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The Relationship Between Zoom Fatigue and Educational Stress in Nursing Students: A Descriptive, Correlational Study

Hemşirelik Öğrencilerinde Zoom Yorgunluğu ile Eğitim Stresi Arasındaki İlişki: Tanımlayıcı, İlişkisel Bir Çalışma

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Abstract

The aim of this study was to examine the relationship between zoom fatigue and nursing education stress among nursing students. A descriptive, correlational, and cross-sectional study design was employed. Data were collected via an online survey completed by nursing students. The target population consisted of second, third, and fourth-year nursing students (N = 223) enrolled during the 2021–2022 academic fall semester. The study was conducted between October 2021 and January 2022. Data were collected using the "Student Information Form", the "Zoom Fatigue Scale", and the "Nursing Education Stress Scale". A p-value of <0.05 was considered statistically significant. The mean total score on the zoom fatigue scale was 3.49 ± 0.89, while the mean total score on the nursing education stress scale was 71.23 ± 14.01. A significant difference was found in the nursing education stress scale total scores based on gender ($p < 0.05$). Additionally, a positive and statistically significant correlation was observed between the total scores of the zoom fatigue scale and he nursing education stress scale ($p < 0.05$). These findings indicate that as zoom fatigue levels increased, nursing education stress also increased. Interactive classroom environments should be provided to support nursing students in developing their professional knowledge and competencies. It is recommended that nursing educational programs include content aimed at enhancing stress management, psychological resilience, and self-care skills, while also ensuring that students have safe and accessible access to psychological counseling services when needed.

Key Words: Education, nursing students, stress, zoom fatigue

Özet

Bu çalışmanın amacı, hemşirelik öğrencilerinde Zoom yorgunluğu ile hemşirelik eğitimi stresi arasındaki ilişkiyi incelemektir. Araştırma, tanımlayıcı, ilişki arayıcı ve kesitsel bir desenle yürütülmüştür. Veriler, hemşirelik öğrencileri tarafından çevrimiçi olarak doldurulan bir anket yoluyla toplanmıştır. Araştırmanın hedef kitlesini, 2021–2022 akademik yılında öğrenim gören ikinci, üçüncü ve dördüncü sınıf hemşirelik öğrencileri (N = 223) oluşturmuştur. Çalışma, Ekim 2021 ile Ocak 2022 tarihleri arasında gerçekleştirilmiştir. Veriler; "Öğrenci Bilgi Formu", "Zoom Yorgunluğu Ölçeği" ve "Hemşirelik Eğitimi Stres Ölçeği" kullanılarak toplanmıştır. $p < 0.05$ değeri istatistiksel olarak anlamlı kabul edilmiştir. Zoom yorgunluğu ölçeği toplam puan ortalaması 3.49 ± 0.89; hemşirelik eğitimi stres ölçeği toplam puan ortalaması ise 71.23 ± 14.01 olarak bulunmuştur. Öğrencilerin cinsiyetlerine göre hemşirelik eğitimi stres ölçeği toplam puanları arasında anlamlı bir fark saptanmıştır ($p < 0.05$). Ayrıca, zoom yorgunluğu ölçeği ile hemşirelik eğitimi stres ölçeği puanları arasında pozitif ve anlamlı bir ilişki olduğu belirlenmiştir ($p < 0.05$). Bu bulgular, zoom yorgunluğu düzeyi arttıkça hemşirelik eğitimi stresinin de arttığını göstermektedir. Hemşirelik öğrencilerinin mesleki bilgi ve yeterliliklerini geliştirmelerini desteklemek amacıyla etkileşimli sınıf ortamları sağlanmalıdır. Hemşirelik eğitim programlarının, stres yönetimi, psikolojik dayanıklılık ve öz bakım becerilerini geliştirmeye yönelik içerikler içermesi ve öğrencilerin ihtiyaç duyduklarında psikolojik danışmanlık hizmetlerine güvenli ve erişilebilir şekilde ulaşmalarının sağlanması önerilmektedir.

