Research Article

Chronotype, Daytime Sleepiness, and Related Factors Effects on Skipping Classroom among Medical Students in Tabuk

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Abstract

Background: Lecture attendance is very critical in medical practice. Good sleep hygiene is crucial for academic performance. Therefore, this research aimed to assess the relationship between daytime sleepiness and the chronotype, and skipping the classroom.

Methods: A cross-sectional study was conducted among medical Students in Tabuk from April 2022 to July 2022. Three hundred and thirty-four medical students were randomly selected. A standardized questionnaire based on the daytime sleepiness scale, morningness–eveningness questionnaire, and risk for skipping classrooms was used. The students detailed their sleeping habits for two weeks and then responded to the questionnaire distributed directly by the researchers who attended to solve any difficulties.

Results: Out of the 334 students,74.7% skipped the classroom last month. The most common reason for absence was the lecturer directly reading from the slide show (72.8%), followed by late lectures (67.8%), lecturers' presentation skills (65.6%), and lack of interest (57.9%). Daytime sleepiness was evident in 40.1% of the students and was associated with skipping lectures (Wald, 3.86, *P*-value, 0.049, and 95% CI, 0.19–0.91). The majority were intermediate chronotypes (66.4%), followed by evening chronotypes (24.2%) with no association with skipping classrooms.

Conclusion: Skipping lectures is common among medical students in Tabuk City, Saudi Arabia; the causes were lecture timing, daytime sleepiness, and lecturers' presentation skills. Most students were an intermediate chronotype that was not associated with classroom absence. Further larger multi-center studies are needed.

Keywords: skipping classrooms, medical students, daytime sleepiness, chronotype, Saudi Arabia

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1. Introduction

Despite significant educational advances, traditional lectures are still practiced in medical education together with hospital-based clinical training and simulation labs [1]. Lecture attendance, although very critical in medical practice, is widely neglected.

The risk factors for absence from the classroom are primarily individual (sleepiness, illness, and inefficiency of lectures in crowded classrooms) [1]. Previous literature showed that interventions at improving the student's attitude about classroom attendance are beneficial [2]. In addition, absence's effects on college students' academic achievement have been previously documented [3, 4]. Acknowledging that it is not possible to memorize everything in Medicine, and the presence of other attractable learning resources (the United States Medical Licensing Examination [USMLE]) might be plausible to absenteeism. However, USMLE's recent pass/fail adoption may positively influence traditional lecture attendance [5].

The time of activity during the day determines the chronotype of an individual (early chronotype who prefers morning activity, also known as Pearls, intermediate and late chronotype, also known as night Owls) [6]. Early school timing was associated with poor daytime dysfunction in both morning and evening chronotypes [7]. In addition, the evening chronotype during the day (circadian misalignment) achieves less than when working in the evening [8].

Excessive daytime sleepiness, a public health issue, is prevalent among most populations. Although commonly attributed to lifestyle or laziness, it has been linked to cardiovascular diseases, depression, work errors, and car accidents. Daytime sleepiness is the inability to maintain alertness and wakefulness during major waking day episodes, with unintentional and inappropriate sleep occurring almost every day for at least three months [9, 10].

Excessive daytime sleepiness could lead to fatigue and substantially impair attention and academic achievement. In addition, the Kingdom of Saudi Arabia is a vast country with ethnic, cultural, and environmental diversity. Furthermore, different medical schools use different curricula and timetables, so the studies conducted in the Western World and other regions of Saudi Arabia may not apply to Tabuk, Saudi Arabia.

Rique *et al.* [10] conducted a study among medical students in Brazil and found that daytime sleepiness is not associated with chronotype. On the other hand, a European study found a relationship between evening chronotype and daytime sleepiness [11].

The research hypothesis is that late chronotype might skip lectures due to circadian misalignment and excessive daytime sleepiness.

To the best of my knowledge, no researchers have assessed the relationship between chronotype and daytime sleepiness with skipping class lectures. Thus, this study aims to investigate the same among medical students in Tabuk, Saudi Arabia.

