

Research Article

Symptoms and Reasons of Delayed Sleep Phase in University Student and Its Effects on Their Academic Performance

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Abstract

Human's body have basic needs like food, health, sleep, to perform well, for that we need to keep balance between work and life. Sleep is one of important function of human body. Sleep-wake cycle has a great impact on an individual's cognitive, occupational and social performance. Sleep cycle effects the job performance, academic performance and the daily routine tasks as well. Disturbance in sleep pattern lead clinically significant impairment in an individual. Disorders like circadian rhythmic sleep disorders are result of disruptive sleep pattern. Circadian rhythm sleep disorders include delayed sleep phase type, advance sleep phase disorder, irregular sleep-wake disorder and free running disorder (DSM-5). Through this study we are exploring what are the major symptoms that indicated the delayed sleep disorder in university students and the reasons (either personal or social) that trigger the symptoms of delayed sleep phase type in university students? What are the effects of the delayed sleep on their academic performance? Qualitative research design is used to understand the relationship between the research variables. Detailed interview has conducted from the 15 adults from different universities and colleges. It was concluded that delayed sleep impact individual's mental as well as physical well-being. The delayed sleep pattern of university students has many reasons and it effect the student's academic performance.

Keywords

Circadian Rhythm Sleep, Disruptive, Delayed Sleep, Academic Performance

1. Introduction

Human's body have basic needs like food, health, sleep, to perform well, for that we need to keep balance between work and life. Sleep is one of important function of human body. Sleep-wake cycle has a great impact on an individual's cognitive, occupational and social performance. Sleep cycle effects the job performance, academic performance and the daily routine tasks as well. Disturbance in sleep pattern lead clinically significant impairment in an individual. Disorders

like circadian rhythmic sleep disorders are result of disruptive sleep pattern. Circadian rhythm sleep disorders include delayed sleep phase type, advance sleep phase disorder, irregular sleep-wake disorder and free running disorder (DSM-5). For further understanding, diagnostic criteria of circadian rhythm sleep-wake disorders would help to understand the symptoms.

Circadian Rhythm Sleep-Wake Disorder

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According to DSM-5, circadian rhythm sleep wake disorder has following diagnostic criteria.

- 1) A persistent or recurrent pattern of sleep disruption that is primarily due to an alteration of the circadian system or to a misalignment between the endogenous circadian rhythm and the sleep wake schedule required by and individual's physical environment or social or professional schedule.
- 2) The sleep disruption leads to excessive sleepiness or insomnia, or both.

The sleep disturbance causes clinically significant distress or impairment in social, occupational, and other important areas of functioning.

Subtypes of circadian rhythm disorders

Specify whether,

307.45(G47.21) Delayed sleep phase type; A pattern of delayed sleep onset and awakening times, with an inability to fall asleep and awaken at a desired or conventionally acceptable earlier time.

307.45(G47.22) Advance sleep phase type; A pattern of advance sleep onset and awakening times, with an inability to remain awake or asleep until the desired or conventionally acceptable later sleep or wake times.

307.45(G47.23) Irregular sleep-wake type; A temporarily disorganized sleep-wake pattern, such that the timing of sleep and wake periods is variable throughout the 24 hours period.

307.45(G47.24) Non, 24-hours sleep-wake type; A pattern of sleep-wake cycles that are not synchronization to the 24 hours environment, with a consistent daily drift (usually to later and later times) of sleep onset and wake times.

307.45(G47.25) Shift work type; Insomnia during the major sleep period and/or excessive sleepiness (including inadvertent sleep) during the major awake period associated with a shift work schedule.

307.45(G47.21) Delayed sleep phase type; According to DSM-5 diagnostic criteria, the delayed sleep phase type is based primarily on a history of a delay in the timing of the major sleep period (usually more than 2 hours) in relation to the desired sleep and wake-up time, resulting in symptoms of insomnia and excessive sleepiness. When allowed to set their own schedule, individual with delayed sleep phase type exhibit normal sleep quality and duration for age. Symptoms of sleep-onset insomnia, difficulty waking in the morning, and excessive early day sleepiness are prominent.

Specify it Familial; A family history of delayed sleep phase is present.

Overlapping with non 24 hours sleep-wake type; Delayed sleep phase may overlap with another circadian rhythm sleep-wake disorder, non 24 hours sleep wake type.

