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Sleep and Quality of Life of Turkish University Students During the COVID-19 Pandemic

COVID-19 Salgını Sırasında Türk Üniversite Öğrencilerinin Uyku ve Yaşam Kalitesi

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Abstract

Objective: In Türkiye, the Coronavirus disease-2019 (COVID-19) pandemic came with restrictions to reduce and control the spreading of the virus. A lockdown and switch to online education was one of these restrictions. The aim of this study was to evaluate the influence of these restrictions on insomnia complaints and daytime functioning.

Materials and Methods: Health science students in Türkiye aged 18-30 were asked to participate in an online survey. The survey contained questions about sleep time, sleep quality, insomnia complaints, quality of life (QoL), and daytime functioning. In total 302 students (70.8% female) participated in the study. Assessments were made for the periods (1) [before the COVID-19 pandemic (BP), 1 January 2020-10 March 2020], (2) the first no lockdown period (11 March 2020-28 April 2021), (3) lockdown (29 April 2021-17 May 2021), (4) the second no lockdown (NL2) period (18 May 2021-31 December 2021), and (5) the third no lockdown period (1 January 2022-December 2022).

Results: Total sleep time significantly increased during lockdown and NL2 compared to BP. However, sleep satisfaction, sleep quality, insomnia, daytime fatigue and QoL worsened significantly during lockdown and NL2 compared to BP. After lockdown, restrictions were gradually lifted, and assessments returned to BP levels.

Conclusion: The COVID-19 pandemic had a negative effect on sleep quality and increased insomnia complaints which in turn negatively interfered with daytime functioning and QoL.

Keywords: Sleep, sleep wake disorder, reproducibility of results

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19) Türkiye'de virüsün yayılmasını azaltmak ve kontrol altına almak amacıyla kısıtlamalarla geldi. Sokağa çıkma yasağı ve çevrimiçi eğitime geçiş bu kısıtlamalardan bazılarıydı. Bu çalışmanın amacı Türkiye'deki COVID-19 kısıtlamaların uykusuzluk şikayetleri ve gündüz işleyişi üzerindeki etkisini değerlendirmektir.

Gereç ve Yöntem: Türkiye'deki 18-30 yaş arası sağlık bilimleri öğrencilerinden çevrimiçi bir ankete katılmaları istendi. Ankette uyku süresi, uyku kalitesi, uykusuzluk şikayetleri, yaşam kalitesi ve gündüz işleyişine ilişkin sorular yer aldı. Değerlendirmeler (1) [COVID-19 salgını öncesi (CÖ), 1 Ocak 2020-10 Mart 2020], (2) ilk sokağa çıkma yasağı öncesi, (11 Mart 2020-28 Nisan 2021), (3) Sokağa çıkma yasağı dönemi, (29 Nisan 2021-17 Mayıs 2021), (4) ikinci sokağa çıkma yasağı öncesi (YÖ2), (18 Mayıs 2021-31 Aralık 2021) ve (5) (üçüncü sokağa çıkma yasağı öncesi, (1 Ocak 2022-Aralık 2022).

Bulgular: Toplam uyku süresi sokağa çıkma yasağı dönemi ve YÖ2 sırasında CÖ'ye kıyasla önemli ölçüde arttı. Ancak uyku memnuniyeti, uyku kalitesi, uykusuzluk, gündüz yorgunluğu ve yaşam kalitesi sokağa çıkma yasağı dönemi ve YÖ2 sırasında CÖ'ye göre anlamlı derecede kötüleşti. Sokağa çıkma yasağından sonra kısıtlamalar kademeli olarak kaldırıldı ve değerlendirmeler CÖ seviyelerine geri döndü.

Sonuç: Çalışma sonucunda COVID-19 salgınının uyku kalitesini, uykusuzluk şikâyetlerini, gündüz işleyişini ve yaşam kalitesini olumsuz yönde etkilediği tespit edilmiştir.