2. Materials and Methods

A cross-sectional study was conducted among medical students in Tabuk University, Kingdom Saudi Arabia between April and July 2022. Three hundred and thirty-four medical students (second through sixth class) were randomly selected from the Faculty of Medicine by simple random sampling technique. First-year medical students and those on sedative medications were excluded. First-class students were excluded because of the different curriculum. All students who agreed were approached. A standardized questionnaire based on the daytime sleepiness scale, morningness–eveningness questionnaire, and risk for skipping classrooms was used. Participants were invited to sign a written informed consent and then respond to the questionnaire. The students detailed their sleeping habits for two weeks and then responded to the questionnaire distributed directly by the researchers who attended to solve any difficulties.

2.1. Sample size calculation

A list of 772 students was obtained from the Deanship of Academic Affairs. A simple random sampling method was used to get the final sample. The sample size was determined using a single population proportion formula with the following assumptions; the magnitude of skipping classroom (P = 50%; no previous study in the study area), 95% UI, and the margin of error (d) = 5%. The minimum sample size was 334 students.

2.2. Classroom skipping assessment

1. Skipping classroom was calculated by the number of skipped lectures or clinical sessions/month or if the student froze the year or was forbidden from the examination due to absence. Finally, a meeting was held with the participants, and all information regarding the research objectives and how to fill out the questionnaire was conveyed to them.

2. This study intended to establish the relationship among the following variables:

3. Daytime sleepiness

4. Morningness–Eveningness

5. Skipping classroom

2.3. Daytime sleepiness measurement

The Epworth sleepiness scale (ESS), a well-validated [11] self-reported questionnaire, was used to assess excessive daytime sleepiness. The scale is an eight components choice question. The questionnaire asks the subjects to rate their probability of falling asleep or dose in eight different situations. Sitting and reading, watching TV, sitting inactive in public places, as a passenger in a car for 1 hr without a break, lying down to rest in the afternoon when circumstances permit, sitting talking to someone, sitting quietly after lunch without alcohol, and in a car, while stopped for a few minutes in traffic. Each question had four choices (no = zero, 1 = mild, 2 = moderate, and 3 = severe) with an aggregate of 0–24. Students who scored ≥10 were considered excessive daytime sleepers [12].

2.4. Morningness–Eveningness measurement

To determine the Morningness–Eveningness, a standardized tool, the Morningness–Eveningness Questionnaire (MEQ), a self-administered validated questionnaire developed by the researchers James A Home and Olov Ostebrg (1976), was used. Its primary purpose is to measure whether a person's circadian rhythm (biological clock) produces alertness in the morning, evening, or in between [13–15].

The morningness–eveningness questionnaire includes 19 questions, each with five or four components detailing sleep habits with the following scoring: A score of 16–30 indicating a definite evening, 31–41 moderate evening, 24–58 intermediate, 59–69 moderate morning, and 70–86 definite morning.

2.5. Reasons for skipping lectures

Reasons behind skipping lectures included early or late timings and the availability of lectures to students through other sources. In addition, other reasons provided were: below-expectation quality of lectures (e.g., reading directly from the slides or organization of the show), students being uninterested in the topic, the lecturer being

relaxed about attendance, the transportation factor, and student's perception that the lecture did not benefit them or prepare them for the examination. Open-ended questions were included for other reasons for absence.

2.6. Data analysis

Microsoft Excel was used for data gathering, and the Statistical Package for Social Sciences and the Chi-square test were used to compare categorical data. In addition, the binary logistic regression analysis was used for the relationship between various variables. Data were presented as percentages or mean ± SD unless otherwise indicated. A *P*-value of <0.05 was considered significant.

3. Results

The study included 334 medical students, aged 19–28 years with a mean age of 24.49 ± 1.92 years. Their cumulative grade average was 4.03 ± 0.76 out of 5, their time to reach the college was 20.15 ± 9.78 min, the daytime sleepiness and chronotype scores were 8.65 ± 4.22 and 47.47 ± 9.11, respectively, and skipping classroom was 2.99 ± 3.46 times (Table 1).

