





# Evaluation of Daytime Sleepiness and Related Factors of Midwifery Students During the Covid-19 Pandemic: A Multi-Site, Cross-Sectional Study

Ebelik Öğrencilerinin Covid-19 Pandemisi Sırasında Gündüz Uykululuğu ve İlişkili Faktörlerin Değerlendirilmesi: Çok Alanlı, Kesitsel Bir Çalışma

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## ABSTRACT

**Objective:** The present study aimed to investigate the prevalence of daytime sleepiness and related factors, particularly during the pandemic period among midwifery students ( $n = 474$ ).

**Methods:** This cross-sectional study data were collected from the Information Form, Epworth Sleepiness Scale, and State-Trait Anxiety Inventory.

**Results:** The prevalence of students with daytime sleepiness (Epworth Sleepiness Scale  $\geq 10$ ) was determined as 22.2%. It was found that the sleep duration after the pandemic increased significantly in both groups. The multivariate logistic regression analysis results demonstrated that the Trait Anxiety score, sleepiness in lessons, and the state of having a sleep routine at night were the risk factors affecting daytime sleepiness among midwifery students.

**Conclusion:** Students should be directed to pieces of training where they will gain sleep habits.

**Keywords:** Anxiety, midwifery students, sleepiness

## ÖZ

**Amaç:** Bu çalışmada ebelik öğrencilerinde ( $n=473$ ) özellikle pandemi döneminde gündüz uykululuk prevalansının ve ilişkili faktörlerin araştırılması amaçlanmıştır.

**Yöntemler:** Bu kesitsel çalışmanın verileri Bilgi Formu, Epworth Uykululuk Ölçeği (ESS) ve Durumluk-Sürekli Kaygı Envanteri (STAI) ile toplanmıştır.

**Bulgular:** Gündüz uykululuk (ESS  $\geq 10$ ) olan öğrencilerin yaygınlığı %22,2 olarak belirlendi. Pandemi sonrası uyku süresinin her iki grupta da anlamlı olarak arttığı saptandı. Çok değişkenli lojistik regresyon analizi sonuçları, ebelik öğrencilerinde Sürekli Kaygı puanı, derslerdeki uykululuk hali ve gece uyku düzenine sahip olma durumunun gündüz uykululuğunu etkileyen risk faktörleri olduğunu göstermiştir.

**Sonuç:** Öğrenciler uyku alışkanlığı kazanacakları eğitimlere yönlendirilmelidir.

**Anahtar Kelimeler:** Uyku hali, ebelik öğrencileri, anksiyete

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## Introduction

The Covid-19 epidemic emerged in Asia in December 2019 escalating into a pandemic situation that swiftly had the entire world in its grip (WHO, 2020a; WHO, 2020b). Many measures were put in place to curb the spread of the pandemic. Crowded environments such as schools and universities where contamination could easily occur were closed as part of these measures (Bozkurt, 2020; Jung et al., 2020). Courses continued online following the closure of universities and schools (Erkut, 2020). School closures had been one of the central policies of global health strategies implemented

worldwide, which significantly affected students' daily routines such as leisure activities, social communication, and especially sleep (Ranjbar et al., 2021). Known to have irregular sleep patterns with a tendency to stay up late even before the pandemic (Howells & Smith, 2019), university students, especially those studying Medicine and Health Sciences, have a substantial academic burden that leads to sleep deprivation and daytime sleepiness (Dagnew et al., 2020).

Excessive daytime sleepiness refers to the difficulty in maintaining the desired level of alertness. There is uncontrollable sleepiness during the daytime, often accompanied by symptoms such as slowing down of psychomotor skills and closing the eyelids longer than necessary to blink (Arbour et al., 2020; Demir, 2017; Isac & Abraham, 2020; Panchal & Yadav, 2020; Shen et al., 2019). Daytime sleepiness is normal for everyone, yet it becomes problematic when it is excessive. Excessive daytime sleepiness has become a significant public health issue that can cause adverse behavioral, physiological, cognitive effects, poor social relationships, psychological distress, and poor academic performance that limit individuals' functions and quality of life (Dagnew et al., 2020; Howells & Smith, 2019; Roth, 2015; Shen et al., 2019). In this context, an examination of studies in the literature shows that the prevalence of daytime sleepiness is high among students, and it is one of the most common sleep problems among students (Demir, 2017; Howells & Smith, 2019; Johnson et al., 2017; Kaur & Singh, 2017). Among the factors that negatively affect academic performance, university students rank sleep problems second only to stress (American College Health Association, 2011).

The etiology of excessive daytime sleepiness is multifactorial; it is associated with age, gender, stress, BMI (obesity), smoking and alcohol intake, illness, anxiety, or depression (Arbour et al., 2020; Shen et al., 2019). In addition, different studies have shown that caffeine is a factor affecting daytime sleepiness among university students (Kaur & Singh, 2017; Sawah et al., 2015). In a study conducted with a large sample ( $n=4882$  medical students), it was also found that students with daytime sleepiness had a higher degree of depression and anxiety than students without daytime sleepiness (Shen et al., 2019). Sleep problems were reported to significantly impact depression and anxiety among Estonian medical students ( $n = 413$ ); it was emphasized that there was a significant relationship between daytime sleepiness and depressive symptoms among female students (Eller et al., 2006).