Anahtar Kelimeler: Uyku, insomnia, gündüz işleyişi, yorgunluk, yaşam kalitesi, COVID-19, öğrenciler

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Introduction

The Severe acute respiratory syndrome-Coronavirus-2 (SARS-CoV-2) was discovered in Wuhan, China in January 2020. Since then, this virus started spreading over the world and the World Health Organization declared it a pandemic on the 12th of March 2020.[1] To reduce and control the spreading of the coronavirus, countries all over the world implemented restrictions and lockdowns. However, there was great variability between and within countries regarding the stringency of the measures taken to prevent the spread of SARS-CoV-2.[2-4] Whereas some countries enforced strict lockdown periods of long duration for the general population (e.g., Australia), other countries (e.g., Sweden and Türkiye) remained relative open societies with fewer restrictions that were limited to hygiene measures and social distancing, or short-term curfews (i.e., partial lockdowns) for specific populations only.[2-4] Research revealed that lockdown measures such as the closure of social venues and stay at home orders in particular had a significant negative impact on young adults.[5,6] In addition, in many countries during the Coronavirus disease-2019 (COVID-19) pandemic there was a switch from classroom to virtual education.[7] The corresponding reduction in social interactions during the lockdown periods was reflected in significantly poorer mood (e.g., stress, anxiety, and loneliness) and a poorer quality of life (QoL).[8-10] For part of these young adults, the lockdown periods were associated with poorer health outcomes and increased health risk behaviors, such as reduced immune fitness[8], a reduction in physical activity,[11-14] and increased alcohol consumption and smoking.[15,16] The COVID-19 pandemic also had a significant impact on sleep. Several studies reported increased sleep problems during the lockdown periods, including disturbed sleep patterns and poorer sleep quality compared to before the COVID-19 pandemic.[17-25] These effects on sleep were reflected in increased daytime fatigue and impaired daytime daily functioning during the lockdown periods. The negative lockdown effects on mood seem related to these reported sleep problems. For example, it was found that psychosocial stress, anxiety, and loneliness during lockdowns was associated with altered sleep behaviors and poorer sleep quality.[18-20] Of note, part of the population also benefited from the lockdown periods.[26] That is, studying from home and being more flexible in daytime planning (e.g., no travel time and the possibility of having naps) resulted in an improvement of sleep.[18,19] The COVID-19 pandemic in Türkiye was characterized by relatively mild interventions to combat the spread of the SARS-CoV-2 virus. For the current study, the Turkish COVID-19 pandemic was divided into five-time periods[26,27]: (1) [before the COVID-19 pandemic (BP), 1 January 2020-10 March 2020], (2) the first no lockdown period (q1, 11 March 2020-28 April 2021), (3) lockdown (29 April 2021-17 May 2021), (4) the second no lockdown period (NL2, 18 May 2021-31 December 2021), and (5) the third no lockdown period (NL3, 1 January 2022-December 2022). The first COVID-19 case in Türkiye was detected on March 11th, 2020. The NL1 comprised the change from face-to-face education to online education. During this period, partial lockdowns were installed for elderly and those below 20 years old, for limited time periods, and depending on the specific risk assessment of Turkish provinces which was re-assessed every two weeks. Shopping malls, market-places, restaurants and other social venues were only closed during the first two months of NL1. A quick rise was seen in SARS-CoV-2 infections during April 2021, and a full lockdown was installed from the 29th of April 2021 until the 17th of May 2021. In addition to stay-at-home orders, public venues were closed, except for supermarkets and pharmacies. The lockdown period was followed by two no lockdown periods, NL2 and NL3. NL2 started as a partial lockdown (evening and night), and from June 2021 social venues re-opened, taking into account hygiene measures and social distancing. During NL3 there were no COVID-19 restrictions. The time periods and associated measures are described in greater detail elsewhere.[26,27] Of note, in previous Turkish research, sleep quality assessments were usually made for the overall COVID-19 pandemic, without differentiating between lockdown and no lockdown periods. In addition, the assessments did not specifically look into insomnia complaints. In contrast, in the current study separate assessments for insomnia complaints were made for both lockdown and no-lockdown periods. Thus, the current study aimed to further evaluate the impact of the COVID-19 pandemic and associated lockdown period in Türkiye on insomnia and QoL among health science students. It was expected that the lockdown period was associated with increased insomnia complaints and poorer QoL.

