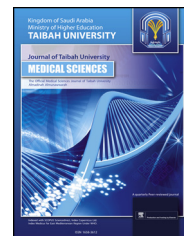




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Original Article

The effect of chronotype (morningness/eveningness) on medical students' academic achievement in Sudan

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المخلص

هدف البحث: هنالك وعي متزايد حول تأثير اختلال الساعة البيولوجية على الصحة والعمل. في هذه الدراسة نهدف للتحقيق في آثار النمط الزمني للنوم على التحصيل الأكاديمي بين طلبة الطب.

طرق البحث: تم إجراء دراسة مقارنة مستعرضة على ١٤٠ من طلاب الطب (٦٤ بمعدل ممتاز "أ"، و٧٦ بمعدل جيد "ج") يدرسون في المرحلة السرييرية بكلية الطب بجامعة أمدرمان، السودان. وقع المشاركون على موافقة خطية مسبقة كما طلب منهم تدوين وقت النوم، ووقت الاستيقاظ، والوقت اللازم للدخول في النوم، ومدة النوم خلال أيام العمل وأيام العطلة الأسبوعية. ثم دعي المشاركون للرد على الاستبانة. وتم حساب نمط النوم من منتصف وقت النوم خلال عطلة نهاية الأسبوع والاستيقاظ. كما تم مقارنة متغيرات متعددة للنوم بين المجموعتين. وتم استخدام اختبار-ت والانحدار اللوجستي لتحليل الدلالات الإحصائية.

النتائج: النمط المسائي كان أكثر شيوعاً بين الطلاب متوسطي الدرجات مقارنة بذوي الدرجات الممتازة. كان هناك فروقات ذات دلالة إحصائية كبيرة بين المجموعتين بما يخص وقت النوم خلال عطلة نهاية الأسبوع، ووقت الاستيقاظ، ومدة النوم. إضافة إلى ذلك، كان واضحاً أن هناك فروقات كبيرة لوقت النوم خلال أيام الأسبوع، والوقت اللازم للدخول في النوم، وتأخر الاستيقاظ بين أيام الأسبوع وعطلة نهاية الأسبوع. ولم تلاحظ فروقات بين المجموعتين خلال أيام الأسبوع في وقت الاستيقاظ ومدة النوم، والنمط الزمني للنوم بين الجنسين، وتأخر وقت النوم بين أيام الأسبوع وعطلة نهاية الأسبوع.

الاستنتاجات: الطلاب متوسطي الدرجات أكثر احتمالاً للنوم المتأخر خلال أيام الأسبوع وعطلة نهاية الأسبوع، وينامون أكثر خلال عطلة نهاية الأسبوع، ويفضلون النمط المسائي.

الكلمات المفتاحية: النمط الزمني للنوم؛ طلاب الطب؛ نمط النوم؛ مدة النوم؛ التحصيل الأكاديمي

Abstract

Objectives: There is increasing awareness about the effects of circadian misalignment on health and work. In the present study, we aimed to investigate the effects of chronotype on academic achievement among medical students.

Methods: A cross-sectional comparative study was conducted among 140 medical students (64 who averaged an A grade and 76 who averaged a C grade) completing the clinical phase at the medical college of Omdurman University, Sudan. The participants were asked to sign a written informed consent and to keep a diary detailing their bedtime, wake-up time, sleep latency, and sleep duration during working days and weekends. Then, the participants were invited to respond to a questionnaire. The chronotype was calculated from the mid-sleep time during the weekend and sleep debt. Various sleep parameters were then compared between the two groups. A t-test and logistic regression analysis were used to test the statistical significance.

Results: The medical students with average grades were more of the evening chronotype than the students with excellent grades ($p < 0.05$). Significant differences were found between the two groups regarding weekend bedtime, wake-up time, and sleep duration. In addition, significant differences were evident for weekday bedtime, sleep latency, and wake-up lag between weekdays and weekends. No differences were observed between the two groups during weekday wake-up time and sleep duration, chronotype between gender, and bedtime delay between weekdays and weekends ($p > 0.05$).

Conclusion: Students whose average grade was a C were more likely to have a later bedtimes during weekdays and

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weekends, sleep more during weekends, and were more evening.