Delayed sleep phase type is one of the most common sleep disorders. In this disorder, circadian timing of sleep -wake is delayed as compared to the required sleep timing. Delayed sleep is more likely to occur in adolescence and young adults. Symptoms includes difficulty falling asleep at the desired time and difficulty waking up at the desired time [5]. Students

(university or college) are often facing difficulties managing sleep wake balance. 10.9% to 19.3% college students have reported difficulties in initiating the sleep and 5.6% to 10.9% students having problems maintaining sleep [12]. Sleep related issues like insomnia, irregular sleep pattern, have great effect on the student academic performance as well as their daily life activities. Study shows that up-to 60% college students suffered from sleep related difficulties and 7.7% have insomnia [1].

Sleep and academic performance are negatively correlated. Studies showed that sleep deprived students performed poorly in school and lack on skills like attention, memory and problem solving. These factors lead a student towards low academic grades [4].

2. Literature Review

The human sleep wake cycle is regulated by circadian system. The circadian system is influence by environmental factors [10]. The complex interaction of endogenous circadian and sleep homeostatic generated sleep-wake cycle. The primary role of circadian sleep clock is to balance the sleep (during nighttime) and wakefulness during the day. The healthy sleep wake depends on the synchronization of the endogenous circadian clock with external factors (like light and dark setting). Sleep related issues like delayed sleep phase generated due to dis-synchronization of circadian sleep clock with external factors. It also said that disturbed internal sleep mechanism and misalignment with the external environment leads to circadian sleep disorders [6]. The homeostatic drive is responsible for increase sleep and regulate the sleep-wake cycle. While circadian processes responsible of alertness during the day or wakefulness. The circadian sleep clock named as super charismatic nucleus located in anterior hypothalamus. It helps to manage the biological and behavioral processes like sleep-wake cycle, body temperature, hormones, and mood [9].

Delayed sleep phase is the most common among all the circadian sleep disorders. Delayed sleep phase includes relatively delayed circadian timing of sleep and wake cycle. The delayed sleep phase disorder is mostly found in teenagers and young adults. The symptoms like difficulty falling in sleep, and difficulty wake up in morning, these symptoms can lead to insomnia and other sleep disorders [9]. Delayed sleep can affect different areas of human performance in daily life. Activities like job responsibilities, home chores, academic performances can affect by unhealthy sleep pattern. Students with delayed sleep symptoms do have difficulty in paying attention in class, suffer from bad grades and excessive sleepiness during day time. A study shows that up to 60% of students suffered from poor sleep quality and 27% of university students are at risk of having one sleep disorder [1]. College students are particularly susceptible to sleep disorders, which can lead to sleep deprivation and other negative outcomes; early treatment may help prevent long-term consequences [8]. Sleep quality was significantly poorer among students compared to those in later academic years. Specifi-

cally, sleep latency and sleep disturbances were the two components most affected in this group. Additionally, poor sleep quality was strongly associated with a lower quality of life across all domains [3]. Student with poor sleep were significantly more likely to experience daytime dysfunction in school life, including absenteeism, tardiness, falling asleep during class, and impaired academic performance [7].

Sleep is an essential part of human life, it helps to increase an individual's capability of learning, attention and for psychological and mental processes. This study defined the relationship between student's sleep and academic performance. The study suggested that students with low grades and students with high grades do have significant differences and one of them is disturb sleep patterns [9]. Another study concluded that healthy sleep pattern can lead towards good and satisfactory academic performance and they also show less daytime dizziness, sleep satisfaction, no pharmaceutical drug consumption, increase sleep efficiency. Sleep pattern and academic performance are closely related and should be evaluated in students [5].

Depression or other psychological issues and sleep are interrelated. According to this reported study 14.8% students reported depression symptoms and 11% students reported suicidal ideation. Sleepiness also has great impact on mood, memory and learning [11]. The university students are at risk of having sleep disorders due to many demographic and psychological factors. The study elaborated that female have sleep disturbance due to low academic performance but that's not the case for males [2].

Hypothesis

What are the major symptoms that indicated the delayed sleep disorder in university students and the reasons (either personal or social) that trigger the symptoms of delayed sleep phase type in university students? What are the effects of the delayed sleep on their academic performance?

3. Materials and Methods

Qualitative research design is used to study as it enables a researcher to understand the relationship between the research variables. The method for data collection is an interview method. A self-constructed interview is used to collect the qualitative data related to the delayed sleep and its effects of the academic performance in university students. This interview is consisted on fifteen questions related to the perception, routine and habits related to the sleep pattern and the influence on the studies and class participants. I had included seventeen students as the sample for the interview process.