Materials and Methods

Turkish university students of health science faculties, 18 to 30 years old, were invited via social media (WhatsApp groups and Instagram) to participate in an online survey. The study was approved by the Science-Geo Ethics Review Board (S-G ERB) of Utrecht University (approval number: S-23525c, date: 10.05.2023). Informed consent was obtained electronically, and students were free to discontinue the survey whenever they desired. The survey was developed and completed via Google Forms and conducted in English language. A detailed description of the survey and methodology has been published elsewhere.[28] The survey comprised questions on sleep and QoL. These questions were answered for the periods BP, NL1, lockdown, NL2, and NL3. The survey collected demographic information on age, sex, university, faculty, and which class students followed (year 1 to 5). Total sleep time (in hours) was assessed and sleep quality were assessed using a scale ranging from 0 (very poor) to 10 (excellent).[29] The Insomnia Severity Index (ISI-2) was used to assess insomnia.[30] The ISI-2 comprises two items. The first item assessed the participants' satisfaction with their sleep pattern, the second item assessed to what extent sleep interfered with their daily functioning. The ISI-2 items are scored on 5-point Likert scales (score 0 to 4). The sum score of the two items is the insomnia score, ranging from 0 (no insomnia) to 8 (severe insomnia). Previous research reported that the ISI-2 has a Cronbach's alpha >0.8.[31,32] Daytime fatigue

was measured using a single-item scale, ranging from 0 (absent) to 10 (extreme).[33,34] QoL was measured using a single-item scale, ranging from 0 (very poor) to 10 (excellent).[35]

Statistical Analysis

The statistical analyses were conducted with SPSS (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 29.0. Armonk, NY, USA: IBM Corp.). Study out-comes for the different time periods were compared with the Related-Samples Friedman's Two-Way Analysis of Variance by Ranks. Differences of the periods from BP were considered significant, after Bonferroni's correction for multiple comparisons, if $p<0.0125$. The study outcomes of males and females were compared for each time period with the Independent Samples Mann-Whitney U test, applying a Bonferroni's correction for multiple comparisons ($p<0.0125$ for significance). To evaluate if the possible impact of age, the lockdown effect (difference score, lockdown minus BP) was correlated with age. In addition to age, the lockdown effect was also correlated to academic level (class level 1 to 5). Spearman's correlations were considered significant if $p<0.05$.

Results

N=307 students participated in the study. Three students were excluded from the analysis due to missing data. Two other participants were excluded because their age was outside the inclusion criteria. Data of n=302 students (n=214 females and n=88 males) were analyzed. Their mean standard deviation age was 22.1 (1.9) years old. The students originated from 17 different universities (n=9 from İstanbul and n=8 from other cities). They were students of the faculties of pharmacy (n=172), medicine (n=53), dentistry (n=76), and biochemistry and molecular biology (n=1). The majority of students followed class 2 (20.20%), class 3 (28.81%), and class 4 (33.11%), and to a lesser extent class 5 (10.93%), and class 1 (6.95%). Table 1 and Figure 1 summarize the study outcomes. Compared to BP, total sleep time was significantly increased during lockdown ($p<0.001$) and NL2 ($p=0.010$). Compared to BP, sleep quality was significantly poorer during lockdown ($p<0.001$) and NL2 ($p<0.001$). The reduction in sleep quality for NL1 and NL3 did not reach statistical significance (both $p=0.019$). Compared to BP, satisfaction with sleep was significantly reduced during lockdown ($p<0.001$) and NL2 ($p<0.001$). Compared to BP, the interference of sleep with daytime functioning was significantly greater during lockdown ($p<0.001$). Compared to BP, the ISI-2 insomnia score was significantly higher during lockdown ($p<0.001$) and NL2 ($p<0.001$). Compared to BP, daytime fatigue was significantly greater during NL1 ($p=0.007$), lockdown ($p<0.001$) and NL2 ($p<0.001$). Compared to BP, QoL was significantly poorer during NL1 ($p<0.001$), L1 ($p<0.001$), and NL2 ($p<0.001$) (Figure 2). To evaluate possible sex differences, the study outcomes of males and females were compared for each time period, applying a Bonferroni's correction for multiple com-parisons $p<0.0125$ for significance. No significant sex differences were found. To evaluate the possible impact of age, the lockdown effect (difference score, lockdown minus BP) was correlated with age. In addition to age, the lockdown effect was also correlated to academic level (class level 1 to 5). Except for a significant correlation between age and daytime sleepiness ($r=0.137$, $p=0.017$), none of the difference scores correlated significantly with age or class.