In recent studies with university students in medicine and health departments (usually nurses) in various countries, different prevalence rates have been reported for daytime sleepiness, ranging from 26% to 90% (Dagnew et al., 2020; Jahrami et al., 2019; Kaur & Singh, 2017; Sammer et al., 2020). In studies conducted during the Covid-19 pandemic period, this prevalence rate ranged from 10.31% to 20.2% (Becker et al., 2021; Tao et al., 2021). The culprit is students confined to their homes are socially restricted.

In the literature review on the basis of this information, no study was found that investigated the daytime sleepiness of midwifery students responsible for the care of pregnant women and babies who have a high academic workload. Thus, the current study aimed to determine the prevalence of daytime sleepiness and the factors affecting daytime sleepiness, especially during the pandemic period among midwifery students. In this context, the research questions are

- Is there daytime sleepiness among midwifery students during the Covid-19 pandemic? What is the current situation like?
- What are the factors affecting students' daytime sleepiness status?

## Methods

### Design and Setting

The research is a multi-center, cross-sectional online survey study involving students studying in midwifery undergraduate programs in Turkey between December 24, 2020, and April 30, 2021.

### Recruitment and Data Collection

The research population consists of students studying in midwifery undergraduate programs at 57 universities (private and state). All students, enrolled in the midwifery programs of these universities, were invited to participate in the study via WhatsApp groups and social media accounts using convenience sampling. The invitation included an information sheet explaining the study, assuring students that participation was voluntary and anonymous and included a link to a consent sheet and the online survey. The surveys were prepared via Google Form and remained open from December 24, 2020, to April 30, 2021. During the data collection process, two reminder messages were sent to WhatsApp groups and social media accounts.

### Sample Size

The estimated population of students at participating universities was 15,617. It was determined to reach a minimum of 375 students in the research with the Raosoft sample size calculation program using the sample size formula known in the study universe ( $\alpha=0.05$ ,  $1 - \beta=0.95$ ) ([http://www.raosoft.com/sample\\_size.html](http://www.raosoft.com/sample_size.html)).

Students who can read and understand Turkish in undergraduate midwifery departments of universities (private and state) in Turkey, are willing to participate in the study, have access to the Internet, and answer the questionnaires fully are included in the study.

### Survey Instrument

The survey comprised the Information Form, Epworth Sleepiness Scale (ESS), and The State-Trait Anxiety Inventory (STAI). Details of the forms are given in the following sections.

### Information Form

The form consists of 30 questions in total, including students' sociodemographic characteristics (class, age, place of residence, family type, family income, et cetera), sleep-related features before and after the pandemic, and factors that may affect sleep.

### Epworth Sleepiness Scale

It is a self-administered eight-item questionnaire widely used for the assessment of daytime sleepiness. Participants are asked to rate their recent chances of falling asleep in eight different daily life situations, using a 4-point scale (0–3) for the rating (0 = never fall asleep, 3 = high chance of falling asleep). Participants receive scores ranging from 0 to 24. A high score indicates severe daytime sleepiness (Johns, 1992). The scale has high sensitivity and high specificity, with a cut-off score of >10 for abnormal daytime sleepiness (Johns, 1992). The scale's validity and reliability were validated by Izci et al (2008) in Turkey, and the Cronbach's alpha ( $\geq 0.86$ ) was measured in the study. It was determined to have a high level of internal consistency (Izci et al., 2008). The alpha

value for this study was 0.73. Written permission was obtained from Izci et al. for the use of the scale.

### The State-Trait Anxiety Inventory

The validity and reliability of the Turkish version of the scale, developed by Spielberger et al. in 1970, were validated by Öner and Le Compte (1974–1977). It consists of 40 items; the “State Anxiety Scale” consists of 20 items and the “Trait Anxiety Scale” consists of 20 items. The emotions or behaviors expressed in the items of the State Anxiety Inventory are indicated by marking one of the options (1) not at all, (2) a little, (3) a lot, (4) completely, depending on the degree to which the individual feels the situation he/she is in. Emotional behaviors expressed in Trait Anxiety Inventory items are rated as (1) rarely, (2) sometimes, (3) often, and (4) always, according to the degree of frequency. There are 2 types of expressions in the scales, direct and inverted. Ten items (items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20) in the state anxiety scale and seven items (1, 6, 7, 10, 13, 16, 19) in the trait anxiety scale in the other scale has a reversed expression. For scoring, the total weighted score of the reverse statements is subtracted from the total weighted score of the direct statements, and 50, a predetermined and unchanging value for state anxiety, and 35 for trait anxiety are added to this number. A minimum of 20 and a maximum of 80 points are taken from each scale. A high score indicates a high level of anxiety, and a low score indicates a low level of anxiety (Öner, 1997; Öner & Le Compte, 1983). The alpha value of the scale is 0.83–0.87 for the Trait Anxiety Scale and 0.83–0.92 for the State Anxiety Scale. For this study, the alpha value for the Continuity Anxiety Scale was 0.86, and the State Anxiety Scale was 0.92. Written permission was obtained for the use of the scale.