4. Results

Demo-graphs

Demographic includes age, gender and family system (nuclear or joint) have an impact on human mental and social

well-being. Sleep is the most important and essential aspect of human needs. Sleep could be affected by the external and internal factors. Factors like age, if a person is in his old age, he naturally faces difficulty in falling asleep. But if the participant or respondent is in his early adulthood then there would be a disturbance is his environment. As similar to the house setting, like if the participant is belonged to a joint family setting the participants might disturbed due to extra amount of attention and noise. As per nuclear family setting, the participant has more level of concentration and alertness as compared to the former one. Some of the health problems claimed that they are gender specified, male and female option included is to take toll on the influences of the delayed sleep on the both genders.

1. Perception of sleep.

The concept of sleep and its importance in the human life is quite commendable. Sleep helps human to restore the energy level and improve the functioning in daily life. This question included the importance and point of view of the respondents about the sleep. The respondents responded to this question as they believe that sleep is like a comfort zone for an individual. It took away the stress and help to relax oneself. According to the responses, the sleep is like a break from the daily problems and provide them a sense of peace.

2. Mood.

The impact of delayed sleep on the behavior of the individual is also concerned. The sleep pattern plays a vital role in how an individual behave. This question involves in the information regarding how lack or delayed sleep affect the individual's behavior especially mood. The respondents responded to this question, they claimed that sleep (delayed) affect their mood or sleep is responsible for their behavior. They also concluded that delayed sleep makes them feel tired even though they are taking normal seven to eight hours of sleep. The delayed sleep resulted in irritated and frustrated mood. As compared to the respondents who believed that sleep affected the mood there were other respondents claimed that delayed sleep does not has any impact their mood. They are not feeling any kind of problem related to mood and delayed sleep have no impact on their mood.

3. Trouble falling asleep.

There are bunch of reasons for having difficulty falling sleep. People have various reasons like night shifts, late night study session, excessive use of social media, reading. The question indicated the sleep pattern at night and the time they need to fall sleep. the respondents responded that they faced greater difficulty while falling asleep. They kept toss and turn in bed and after three to four hours of struggle they finally fall asleep. On the other hand, some respondents responded that they do not have any problems while falling asleep. They fall asleep as fast as they lay down on the bed. Through this question, two different opinions and two different answers were deciphered. The two different sides of story explained the phenomena of falling asleep is hard for few people and a cherry on top for other people.

4. Sleep hours.

Healthy body has healthy brain, for healthy brain we need to have proper seven to eight hours of sleep. this question was included to know about how many hours of sleep they have. The responses vary person to person according to their routine. The respondents responded that they have almost 5-6 hours of sleep due to their routine and some respondents responded as they have 4-5 hours of sleep. On the other hand, some respondents responded that they have proper 8 hours of sleep and no matter of what they do not compromise on their sleep.

5. Reason.

There are multiple reasons for delayed sleep. The reasons vary form person to person. The key factors that add trouble in the sleep pattern are discussed through this question. The participants responded this question and proposed different reasons. The respondents elaborated that they are unable to fall asleep due excess use of cell phone, social media, daily life stress, negative thought pattern, overthinking, fatigue, sadness, distress regarding studies. More than forty percent of respondents responded that they had delayed sleep because their excessive use of social media at the time of fall sleep in night. Rest of the respondents elaborated the following (discussed above) reasons of delayed sleep. The ten percent of the participants also claimed that they are use to stay awake late at night due to their study time table. They further included due to their daily routine and their reading habits they used to study late at night and hence fall asleep late at night.

6. Wake up.

This question elaborated the importance of the waking up patters in the students. Delayed sleep and how they manage to wake up in the morning. The respondents were asked this question and they responded with different responses. The participants claimed that they set the alarm (once) and they woke up as soon as the alarm ring. Other participants responded that they have to set multiple alarms just to wake themselves up. On the other hand, few participants also concluded that they don't need any alarm setting, they woke up at the time they had decided to wake up in the morning.

7. Physical state.

Delayed sleep impact our mind as well as physical state. Through this question, the respondents were asked that how they feel when they woke up in the morning. Respondents have different responses as they have different ways to respond to the morning schedule for wake up. Participant responded as they have headache, numbness, absent mindedness, irritable, frustrated and edgy at the time they woke up in the morning. On the other hand, few respondents responded as they felt refreshed no matter how much sleep they got but they felt energetic, peaceful and refreshed. There are responses that depict those students with the sleep problem have mood issues when they wake up in the morning but few number of students do not bother about the delayed sleep and yet felt energetic even after few hours of sleep.