Discussion

This study aimed to assess the influence of the COVID-19 lockdown period on insomnia complaints and QoL among students in Türkiye. Total sleep time, sleep quality, satisfaction with sleep, interference of sleep with daytime functioning, insomnia ratings, daytime fatigue, and QoL of these students differed statistically significant in the lockdown period and NL2 from BP. In addition to this, daytime functioning and QoL in NL1 also differ significantly from BP. The total sleep time seemed to increase after BP with a highest amount during lockdown. The satisfaction with sleep, sleep quality, interference of sleep with daytime functioning, insomnia ratings, daytime fatigue and QoL worsened after BP and was at its worst during the lockdown period after which it started to improve again. Several previous studies on sleep during the COVID-19 pandemic have been conducted among Turkish students. For example, a survey study among Turkish medical students found that significantly poorer sleep quality during the COVID-19 pandemic was reported by 53.4% of students.[36] In another study among Turkish medical students poorer sleep was reported by 81 of

Table 1. Study outcomes

	BP	NL1	Lockdown	NL2	NL3
Total sleep time (hours)	7.4 (1.5)	7.6 (1.4)	8.0 (1.6)*	7.7 (1.4)*	7.4 (1.3)
Sleep quality	6.1 (2.7)	5.8 (2.7)	5.3 (2.7)*	5.5 (2.6)*	5.8 (2.6)
Satisfaction with sleep	1.5 (0.9)	1.7 (1.0)	2.0 (1.0)*	1.9 (1.0)*	1.7 (1.0)
Interference of sleep with daytime functioning	1.8 (1.1)	1.9 (1.1)	2.0 (1.1)*	1.9 (1.1)	1.7 (1.1)
ISI-2	3.3 (1.7)	3.6 (1.6)	4.0 (1.6)*	3.8 (1.5)*	3.4 (1.6)
Daytime fatigue	3.0 (2.8)	3.6 (2.9)*	4.3 (2.9)*	3.8 (2.8)*	3.1 (2.9)
Quality of life	5.7 (2.9)	4.8 (2.6)*	4.1 (2.6)*	4.9 (2.6)*	5.9 (4.2)

Mean and standard deviation (between brackets) for each time period. Data was compared to BP with the Related-Samples Friedman's Two-Way Analysis of Variance by Ranks. Differences from BP were considered significant, after Bonferroni's correction for multiple comparisons, if $p<0.0125$ (indicated by *).
BP: Before the COVID-19 pandemic, NL1: First no lockdown period, NL2: Second no lockdown period, NL3: Third no lockdown period, ISI-2: 2-Item Insomnia Severity Index