### Ethical Considerations

Approval for the study was obtained from Karabuk University's Social Sciences and Humanities Research Ethics Committee (Reference number: E-78977401-050.02.04-368 Date: December 24, 2020). All the procedures were performed according to the rules when it came to studies involving human participants, in consideration of the ethical standards of the institutional and national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

### Statistical Analysis

The IBM Statistical Package for Social Sciences V23 software (IBM SPSS Corp., Armonk, NY, USA) was used for data analysis. The conformity of the data to the normal distribution was examined using the Kolmogorov–Smirnov test. Descriptive statistical methods (frequency, percentage, arithmetic mean, standard deviation, median) were used in the data analysis. It was presented as mean  $\pm$  standard deviation and median (minimum–maximum) for quantitative data and as frequency and percentage for categorical data. Pearson's Chi-Square test, Fisher's exact, and Mann–Whitney *U* test were used for intergroup comparisons. Logistic regression analysis (backward elimination Wald method) was used to analyze the independent variables affecting daytime sleepiness. Logistic regression analysis was analyzed as univariate and multivariate models. Statistical significance was accepted at  $p < .05$  at the 95% confidence interval.

## Results

Four hundred seventy-three undergraduate students studying in the midwifery departments of various foundation and state schools in Turkey answered the online questionnaires. The mean

age of the students was  $20.83 \pm 1.92$ , and their mean body mass index (BMI) was found to be normal ( $21.90 \pm 3.45$ ). The majority of the participants were third-year undergraduate midwifery students (Table 1, 31.7%,  $n=150$ ). Further, 59% of the participants stated that their academic achievement was good. The majority (98.1%) were single, and 69.3% of them stated that the income situation in their households was equal to the expenditure situation. It was determined that the BMI of 68.9% of the students was within normal limits, 87.7% of them did not drink alcohol, and 88.2% of them did not smoke. While 46.7% of the participants reported that they stayed in the dormitory before the pandemic, 92.4% stated that they lived with their families after the pandemic (Table 1).

Since it was determined as  $\geq 10$  cut-off points for abnormal daytime sleepiness in the ESS scale, a cut-off score of 10 was used in our study. According to the ESS scale, there was no statistically significant difference between groups with and without sleepiness and sociodemographic characteristics ( $p > .005$ , Table 1). The prevalence of students with daytime sleepiness (ESS  $\geq 10$ ) was also found to be 22.2%.

A statistically significant difference was found between the trait anxiety score and the state anxiety score in comparing the STAI scores and the groups. However, no significant difference was found between the state anxiety score (Table 1). The trait anxiety score of the group with abnormal daytime sleepiness was statistically significantly higher ( $p < .005$ , Table 1).

A statistically significant difference was found between the groups in waking up at night, falling asleep during classes, and sleeping simultaneously at night in the current study ( $p=.045$ ,  $p=.000$ ,  $p=.000$ , Table 2). Bonferroni correction post hoc analysis revealed that this difference was due to the group that never went to bed simultaneously at night.

No statistically significant difference was found between the groups regarding gastrointestinal tract (GIT) disorder, acute infection, psychological discomfort, ability to fall asleep quickly, using any medication due to a chronic disease, and doing regular exercise in the last month ( $p > .05$ ). Furthermore, there was no statistically significant difference between the groups regarding the duration of sleep stated by the participants at night and the time they slept in 24 hours before and after the pandemic ( $p > .05$ ).

There was no statistically significant difference between the groups regarding the mean sleep duration of the students within 24 hours before and after the pandemic. However, via the Wilcoxon analysis performed within the groups, it was determined that the increase in sleep duration after the pandemic was statistically significant in both groups ( $p=.001$ ,  $p=.000$ , Table 2).

The independent risk factors affecting daytime sleepiness were evaluated by binary logistic regression analysis (Backward Elimination Wald Method). It was observed that the mean age of the students, trait anxiety score, napping during classes, and sleeping simultaneously at night were the independent variables affecting daytime sleepiness. Variables that were significant due to the multivariate analysis were found to have a statistically significant effect as a result of the univariate analysis; they were identified as independent risk factors. It was found that 77.6% of the cases were classified correctly with the model created by the multivariate analysis.

