; most persons are at most unstable and fatigued at noon, in particular after sharing various energy frequencies and info-energy (favorable or unfavorable) with different people while at work. To cleanse the spiritual dirt and bring back to the body, soul, the free flowing and highly charged energy to perform during the later part of the afternoon, Allah SWT, in His Infinite

Wisdom has prescribed to all Muslims to be patient, perform ablution and say their 8-unit prayer in the afternoon. Regardless of the circumstance the people are in (those working late, those not working, and so forth), they may still earn the benefits of the afternoon prayer by balancing their energy fields through meditation, relaxation and worship, achieving higher states of vibration in the individual's force fields.

Hypothesis: There is a significance difference of student's achievement among those who changed their circadian rhythms by Islamic religious activity and the student who didn't change their circadian rhythms.

Method

T test

The t-value will be positive if the first mean is larger than the second and negative if it is smaller. In most social research, the "rule of thumb" is to set the alpha level at .05. This means that five times out of a hundred you would find a statistically significant difference between the means even if there was none (i.e., by "chance").

The participants consisted of students from biopsychology course at one large private university, We chose to sample students from biopsychology course because students at this university are required to take such courses, regardless of their major, which allowed for a representative sample of students. This university have undergraduate enrollments more than 10,000 students.

Overall, there were 66 students who participated in the study.

Participants responded to religious questions and read, write and understand qur'an between six and seven in the morning once a week during one 14 weeks.

Procedure

Participants at the two classes voluntarily completed the reading and writing qur'an in small groups for partial course credit in their biopsychology courses.

Results

There was significant different between intervention group and control group ($p = 0.000$). The students from the intervention group had significantly higher scores on their course grade than their counterpart.

	VAR00001	N	Mean
VAR00002	1.00	33	9.0909
	2.00	33	4.3636

Discussion

Based on the findings, we believe that the knowledge about sleep-wake patterns and circadian rhythms may be important for a better understanding of the academic

failure/success at the university, and may be used to improve intervention processes to achieve greater success at the university. For example, information about adequate sleep-wake habits and religious activity may help student to achieve a more efficient learning, with less wastes of time, effort, energy and motivation; assessment of circadian rhythm characteristics may be useful for counselling students as how to cope best with instructional and examination schedules, by taking account of each student individual characteristics.

¹ The normal cycle of a human being is to sleep/rest at night and work in the day. Scientifically, the phenomenon of the body's cycle is explained by a term called the circadian rhythm, which was made popular by scientists in the early 20th century. It means an approximate daily periodicity, a roughly 24-hour cycle in the biochemical, physiological of behavioral processes of living beings, including human beings. In simple words, what our body is supposed to do (rest or be active) at a given time.

The main factor that affects the circadian rhythm is the light accepted by a region in the brain (hypothalamus). However, the light that affects the circadian rhythm is highly specific (in wave length, intensity, and other attributes), and to no surprise, the corresponding attributes are found in no other than our own sun.

Allah the Almighty has said about this in The Qur'an in Surah (chapter) Yunus verse 67:

هُوَ الَّذِي جَعَلَ لَكُمُ اللَّيْلَ لِتَسْكُنُوا فِيهِ وَالنَّهَارَ مُبْصِرًا ۗ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِّقَوْمٍ
يَسْمَعُونَ

Which can be approximately translated (according to Tafseer Al Jalalayn) as "He it is Who made for you the night that you should rest therein, and the day to see. Surely in those are signs, indications of His Oneness, exalted be He, for folk who are able to hear (those who think deeply). "

Allah the Almighty has made it clear for us to use the night to rest, and the day to "see". The word "see" here shows Allah's define knowledge (revealed to our beloved Prophet nearly 1400 years ago) that it is indeed "light" that affects our cycle, similar to what has only been recently discovered using modern science. Note the precise manner in which Allah addressed this matter.

¹ Straying away from what's natural (of what Allah has commanded), can lead to serious disorders. In the case of disregarding the natural cycle of night and day, one can experience disorders such as the circadian sleep disorder (results in insomnia or excessive sleepiness during the day), the delayed sleep phase syndrome (could only sleep after 2am), and others.

There are so many phenomena around us that we overlook (and consider casual) due to our ignorance. The alteration of night and day is one of them. How the earth precisely rotates, how the distance between the earth and the sun stays that way, our body's the circadian rhythm, and everything we can think of, are all proofs of the perfection in His creations. If we ponder and think about the creations, it will further increase our faith and belief in the Almighty creator.

إِنَّ فِي خَلْقِ السَّمَوَاتِ وَالْأَرْضِ وَاخْتِلَافِ اللَّيْلِ وَالنَّهَارِ لَآيَاتٍ لِّأُولِي الْأَلْبَابِ

Approximate meaning (Yusuf Ali translation):

“Behold in the creation of the heavens and the earth, and the alternation of night and day, there are indeed Signs for men of understanding” (Ali Imran 190)

May we all be given the awareness and wisdom to ponder on all the blessings that Allah has given to us on matter how “small” or “casual” the may seem.

The associations between insufficient sleep duration and low university grades are understandable in the view of sleep functions. Such findings agree with the supposition that, during sleep, learning and memory consolidation occur .

Consistent findings were the associations of poorer academic performance with later sleep–wake schedules and/or with evening orientation. These findings are not easy to sleep-wake schedules and/or with evening orientation ,these findings are not so easy to interpret. Why do students with later sleep-wake patterns and/or preferences may obtain lower results? There are several possibilities: 1. –They miss morning classes in order to obtain enough sleep.2 –They wake up early to attend morning classes and, in this case, they are still at disadvantage (a) they must attend classes and examinations on the morning when they are not yet at their best, i.e., time of the day incongruent with their individual circadian rhythm characteristics (cf. Anderson et al., 1991); (b) they become sleep deprived (because probably they went to bed late the previous night), and (c) sleep-wake schedules become irregular, for example, because they wake up late on weekends. As mentioned in “Introduction”, either sleep deprivation or irregular sleep–wake schedules may undermine adequate daytime functioning. We therefore propose that, whenever morning schedules are imposed for instruction and examinations it is reasonable to expect that evening types and students with later sleep-wake patterns may have worse academic performance. In fact, based on Skinner (1985) results we may suppose that late sleep wake-patterns are not a problem if the student had the opportunity to attend afternoon or evening instructional schedules

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