Moreover, 67.6% of the participants were women, 80% of the students believed that the lectures positively influence their performance, 77.9% were on the side of optional classrooms, and only 45% will attend classrooms if the video is provided. The most common reason for absence was that the lecturer was directly reading from the slide show (72.8%), followed by late lectures (67.8%), and lecturers' presentation skills (65.6%). In addition, the open questions mentioned fatigue, menstrual periods, lack of concentration, and long lectures without breaks. Notably, 57.9% of the students were not interested in the lectures, and 74.7% skipped classrooms last month. Daytime sleepiness was evident in 40.1% of the students, and the majority were intermediate chronotypes (66.4%), followed by evening chronotypes (24.2%), while the minority were morning larks (Table 2).In the current study, women were younger than men (22.19 ± 1.97 vs. 23.11 ± 2.02, *P*-value < 0.001, 95% CI, 0.47–1.35) and took more time to reach college (21.57 ± 11.28 vs. 18.59 ± 7.57, *P*-value, 0.035, 95% CI, −5.73–0.002), Table 3 shows a comparison between male and female students.

In this study, skipping classrooms was associated with age (Wald, 4.36, *P*-value, 0.037, and 95% CI, 0.52–0.98) and daytime sleepiness (Wald, 3.86, *P*-value, 0.049, and 95% CI, 0.19-0.91). However, no association was found between skipping classrooms

and cumulative grade average (Wald, 0.010, *P*-value, 0.920, and 95% CI, 0.45–2.41, transportation (Wald, 0.092, *P*-value, 0.762, and 95% CI, 0.95–1.03), and chronotype (Wald, 2.38, *P*-value, 0.122, and 95% CI, 0.16–0.99) (Table 4).

TABLE 1: Basic characteristics of medical students, University of Tabuk, Saudi Arabia.

Character	Mean ± SD
Age (19–28 yr)	24.49 ± 1.92
Cumulative grade average (1.2–5.0)	4.03 ± 0.76
Time to reach the college (min)	20.15 ± 9.78
Skipping classrooms	2.99 ± 3.46
Epworth Sleepiness Scale	8.65 ± 4.22
Morningness–Eveningness score	47.47 ± 9.11

TABLE 2: Sleep pattern, reasons for skipping classroom, and the importance of attendance among medical students at the University of Tabuk, Saudi Arabia.

Character	No (%)
Sex Women Men	226 (67.6%) 108 (32.3%)
Lectures positively influence performance	260 (80%)
Optional classrooms	258 (77.9%)
Attending if video was provided	149 (45%)
Reason of absence Early lectures Late lectures Lecturers' presentation skills The lecturer is not strict in taking attendance The lecturer reads directly from the slideshows Lack of interest	165 (49.8%) 225 (67.8%) 217 (65.6%) 79 (23.8%) 241 (72.8%) 191 (57.9%)
Daytime sleepiness Excessive daytime sleepiness	129 (40.1%) 30 (9.3%)
Chronotype Morning Intermediate Evening	31 (9.5%) 217 (66.4%) 79 (24.2%)
Skipping classroom	216 (74.7%)

TABLE 3: Comparison between males and females at the University of Tabuk, Saudi Arabia regarding skipping classroom.

Character	Males	Females	P-value	95% CI
Age (19–28 yr)	23.11 ± 2.02	22.19 ± 1.97	<0.001	0.47–1.35
Cumulative grade average (1.2–5.0)	3.92 ± 0.73	4.14 ± 0.79	0.052	−0.0.43–0.002
Time to the college (min)	18.59 ± 7.57	21.57 ± 11.28	0.035	−5.73–0.002
Skipping classrooms	2.92 ± 3.33	3.01 ± 3.54	0.806	—9.43–0.73
Epworth Sleepiness Scale	8.21 ± 4.07	8.85 ± 4.28	0.203	−1.62–0.34
Morningness–Eveningness score	47.11 ± 9.81	47.64 ± 8.78	0.625	−2.65–1.59

*T-test

TABLE 4: Relationship between skipping classes and daytime sleepiness, chronotype, transportation, cumulative grade average, age, and gender among the medical students of the University of Tabuk.