**Table 1.**  
Comparison of Students' Sociodemographic Characteristics and STAI Scale Scores

	Total (N= 473)		ESS ≥10 (N=105)		ESS <10 (N= 368)		Statistics	
	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	Z	p
<b>Age</b>	20.83 ± 1.92	21 (18–33)	21.17 ± 2.23	21 (18–32)	20.74 ± 1.81	21 (18–33)	–1.812	<b>.07</b>
<b>BMI</b>	21.90 ± 3.45	21.3 (15.50–35.86)	22.47 ± 3.90	21.93 (16.18–34.89)	21.74 ± 3.30	21.20 (15.50–35.86)	–1.415	.157
<b>STAI-State Anxiety</b>	40.9 ± 5.16	40 (27–59)	40.95 ± 5.01	40 (31–54)	40.89 ± 5.20	40 (27–59)	–0.01	1.00
<b>STAI-Trait Anxiety</b>	48.08 ± 6.18	48 (32–79)	49.40 ± 6.03	50 (37–68)	47.7 ± 6.17	47 (32–79)	–2.52	<b>.010</b>
<b>Sociodemographic characteristics</b>	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	$\chi^2$	<i>p</i>
Which grade is she reading?							0.925	.819
First grade	87	18.4	19	18.1	68	18.5		
Second grade	126	26.6	26	24.8	100	27.2		
Third grade	150	31.7	32	30.5	118	32.1		
Fourth grade	110	23.3	28	26.7	82	22.3		
Academic success							3.133	.209
Moderate	136	28.8	27	25.7	109	29.6		
Good	279	59.0	60	57.1	219	59.5		
Very good	58	12.3	18	17.1	40	10.9		
Socioeconomic status							3.264	.196
Income less than expenses	96	20.3	24	22.9	72	19.6		
Income equals expense	328	69.3	66	62.9	262	71.2		
Income more than expenses	49	10.4	15	14.3	34	9.2		
Marital status							0.653	.691*
Married	9	1.9	1	1	8	2.2		
Single	464	98.1	104	99	360	97.8		
Body mass index							5.497	.139
Underweight (<18.5)	67	14.2	13	12.4	54	14.7		
Normal (18.5–24.9)	326	68.9	67	63.8	259	70.4		
Overweight (25–29.9)	68	14.4	20	19	48	13		
Obese (30–39.9)	12	2.5	5	4.8	7	1.9		
Alcohol use							0.087	.768
I do not use	415	87.7	93	88.6	322	87.5		
Social drinker	58	12.3	12	11.4	46	12.5		
Smoking							2.132	.344
I do not use	417	88.2	89	84.8	328	89.1		
<10 pieces per day	39	8.2	10	9.5	29	7.9		
From 10 pieces per day>	17	3.6	6	5.7	11	3		
Drinking coffee							10.808	<b>.004</b>
I do not use	130	27.5	19	18.1	111	30.2		
1–2 cups a day	317	67.0	75	71.4	242	65.8		
3≥ cups per day	26	5.5	11	10.5	15	4.1		
Place of residence before the pandemic							4.575	.206*
Student house	50	10.6	9	8.6	41	11.1		
Dormitory	221	46.7	54	51.4	167	45.4		
With family	190	40.2	42	40	148	40.2		
At relatives house	12	2.5	0	0	12	3.3		
Where she currently resides							5.678	.058*
Student house	27	5.7	1	1	26	7.1		
Dormitory	437	92.4	102	97.1	335	91		
With family	9	1.9	2	1.9	7	1.9		

Z: Mann–Whitney U test;  $\chi^2$ : Pearson Chi-square test; \*Fisher's exact test.

**Table 2.**  
Comparison of the Sleep-Related Characteristics of the Students According to the Groups

Sleep-Related Features	Total (N=473)		ESS ≥10 (N=105)		ESS <10 (N=368)		Statistics	
	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Z*	p
Mean sleep time in 24 hours	7.98 ± 1.31	8 (4-12)	7.94 ± 1.24	8 (4-12)	7.99 ± 1.33	8 (4-12)	-0.443	.658
Mean sleep time in 24 hours before the pandemic	7.32 ± 1.47	7 (3-15)	7.35 ± 1.27	7 (5-10)	7.32 ± 1.53	7 (3-15)	-0.41	.680
	<b>p = .000; Z** = -8156</b>		<b>p = .001; Z** = -3217</b>		<b>p = .000; Z** = -7592</b>			
Sleep time at night	7.19 ± 1.45	7 (4-12)	7.22 ± 1.36	8 (4-10)	7.18 ± 1.47	7 (4-12)	-0.517	.605
ESS	6.54 ± 3.90	6 (0-18)	12.18 ± 2.05	12 (10-18)	4.94 ± 2.58	5 (0-9)	-15.69	<b>&lt; .001</b>
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>χ²</b>	<b>P</b>
Having a gastrointestinal tract (GIT) disorder in the past month							3.383	<b>.066</b>
Yes	84	17.8	25	23.8	59	16		
No	389	82.2	80	76.2	309	84		
Acute infection in the last month							0.95	.330
Yes	23	4.9	7	6.7	16	4.3		
No	450	95.1	98	30.4	352	95.7		
Psychological disorder in the last month							1.007	.316
Yes	71	15	19	18.1	52	14.1		
No	402	85	86	81.9	316	85.9		
Waking up at night							4.02	<b>.045</b>
Yes	243	51.4	63	60	180	48.9		
No	230	48.6	42	40	188	51.1		
Falling asleep comfortably							0,12	.942
Never	68	14.4	15	14.3	53	14.4		
Sometimes	205	43.3	47	44.8	158	42.9		
Always	200	42.3	43	41	157	42.7		
Sleepiness in courses							21,397	<b>&lt;.001***</b>
Never	43	9.1	0	0	43	11.7		
Sometimes	273	57.7	55	52.4	218	59.2		
Always	157	33.2	50	47.6	107	29.1		
Sleeping at the same time at night							20.86	<b>&lt;.001</b>
Never	183	38.7	60	57.1	123	33.4		
Sometimes	214	45.2	37	35.2	177	48.1		
Always	76	16.1	8b	7.6	68b	18.5		
Using a medication							1.438	.230
Yes	46	9.7	7	6.7	39	10.6		
No	427	90.3	98	93.3	329	89.4		
Exercising regularly							0.153	.695
Yes	84	82.2	20	19	64	17.4		
No	389	17.8	85	81	304	82.6		

Z\*: Mann-Whitney U test; Z\*\*: Wilcoxon test; \*\*\*Fisher's exact test; χ²: Chi-square test.

Accordingly, the increase in the age of the students increased their daytime sleepiness by 1.123 times and the increase in their trait anxiety by 1.051 times. It was determined that the students who never slept in the classes had a 0.540 times decrease in sleepiness compared to those who dozed off all the time. It was observed that the daytime sleepiness of students who did not always go to bed at the same time at night was 3.559 times higher than students who always slept simultaneously (Table 3).