8. Sleepy head.

This question concluded the behavioral display of the re-

spondents. The behavior they showed when they have delayed sleep or they don't have a proper and healthy sleep at night. In this question, it is specified how they manage and felt during the day. The respondents have dual approach with their answers. Half of the respondents responded as they felt sleepy during the early in day but they felt refreshed after few hours, few of the responded answered that they felt sleepy all of the day and at the night they felt fresh and rest of the participants responded that do not feel sleepy at all during the day. Same goes for the managing the daily routine tasks, the respondents elaborated that they faced difficulties managing the early lectures and their task performances while the other participants exclaimed that they faced difficulty in remembering their tasks and even forget their general commitments and on the other hand those participants who do not feel sleepy during the day they do not face any difficulty while carrying out their daily routine tasks.

9. Punctual.

Being punctual means to know how delayed sleep effect the daily life of a student. The question showed the perspective of university routine. The question concluded the sole reason of student's academic interest and class participation. The nine respondents responded to this particular question as the energetic respondents responded that they are punctual and always on time while on the other hand, the eight participants with delayed sleep and irritable physical state concluded that they are not punctual as well as not interested in attending classes. They are unable to reach university at time and attend the class.

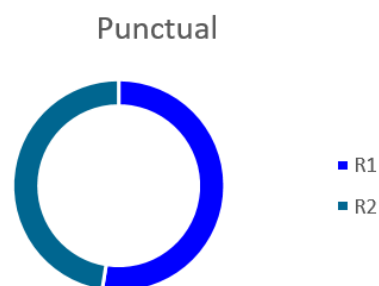


Figure 1. Effect of sleep cycle on punctuality in class.

10. Performance.

Respondents were asked about their academic and class performance through this question. Sleep is related to every activity and task and it helps to improve the task performance. This question elaborated the sleep and its relation with the academic performance of the university student. the respondents responded to this question with variations. Few respondents responded that they perform well in their class and active during the class. While the other side of the responses of the respondents exclaimed that they usually absent-minded during class. Eight out of seventeen (P1) students responded that they perform well in their class and six stu-

dents (P2) responded that they are not performing well in the class. The rest of the respondents (P3) answered as they are average students and they need to pay more attention and improvise themselves.

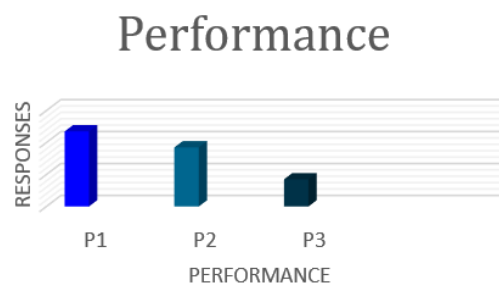


Figure 2. Effect of delayed sleep on class performance.

11. Lecture.

The role of sleep in our daily functioning is exploring through these questions. The impact of sleep elaborated that the students with healthy sleep pattern pay more attention as compared to those who are sleepy all the day. The question elaborated the approach of the respondent students regarding the lectures they have attended in the university. Eight out of seventeen (L1) interviewee responded that they attentively take their lectures and they pay full attention to their lecture write up. Seven out of seventeen respondents (L2) responded that they are unable to understand and write most of the lecture because they felt distracted and dull. Two remaining respondents (L3) responded that when they don't have a proper sleep then they are not able to understand and take the notes and vice versa.

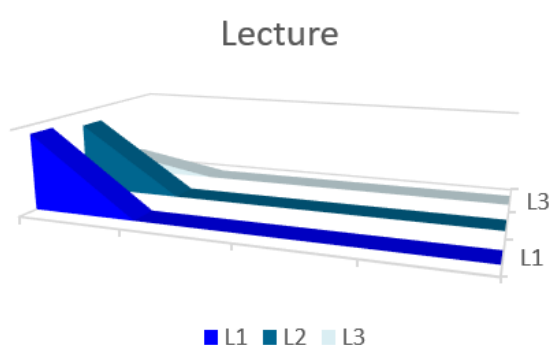


Figure 3. Effect of sleep deprivation on attention in class.

12. Satisfaction.

Satisfaction related to the academic performance and grades depicted the student's contentment towards their studies. This question includes the level of information regarding the level of satisfaction and their expectation related to the studies. It also comprehended the chances and possible room for improvement. Six out of seventeen (S1) respondents

responded to this question as they are content and satisfied with their study and grades. Three participants (S2) responded that they are not satisfied with their grades and class participation. And they are not interested to change the approach they have. Eight out of seventeen students (S3) responded that they are aware of their mistakes and they have to improve their schedule to have better results.

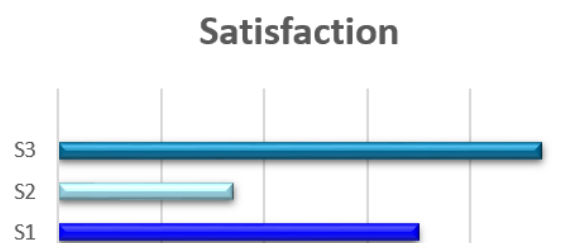


Figure 4. Delayed sleep cycle and academic satisfaction.