Character	Wald	Difference	P-value	95% CI
Age (yr)	4.36	1	0.037	0.52–0.98
Sex	0.003	1	0.956	0.40–2.63
Cumulative grade average	0.010	1	0.920	0.45–2.41
Time to the College (min)	0.092	1	0.762	0.95–1.03
Daytime sleepiness	3.86	1	0.049	0.19–0.91
Morningness–Eveningness score	2.38	1	0.122	0.16–0.99
Constant	0.85		0.356	

*Binary logistic regression analysis

4. Discussion

In the present study, 80% of the students believed that the lectures positively influenced their performance, 77.9% were on the side of optional classrooms, and only 45% will attend classrooms if videos are provided. A study conducted among medical students in five public and private sector colleges [16] reported that lectures are helpful in line with the present findings. In the present study, 74.7% of the students skipped at least one lecture in the past month. The main reasons behind skipping classrooms were the lecturer's presentation skills, the time of lectures, and the lack of interest. Policies for rescheduling the lectures and improving the lecturers' presentation skills are needed. Notably, a lack of interest in lectures is a warning because it might be that the students joined Medicine against their choice. Lack of interest and absence after graduation will substantially affect patient's care. The lecturers' presentation skill was the most common reason for absence in a study conducted among medical students in the USA [17]. Further studies observed that lecture timings and the lecturers' presentation skill as the main factors for absence in agreement with our findings [15].

The current study found daytime sleepiness in 40.1% of the students, in agreement with El Hangouche *et al.* [18], who conducted a survey among medical students in Morocco and found daytime sleepiness in 36.6%. Previous studies from Saudi Arabia have reported a prevalence of 37.8% [19]. In the present data, no differences between males and females regarding daytime sleepiness support the findings of a previous meta-analysis [20]. No association was evident between daytime sleepiness and cumulative grade average, similar to a prior study in Jordon[21]. Authors from Jordon reported no difference in daytime sleepiness among females and males similar to the current

findings in which the daytime sleepiness was not different across gender. Our results contradict Abdulghani and colleagues' [22], who published a study in Malaysia and found more daytime sleepiness among women. Similarly, our results also contradict the findings of a recent study that reported a high excessive daytime sleepiness (54.4%), especially among women [23]. Excessive daytime sleepiness might be due to poor sleep quality or duration. Investigating the causes of daytime sleepiness, including meal timing, caffeinated drinks, and display viewing, is needed [24].

The present study showed a positive correlation between daytime sleepiness and skipping classrooms. Similarly, Bati *et al.* reported that sleepiness is among the most cited reasons for skipping lectures in Turkey [1]. In this study, 9.5%, 66.4%, and 24.2% were morning, intermediate, and evening chronotypes (with no difference between women and men), similar to previous studies [25, 26]. There is no association between skipping lectures and chronotype; similar results were reported by an earlier study [10]. A plausible explanation might be the dominance of the intermediate chronotype. Evening chronotype, social jetlag, and short sleep duration are significant determinants of daytime sleepiness [27].

The association between skipping lectures and age found in this study might be due to peer influence and familiarity with the program. Interventions targeting specific age groups might improve attendance rates. Desalegn *et al.* [28] found no association between skipping classrooms and cumulative grade average (GPA) in agreement with our findings. Our findings also support previous observations [29, 30]. On the other hand, Alamoudi *et al.* [15] found better academic performance among non-skippers. The GPA is a cumulative grade over the years and might not reflect the student's performance during the survey.

Limitations

The study was limited by the cross-sectional methodology and being a single-center study. Thus, generalization cannot be ensured.

5. Conclusion

Most students had skipped at least one lecture in the past month; the causes were lecture timing and lecturers' presentation skills. Daytime sleepiness was prevalent among medical students in Tabuk University, Saudi Arabia, and was associated with skipping

classrooms. Most students were intermediate chronotype that was not associated with classroom absence. Further larger multi-center studies are needed.

Acknowledgments

Ethical Considerations

All participants signed written informed consent and their privacy was secured according to the Declaration of Helsinki. Furthermore, ethical clearance was obtained from the ethical committee of the University of Tabuk (ref, UT-164-27-2021. Dated 13/12/2021).

Competing Interests

None to declare.

Availability of Data and Material

The data and material of this study are available from the corresponding author upon request.

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