### Discussion

The Covid-19 pandemic affected the world population in many ways, especially physically and mentally. One of the most affected institutions by this epidemic is universities that provide education at the undergraduate level. In order to control the epidemic, all schools and universities in Turkey and around the world have started to provide online training instead of face-to-face training



**Table 3.**  
*Risk Factors Affecting Daytime Sleepiness*

	Univariate		Multivariate	
	OR (95% CI)	p	OR (95% CI)	p
Age	1.110 (1.000–1.232)	<b>.049</b>	1.123 (1.003–1.256)	<b>.043</b>
STAI-Trait Anxiety	1.045 (1.009–1.082)	<b>.014</b>	1.051 (1.014–1.1091)	<b>.007</b>
Napping during lesson (always) (reference category)		<b>.026</b>		<b>.032</b>
Napping during lesson (sometimes)	0.000 (0.000)	.997	0.000 (0.000)	.997
Napping during lesson (Never)	0.540 (0.345–0.845)	<b>.007</b>	0.533 (0.333–0.853)	<b>.009</b>
Sleep at the same time at night (always) (reference category)		<b>&lt;.001</b>		<b>.001</b>
Sleep at the same time at night (sometimes)	4.146 (1.873–9.181)	<b>&lt;.001</b>	3.559 (1.566–8.088)	<b>.002</b>
Sleep at the same time at night (never)	1.777 (0.787–4.009)	.166	1.680 (0.729–3.870)	.223
Constant				<b>&lt;.001</b>
Accuracy = 77.6%				

(Dedeilia et al., 2020; Erkut, 2020; Genta et al., 2021; Tokuç & Varol, 2020).

Daytime sleepiness is stated as an important sleep problem with a high prevalence rate among university students. In studies conducted in different countries using the Epworth Insomnia Scale, the prevalence of daytime sleepiness in students was found to be between 26% and 90% (Dagnev ve ark., 2020; Jahrami et al., 2019; Kaur & Singh, 2017; Sameer et al., 2020).

Studies conducted during the Covid-19 pandemic indicate that the prevalence of daytime sleepiness varies between 10.31% and 20.2% (Becker et al., 2021; Tao et al., 2021). When the literature is examined, it has been observed that although there are a limited number of daytime sleepiness studies conducted with nursing students in Turkey, there are also studies other than those conducted only with midwifery students (Demir, 2017; Dođru ve ark., 2021). Hayley et al. (2014) evaluated Excessive Daytime Sleepiness using the ESS scale in their study, which included 946 men and 1104 women, and found the prevalence of ESS to be 13.6% among women (Hayley et al., 2014). In a cross-sectional study conducted by Demir (2017), the prevalence of daytime sleepiness and influencing factors were discussed. It included 382 nursing students. The study found that the prevalence of daytime sleepiness, which was evaluated using the ESS scale, was 10.5% among nursing students (Demir, 2017). Shen et al. (2019), in their study conducted with 4882 students from three different medical faculties in Hunan, China, evaluated daytime sleepiness with ESS and found the prevalence of daytime sleepiness to be 24.6%. Sameer et al. (2020) reported a rate of 44.9% with 441 medical students, while Isac and Abraham's (2020) study with nursing students found that 57.4% experienced excessive daytime sleepiness. Daytime sleepiness of midwifery students was evaluated using ESS in the present study. The prevalence of students with daytime sleepiness (ESS  $\geq 10$ ) was 22.2%. In addition, the ESS score was significantly higher in the group with ESS  $\geq 10$  ( $12.18 \pm 2.05$ ;  $4.94 \pm 2.58$ ,  $p < .001$ , Table 2). While the result of this study is similar to the results of Shen et al.'s study with a larger sample, it differs from the results of other studies (Shen et al., 2019). The reason is these are studies including student groups of both genders from different cultures receiving education in different departments. Further, the dissimilarity of the female age groups included and

the fact that pre-pandemic data were collected are also among the reasons. Although the results of this study were obtained only from female students studying in midwifery departments, it is thought that the fundamental reason why Shen et al.'s (2019) research results are similar to the results of the current study is that the data in the current study were collected during the Covid-19 pandemic (Shen et al., 2019).

American Academy of Sleep Medicine and Sleep Research Society recommends 7 hours of sleep per night for adults and up to 9 hours per night for adolescents and young adults to support optimal health (Watson ve ark., 2015). In the current study, while the duration of sleep in all students was  $7.32 \pm 1.47$  before the pandemic, this duration increased slightly after the pandemic and was found to be  $7.98 \pm 1.31$  in line with the literature. However, there was no statistical difference between the groups regarding average 24-hour sleep times and nighttime sleep durations before and after the pandemic. Upon reviewing the literature, Genta et al. (2021), in their study with 94 high school students, found that the pandemic had a significant impact on students' sleep behaviors and quality of life. Similarly, in a study conducted by Wright et al. (2021) with 139 university students, it was determined that there were significant changes in the sleep behaviors of the students who stayed at home and followed the "Stay home, stay safe" slogan during the Covid-19 period (Wright et al., 2020). The results of the present study and the results from the research studies are different from each other since the content of the intensive education before the pandemic continues online in the same way during the pandemic, and it is compulsory to attend the courses. Factors such as age, marital status, BMI, smoking, alcohol, coffee consumption, class, academic achievement, and residence can affect daytime sleepiness in individuals (Avanak et al., 2018; Demir, 2017; Kaur & Singh, 2017; Vilela et al., 2016). The study determined that age, BMI, marital status, alcohol and coffee consumption, smoking, residence, academic achievement, and class did not affect daytime sleepiness. Upon reviewing the literature, with respect to the study conducted by Demir (2017) with 382 nurse students, it was determined that the rate of daytime sleepiness was higher among students who consumed coffee and tea, those who were married, and those who lived alone and had poor academic achievement. This situation was found to be statistically significant (Demir, 2017). When other studies