13. Role of sleep.

As sleep is concerned in this research process, this question concluded the delayed sleep and its relation with the physical well-being and how it effects the academic performance. Do the students or the participants agree to this statement that delayed is the root cause of their unstable or unsatisfactory academic performance. The respondents responded to this question quite differently. Nine students out of seventeen (D1) responded that sleep does not affect their grades or delayed sleep is not the root cause of their declined academic performance. That's because of their negligence and irresponsible behavior towards studies. Four respondents (D2) responded that sleep helps them to increase the attention span and gave them a chance to cut down their stress and perform well. The other four participants (D3) responded that their unhealthy sleep pattern is responsible for their poor performance in the class.

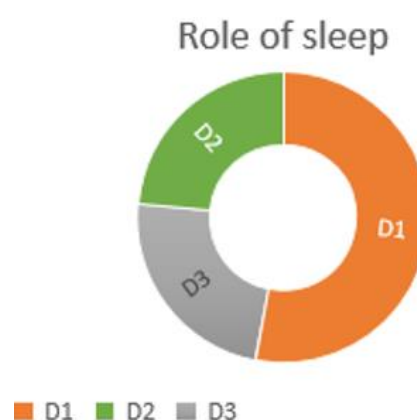


Figure 5. Role of sleep and physical functioning.

14. Ability.

Ability includes the capacity of the participant to improve their sleep habits. The will and self-resilience of participants to improve their sleep pattern and make it a healthier one. The participants responded this question positively. Twelve out of seventeen students (A1) responded that they can change and manage their sleep pattern and they are currently working on it. Three respondents (A2) responded that they had difficulty managing their sleep pattern and they are unable to manage it. Two remaining participants (A3) responded that they easily manage their sleep pattern and do not face any problem.

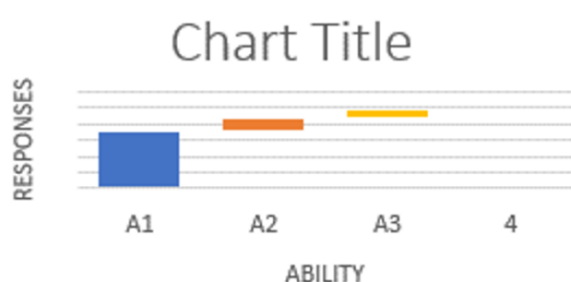


Figure 6. Self resilience and delayed sleep cycle.

The results section should provide an accurate and concise description of the experimental findings, and the resulting conclusions that can be inferred from the experiments. Meanwhile, the results should be presented in a transparent and truthful manner, avoiding any fabrication or improper manipulation of data. Where applicable, results of statistical analysis should be included in the text or as tables and figures.

5. Conclusions

This research concluded that delayed sleep impact individual's mental as well as physical well-being. The interview process elaborated the responses of different participants from the sample. The respondents explained their perception about the sleep and its importance as they believe that sleep is like a hideout for those who are seeking a way out from their stressful daily routine. The participants also explained the relationship of mood and sleep. Through this the effects of delayed sleep on the participants also explored. Irritability, frustration, headache is there in students because of delayed sleep. The timing and hours of the sleep they get determines the healthy and sound sleep. The wake-up routine and ways help to understand the effort and difficulty while waking up. The university routine and class participation plus class performance evaluation also included the information about the students that how sleep effects their academic performance. It is concluded that delayed sleep pattern of university students has many reasons and it effect the student's academic performance.

Abbreviations

DSM Diagnostic and Statistical Manual of Mental Disorders

Author Contributions

Durr e Shahwar is the sole author. The author read and approved the final manuscript.

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Conflicts of Interest

The author declares no conflicts of interest.

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Biography



Durr e Shahwar is a psychologist at an international clinic in Lahore. She completed her MS in clinical psychology from University of Sahiwal in 2023. She had working for the mental health awareness campaigns and well-being of children with neurodivergent brains for last 3 years. She had provided services for many different clinical setups in government or private. She had keen insight in clinically significant disorders. She had published her clinical detail case study in 2025 and published one of her main areas of interest in personality (dark triad) in 2024.

Research Field

Durr e Shahwar: Psychological and Pharmacological Treatment for Brief Psychotic Disorder with Borderline Personality Disorder, Neglectful Parenting, Dark Triad Traits, Antisocial Behavior: A University Student Study.