Keywords: Academic performance; Chronotype; Medical students; Sleep duration; Sleep pattern

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Introduction

Human cognitive and physiological functioning varies throughout the day due to the circadian rhythm, while the sleep–wake cycle is regulated extensively by neural mechanisms (e.g., suprachiasmatic nucleus). However, environmental factors can substantially influence the timing and expression of sleep and wakefulness.¹

Sleep can be altered by various factors such as the overuse of the internet and social media, sleep medications, and coffee intake. Furthermore, sleep can be profoundly altered by different medical conditions including depression, obstructive sleep apnoea, idiopathic hypersomnia, and chronic sleep deprivation.²

Previous literature reported negative associations between poor sleep quality and physical and mental health, academic achievement, and the well-being of college students.^{3,4}

Previous researchers documented the relationship between sleep quality and academic performance. Further studies have shown a high prevalence of sleep problems among college students.⁵ Medical students sleep six hours/day on average in contrast to the eight hours observed in other groups.⁶

Morningness/eveningness refers to the difference between individuals regarding diurnal preference, the sleep–wake pattern of activity, and alertness in the evening or morning. Individuals with a morning chronotype who exhibit extreme morning tendencies (e.g., a trend towards rising early in the morning, perform mentally and physically best in the morning hours, and going to bed early in the evening) are called early Larks (morning chronotype). Those with an evening chronotype are referred to as Night Owls. These individuals rise later in the morning, stay awake later at night, and perform at their best in the late afternoon or evening. These preferences are assumed to have unique genetic, biological, contextual, and psychosocial components. Diurnal preferences have been linked to various habitual and nonhabitual issues such as eating habits, sleeping behaviour among University students, smoking, and drug use.⁷

Early chronotype or morningness has been linked to physical and mental health, self-esteem, school functioning, and intimate relationship, while late chronotype or eveningness has been shown to be associated with mental illness, infections, smoking, and poor sleep quality.⁸

The regularity and synchronization of the sleep–wake cycle are crucial regardless of the chronotype. Among medical students, synchronization is misaligned and disturbed by numerous factors such as curricular load, extracurricular

activities, the influence of hospital demands, pressure for high academic achievement, and emotional stress. Sleep–wake cycle and sleep duration could also influence and condition the learning process and humour.^{9,10}

A recent study conducted in a school that adopted a dual schedule (both morning and evening classes) after a fire accident in a nearby school showed that an early schedule is detrimental to both morning and evening chronotypes in terms of sleep deprivation and daytime sleepiness. Furthermore, those students with an evening chronotype were at increased risk for daytime dysfunction regardless of the school schedule.¹¹

Previous literature observed that a mismatch between circadian (internal) and social (external) times could lead to chronic sleep deficiency. Furthermore, examination time has been shown to significantly influence grades, with students with the morning chronotype scoring higher in early and late morning exams than those with the late chronotype. This group difference in grades scored disappeared in the early afternoon.¹²

Although sleep habits might not be a direct determinant of academic accomplishment, these previous studies demonstrate the need to explore the factors that contribute to and predict the medical student's academic performance.⁵

No researchers have studied the eveningness/morningness chronotype among medical students in Sudan. Sudan is a vast country with social and climate diversity, so sleep studies conducted in Western countries may not apply to this country; therefore, we conducted this research. In the present study, we aimed to assess morningness/eveningness among medical students at Omdurman Islamic University and its relationship with academic achievement.

Materials and Methods

This cross-sectional comparative study was conducted at the Faculty of Medicine, Omdurman Islamic University from June to August 2015. One hundred and forty medical students from the clinical phase were included: sixty-four who scored an A grade average (Excellent) in the previous semester, and seventy-six with a C grade average (Pass). Participants were invited to sign a written informed consent and respond to a structured questionnaire. An orientation meeting was held for the participants to explain how to fill out the survey. The grades A and C were chosen for the comparison because we thought that students with A and B grades are too similar in terms of performance and those with a D grade (fail) would present a very small sample. The questionnaire was distributed after routine class activities. The students with grades other than A and C, those with chronic diseases that can affect their sleep, shift workers, and current smokers were asked to leave the lecture theatre. The questionnaire was distributed to the remaining students. The phone numbers of the investigator and trained facilitators were provided so that they could answer any questions that came up during the completion of the questionnaire; these personnel also collected the finished survey. The end sample size was 140 out of a total of three hundred students. Ten questionnaires were then excluded due to incomplete data or not recording their grades because we thought it could be difficult to include them in the comparison. The survey was approved by a Community Medicine

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