were examined, it was determined that coffee, tea, alcohol consumption, and smoking were associated with increased daytime sleepiness (Avanak et al., 2018; Kaur & Singh, 2017). It has been determined that the current study has different results from other studies because students are at home during the pandemic period and do not spend time on the road to go to school or when returning and do not have to get up early. Thus, in the present study, we argue that it does not affect daytime sleepiness due to the low rates of alcohol and cigarette use and coffee consumption ( $3 \geq$  cups per day) in both groups and the BMI ratio being within the normal range in both groups. The current study believes that the fact that it does not affect daytime sleepiness in the respective classrooms covered by this study may be due to the online education and the postponement of internship applications due to the pandemic.

Anxiety and stress are also known to affect sleep (Horenstein et al., 2019). The current Covid-19 pandemic causes psychosocial problems such as stress, anxiety, fear, poor sleep quality, and sleep disorders (Rana et al., 2020; Xiao et al., 2020). Anxiety and stress levels increase as the routines of university students have changed since the outbreak of the Covid-19 pandemic (Romero-Blanco et al., 2020). Romero-Blanco et al. (2020) evaluated sleep quality using the Pittsburgh Sleep Quality Index (PSQI) in a longitudinal observational study in which 207 nursing students examined sleep pattern changes during the Covid-19 quarantine. It was determined that the PSQI average score of the students participating in the study was worse, with 0.91 points during the quarantine (95% CI,  $-0.51, -1.31$ ) (Romero-Blanco et al., 2020). Shen et al. (2019) evaluated anxiety using the Self-Rating Anxiety Scale in their study. They examined the prevalence of excessive daytime sleepiness, related factors, and its relationship with suicidal behaviors among medical students in Hunan, China. They found that students with high ESS scores also had high anxiety scores (OR, 1.638; 95% CI, 1.366–1.995;  $p < .001$  (Shen et al., 2019)). In the current study, when the trait anxiety and state anxiety scale scores were compared between the groups, a significant difference was found between the groups with trait anxiety scores (ESS  $\geq 10$ ;  $49.40 \pm 6.0$ ; ESS  $< 10$ ;  $47.7 \pm 6.1$   $P = .010$ ); no significant difference was found between the groups with state anxiety scores (ESS  $\geq 10$ ;  $40.95 \pm 5.0$ ; ESS  $< 10$ ;  $40.89 \pm 5.2$   $P = 1.00$ ). Similar to other studies in the literature, it was determined by the current study that the group with excessive daytime sleepiness had a significantly higher trait anxiety score ( $p < .005$ , Table 1). In addition, in the present study, trait anxiety was determined as an independent risk factor affecting daytime sleepiness according to multivariate and univariate binary logistic regression analysis; higher trait anxiety scores increased ESS 1.051 times (Table 3).

Hayley et al. (2014) also stated in their studies that the ESS score increased as the age increased. Epworth Sleepiness Scale was found to be 14.7% among women aged 20–29 years and 17.0% among women aged over 80 (Hayley et al., 2014). Van der Spuy et al. (2017), as a result of univariate and multivariate analyses, found that increased age is associated with the risk of ESS. These results support the conclusion in the present study that ESS increases with increasing age. According to the binary logistic regression analysis, increasing the age of the students, which is an independent risk factor affecting ESS, increases daytime sleepiness 1123 times (Table 3).

Sleep is a fundamental component of physical and mental health. Studies have shown a direct relationship between insufficient

sleep time (less than 7–8 hours of sleep per night) and sleep habits, emphasizing the importance of healthy and consistent sleep habits (Garmy & Ward, 2018). It has been stated that paying attention to regular sleep habits, especially in adolescence, is a protective factor against the emergence of sleep-related psychopathology, providing positive brain development (Lapidaire et al., 2021). It has been observed that napping during lessons and going to bed always at the same time are independent variables affecting ESS. The independent risk factors affecting daytime sleepiness were evaluated by binary logistic regression in the current study. It was determined that the ESS of the students who did not sleep during the lessons was 0.540 times lower than those who did not sleep, and it was thought that this might be related to insufficient sleep. In addition, it was determined that at times sleeping at the same time at night as a sleeping habit increased ESS 3559 times compared to always sleeping at the same time. Therefore, it has been determined that sleep habits such as going to bed always at the same time are essential in reducing or preventing ESS (Table 3).

### Study Limitations

The first limitation of the study was that the research was conducted online. Although the number of samples determined for the study was reached, the data obtained do not represent the entire universe. The second limitation was that it is not known how many students attended which university. It meant that differences in attitude among respondents at universities with higher participation rates were potentially overlooked. The third limitation is that student participation in the study was voluntary.