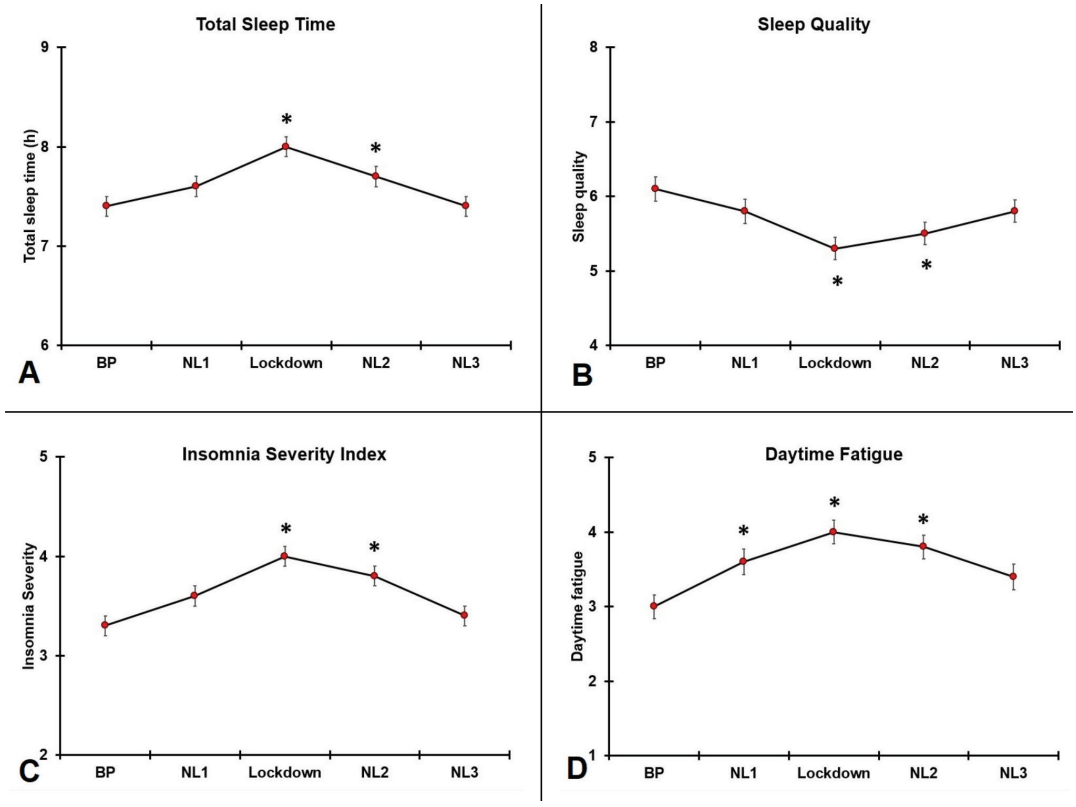

Figure 1. Sleep and daytime fatigue during the COVID-19 pandemic
Shown are (A) total sleep time, (B) sleep quality, (C) insomnia severity index, and (D) daytime fatigue. Differences from BP are considered significant, after Bonferroni's correction for multiple comparisons, if p<0.0125 (indicated by*)

BP: Before the COVID-19 pandemic, NL1: First no lockdown period, NL2: Second no lockdown period, NL3: Third no lockdown period

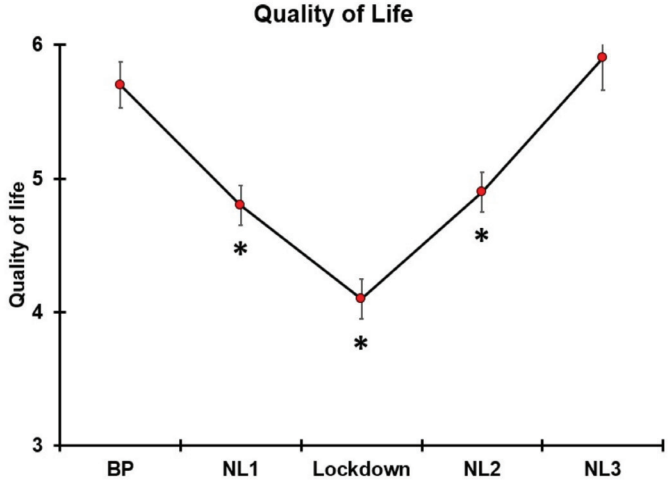

Figure 2. Quality of life during the COVID-19 pandemic
Differences from BP are considered significant, after Bonferroni's correction for multiple comparisons, if p<0.0125 (indicated by*)