### Implications for Midwifery Practice

It is the first study to investigate daytime sleepiness and related factors of midwifery students responsible for the care of pregnant women and infants and have a high academic workload. Although studies are examining the role of depression on ESS in the literature (Howells & Smith, 2019), the fact that there is only one study investigating the role of persistent anxiety on ESS shows that the current study will contribute to this field.

Anxiety and stress negatively affect sleep. Especially the Covid-19 pandemic causes psychosocial problems such as stress, anxiety, fear, low sleep quality, and sleep disorders in society. In the current study, a significant amount of daytime sleepiness and persistent anxiety were found among students; this was influenced by the absence of routine sleep habits. It is recommended to organize training courses to help students gain sleep habits at night and provide counseling for changing habits.

### What is already known about this topic?

The closure of universities during the Covid-19 pandemic has been one of the main policies of global health strategies implemented around the world and has had significant effects on students' daily routines such as leisure activities, social communication, and especially sleep.

This situation causes sleep deprivation and daytime sleepiness in university students studying in Health Sciences, which are known for their irregular sleep patterns and late bedtimes due to their academic burden.

It is known that the prevalence of daytime sleepiness is high among university students and it is one of the most common sleep problems in students.

The daytime sleepiness of midwifery students, who are responsible for the care of pregnant women and babies and have a high academic workload, and the factors affecting this situation have not been investigated.

### What this paper adds?

An undeniable amount of daytime sleepiness and an ongoing anxiety were found in midwifery students.

A significant increase was found in students' sleep time after the pandemic.

It was observed that the mean age of the students, trait anxiety score, napping during classes, and sleeping simultaneously at night were independent risk factors affecting daytime sleepiness.

### What are the implications of these findings for clinical practice?

The lack of routine sleep habits before going to bed at night affected the daytime sleepiness and persistent anxiety detected in the students. For this reason, it will guide the educators in adding courses or trainings that will help students gain sleep habits at night to the curriculum of the department.

It will ensure that the necessary importance is given to daytime sleepiness, which is ignored in students and significantly affects academic success, and initiatives are taken to prevent it.

It will create awareness about daytime sleepiness in midwifery students.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Karabük University (Date: December 24, 2020, Number: 78977401-050.02.04-368).

**Informed Consent:** Written informed consent was obtained from students who participated in this study.

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## Genişletilmiş Özet

Covid-19 salgını Aralık 2019'da Asya'da ortaya çıkmış ve hızla dünyayı etkisi altına alan bir pandemi durumuna ilerlemiştir. Şimdiye kadar dünya nüfusu üzerinde çeşitli finansal ve yaşamsal etkileri olmuştur. Pandemi yayılımını azaltmak için çok sayıda önlem belirlenmiş ve okul, üniversite gibi bulaşmanın oluşabileceği kalabalık ortamlar bu tedbirler kapsamında kapatılmıştır. Pandemi ve bu kapanmanın psikososyal etkileri göz ardı edilmemelidir. Üniversite ve okulların kapatılmasıyla birlikte dersler çevrimiçi olarak devam etmiştir. Okulların kapanması dünya çapında uygulanan küresel sağlık stratejilerinin merkezi politikalarından biri olmuştur. Öğrencilerin boş zaman etkinlikleri, sosyal iletişim ve özellikle uyku gibi günlük rutinleri bu durumdan önemli ölçüde etkilenmiştir.

Gündüz aşırı uyku hali, istenen uyanıklık düzeyini korumada yaşanan güçluktur. Gündüzleri kontrol edilemeyen uyku hali vardır, sıklıkla psikomotor yavaşlama ve göz kapaklarını kırpmak için gerekenden daha uzun süre kapatma gibi belirtilerle birlikte. Gündüz uyku hali herkes için normaldir, ancak aşırı olduğunda kişi için problemler hale gelir. Gündüz aşırı uykululuk, olumsuz davranışsal, fizyolojik, bilişsel etkilere, zayıf sosyal ilişkilere, psikolojik sıkıntıya ve düşük akademik performansa neden olabilen, bireylerin işlevlerini ve yaşam kalitelerini sınırlayan önemli bir halk sağlığı sorunu haline gelmiştir. Bu bağlamda literatürdeki çalışmalar incelendiğinde üniversite öğrencileri arasında gündüz uykululuk prevalansının yüksek olduğu, uyku sorunlarının depresyon ve kaygı önemli ölçüde etkilediği bildirilmiştir. Covid 19 pandemi döneminde yapılan çalışmalarda bu prevalansın arttığı saptanmış, bunun nedeninin de öğrencilerin evlerine kapatıldığı ve sosyal olarak kısıtlandığı görüşü olmuştur. Covid-19 salgını, öğrencilerin uyku düzenlerini etkileyen çeşitli faktörlerle ilişkilendirilebilmektedir. Salgın sürecinde öğrenciler, eğitimlerini evde online olarak sürdürmek durumunda kalmış, sosyal ve fiziksel rutinleri değişmiş ve stresli bir ortamla karşılaşmışlardır. Bu faktörler, uyku düzeni üzerinde olumsuz etkilere neden olmaktadır. Ayrıca, salgın döneminde yaşanan stres, endişe ve belirsizlikler de öğrencilerin uyku kalitesini etkileyebilmektedir. Salgının getirdiği sağlık riskleri, sınavlar, dersler veya gelecek planlarıyla ilgili endişeler uyku problemlerine yol açabilmektedir. Artan psikolojik yük, uyku düzenini bozabilir ve uyku sorunlarının ortaya çıkmasına neden olmaktadır. Bu bağlamda yapılan literatür taramasında, dersleri açısından akademik iş yükü yüksek olan, gebe ve bebek bakımından sorumlu olan ebek öğrencilerinin gündüz uykululuklarını araştıran herhangi bir çalışmaya rastlanmamıştır. Bu nedenle bu çalışmada, ebek öğrencilerinde özellikle pandemi döneminde gündüz uykululuk prevalansının ve gündüz uykululuğunu etkileyen faktörlerin belirlenmesi amaçlanmıştır.

Araştırma, 24 Aralık 2020 – 30 Nisan 2021 tarihleri arasında ebek lisans programlarında öğrenim gören öğrencilerin katıldığı çok merkezli, kesitsel, çevrimiçi anket çalışması olarak gerçekleştirilmiştir. Araştırma evrenini 57 üniversitenin (özel ve devlet) ebek lisans programlarında öğrenim gören öğrenciler oluşturmuştur ( $N=15617$ ). Bu üniversitelerin ebek programlarına kayıtlı tüm öğrenciler kolayda örnekleme yöntemiyle WhatsApp grupları ve sosyal medya hesapları aracılığıyla çalışmaya katılmaya davet edilmiştir. Anketler Google Forms üzerinden hazırlanmış ve 24 Aralık 2020 - 30 Nisan 2021 tarihleri arasında açık kalmıştır. Veri toplama sürecinde WhatsApp gruplarına ve sosyal medya hesaplarına iki adet hatırlatma mesajı gönderilmiştir. Çalışma evreni bilinen örneklem büyüklüğü formülü ( $\alpha=0,05$ ,  $1-\beta=0,95$ ) kullanılarak Raosoft örneklem büyüklüğü hesaplama programı ile hesaplanmış, araştırmada minimum 375 öğrenciye ulaşılması belirlenmiştir (<http://www.raosoft.com/samplesize.html>).

Çalışmada, Bilgi Formu, Epworth Uykululuk Ölçeği (ESS) ve Durumluk-Sürekli Kaygı Envanteri (STAI) kullanılmıştır.

Türkiye'deki çeşitli vakıf ve devlet okullarının ebek bölümlerinde öğrenim gören 473 lisans öğrencisi çevrimiçi anketleri yanıtladı. Öğrencilerin yaş ortalamasının  $20,83\pm 1,92$ , çoğunluğunun lisans üçüncü sınıf ebek öğrencisi olduğu saptandı (%31,7,  $n=150$ ). ESS ölçeğinde anormal gündüz uykululuğu için  $\geq 10$  kesme puanı olarak belirlendiği için çalışmamızda 10 kesme puanı kullanıldı. ESS ölçeğine göre uyku hali olan ve olmayan gruplar ile sosyodemografik özellikler arasında istatistiksel olarak anlamlı fark bulunamadı ( $p>0,005$ ). Gündüz uyku hali (ESS  $\geq 10$ ) olan öğrencilerin prevalansı da %22,2 olarak bulundu. Anormal gündüz uykululuğu olan grubun sürekli kaygı puanının anlamlı derecede yüksek ( $p<0,005$ ) olduğu belirlendi. Gece uykudan uyanma, derste uykuya dalma ve gece aynı saatte uyuma durumları açısından gruplar arasında istatistiksel olarak anlamlı fark bulundu ( $p=0,045$ ,  $p=0,000$ ,  $p=0,000$ ). Gastrointestinal bir ilaç ( $p>0,05$ ). Pandemi öncesi ve sonrası 24 saat içinde öğrencilerin ortalama uyku süreleri açısından gruplar arasında istatistiksel olarak anlamlı fark yoktu. Ancak gruplar içinde yapılan Wilcoxon analizinde pandemi sonrası uyku süresindeki artışın her iki grupta da istatistiksel olarak anlamlı olduğu belirlendi ( $p=0,001$ ,  $p=0,000$ ).

Öğrencilerin yaş ortalaması, sürekli kaygı puanı, derslerde uyuklama ve geceleri aynı saatte uyumanın gündüz uykululuğunu etkileyen bağımsız değişkenler olduğu görülmüştür. Çok değişkenli analiz ile oluşturulan modelde değişkenlerin %77,6'sının açıklandığı tespit edildi.

Uyku, fiziksel ve zihinsel sağlığın temel bir bileşeni olmakla beraber özellikle adolesan dönemde düzenli uyku alışkanlıklarına dikkat edilmesinin pozitif beyin gelişimi sağlayarak uykuya ilişkili psikopatolojinin ortaya çıkmasına karşı koruyucu bir faktör olduğu ifade edilmiştir. Mevcut çalışmada da, öğrencilerde yadsınamaz bir oranda gündüz uyku hali ve sürekli kaygı bulunmuş ve bu durum her gece aynı saatte uykuya dalma gibi uyku alışkanlıklarından etkilenmiştir. Bu nedenle öğrencilere gece uyku alışkanlığı kazandıracak eğitimlerin düzenlenmesi ve bu alışkanlıkların değiştirilmesi konusunda danışmanlık yapılması önerilmektedir.