BP: Before the COVID-19 pandemic, NL1: First no lockdown period, NL2: Second no lockdown period, NL3: Third no lockdown period

275 students, including increased sleep onset latency and more frequent nightly awakenings.[37] However, a study among n=699 Turkish dental students found that sleep quality during the COVID-19 pandemic was affected by only 2% of students.[38] Several factors may have impacted sleep. A study by Duygulu et al.[39] among n=1920 Turkish university students revealed that 82.3% of students were anxious about getting infected with SARS-CoV-2. The feeling of being unable to cope with the pandemic was significantly associated with experiencing sleep problems. Another survey revealed that 51.8% of n=1222 Turkish nursing students had sleep problems, and that their sleep quality correlated significantly with fear of COVID-19 and anxiety.[40] A survey among n=1065 Turkish university students revealed that poor sleep quality during the COVID-19 pandemic was associated with increased levels of depression, anxiety, stress, and eating disorders.[41] Taken together, these studies suggested that sleep of Turkish students was significantly affected during the COVID-19 pandemic. Taken together, the outcome of this study corresponds with results of earlier studies among Turkish students which also reported poorer sleep during the COVID-19 pandemic. The study adds that the insomnia complaints were most pronounced during the lockdown period, and also negatively impacted daytime functioning and QoL.

Study Limitations

There are several limitations that may have influenced the study outcomes. Firstly, recall bias may have played a role, since the data was collected retrospectively. Secondly, the data were all self-reported and therefore reflect the perceptions of the participants instead of objective assessments of sleep. Third, only a relatively small sample of students completed the survey. It is therefore unclear to what extend the results can be extrapolated to all Turkish students. Finally, the study did not assess whether or not students have been infected by SARS-CoV-2 during the COVID-19 pandemic. Other health issues and use of medicines which could have influenced sleep and academic functioning were also not considered in this survey. These could have had a significant impact on sleep assessments. Future research can take these issues into account.

Conclusion

In conclusion, this study confirmed that sleep was significantly affected during the COVID-19 pandemic in Türkiye. The study adds that insomnia complaints of Turkish students were most profound during the lockdown period. Poorer sleep significantly negatively interfered with daytime functioning and was associated with a poorer QoL. In case of future pandemics, it is important that policymakers take these negative consequences on students' health into account when considering a lockdown to combat the spread of a virus.

Ethics

Ethics Committee Approval: The study was approved by the Science-Geo Ethics Review Board (S-G ERB) of Utrecht University (approval number: S-23525c, date: 10.05.2023).
Informed Consent: Informed consent was obtained electronically, and students were free to discontinue the survey whenever they desired.

Footnotes

Authorship Contributions

Concept: S.T., P.A.H., H.B., N.A., J.C.V., Design: S.T., P.A.H., H.B., N.A., J.C.V., Data Collection or Processing: S.T., Analysis or Interpretation: J.C.V., Literature Search: S.T., J.C.V., Writing: S.T., P.A.H., H.B., N.A., J.C.V.
Conflict of Interest: Over the past 36 months, J.V. has acted as a consultant/expert advisor to Eisai, KNMP, Med Solutions, Mozand, Red Bull, Sen-Jam Pharmaceutical, and Toast!. J.V. has received travel support from Sen-Jam Pharmaceutical and owns stock from Sen-Jam Pharmaceutical. No conflict of interest was declared by the other authors.
Financial Disclosure: The authors declared that this study received no financial support.

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