Anahtar Kelimeler: Eğitim, hemşirelik öğrencileri, stres, zoom yorgunluğu

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ARAŞTIRMA MAKALESİ

1. Introduction

The covid-19 pandemic has had a profound global impact, causing rapid transmission, high mortality rates, disruption of education systems, and significant pressure on healthcare infrastructures (Callaway et al., 2020; WHO, 2020). Similar to many other nations, our country implemented a series of preventive strategies in areas such as public life, work environments, and education these included travel bans, social distancing protocols, and isolation measures (Ozkocak et al., 2020; Sahu, 2020). In line with these precautions, the Council of Higher Education in Turkey announced a three week suspension of academic activities across all universities beginning 16 March 2020, followed by a transition to remote education (THEC, 2020). Consequently, traditional face-to-face education in schools, colleges, and universities was rapidly adapted into online or distance learning models (Hodges et al., 2020).

Online learning systems are web-based software for distributing, monitoring and managing training over the internet (Keis et al., 2017). Online learning systems refer to the application of advances in technology to guide, design, and deliver learning content and facilitate two way communication between learners and teachers (Thanji & Vasantha, 2016). However, there are also many problems such as the thirtyfold increase in videoconferencing, simultaneous classroom sessions often turning into long lectures, multitasking and distraction. The exhaustion and feeling of tiredness of people due to these problems is a part of the increasing concern with the term “zoom fatigue”, which is spreading rapidly in the popular media (Fauville et al., 2021; Lowenthal et al., 2020). Bailenson (2021) identified four primary factors contributing to zoom fatigue: prolonged direct eye contact, elevated cognitive effort, continuous self-monitoring due to one's image on screen, and limitations on physical movement. Additionally, distance learning has posed difficulties for students who juggle employment, family obligations, or have insufficient access to digital resources (Ramos-Morcillo et al., 2020). During the pandemic process, students stated that they experienced stress on many issues such as reaching the instructor, unfamiliar learning environment, forgetting and not understanding the subjects (Kose et al., 2021; Turan & Gurol, 2020). Stress can cause health problems such as physical, psychosocial and behavioral disorders in students, as well as reduce educational efficiency and harm the process of professional identity formation (Ergin et al., 2018; Evgin et al., 2017; Karaca et al., 2014; Kilic Firat, 2018).

In today’s increasingly digitalized educational landscape, the impact of online learning environments on students particularly within practice based disciplines such as nursing must be examined through a multidimensional lens. The abrupt shift to distance education during the covid-19 pandemic has placed nursing students under considerable cognitive, psychological, and emotional strain. One of the emerging phenomena associated with prolonged virtual engagement is “zoom fatigue”, a concept that has garnered growing attention in recent years. However, despite its relevance, the relationship between zoom fatigue and educational stress among nursing students remains largely unexplored within the context of health sciences education. While numerous studies have examined nursing students’ perceptions of stress, learning environments, and adaptation during the pandemic (Kurtuncu & Kurt, 2020; Mucuk et al., 2021; Turan & Gurol, 2020), no study to date has specifically addressed the intersection of zoom fatigue and nursing education related stress. In this regard, the present study not only aims to fill a critical gap in the existing literature but also provides a timely and nuanced perspective on the evolving nature of nursing education. The findings are expected to inform future educational policy, guide the development of student-centered digital learning strategies, and contribute meaningfully to the design of more resilient and responsive nursing education systems in the post-pandemic era.

2. Method

2.1. Study Design and Participants

The primary objective of this research was to investigate the association between zoom fatigue and educational stress experienced by nursing students. The study was carried out with students enrolled in the nursing department of a university located in Turkey’s Eastern Anatolia Region. The study population consisted of students from the 2nd, 3rd, and 4th years of the nursing program during the 2021–2022 academic year (N = 296). The required sample size was calculated using G*Power version 3.1.9.7 based on a two-tailed correlation analysis with an assumed medium effect size (r = 0.30), an alpha level of 0.05, and a statistical power of 0.95. The minimum sample size required for adequate power was determined to be 134 participants. During the data collection phase, a total of 223 students who met the inclusion criteria and voluntarily agreed to participate were included in the final sample.

2.2. Research Questions

-What are the levels of zoom fatigue among nursing students?

-What are the levels of nursing education stress among nursing students?

-Do zoom fatigue and nursing education stress levels differ according to demographic variables?

-Is there a significant relationship between zoom fatigue and nursing education stress among nursing students?

2.3. Inclusion Criteria

- Being actively enrolled in an undergraduate nursing program during the covid- 19 pandemic.

- Having attended online/distance education courses during the specified academic term.

- Voluntarily agreeing to participate in the study.,

2.4. Exclusion Criteria

- Not actively receiving online education during the data collection period.

- Submitting incomplete or duplicate survey responses.

2.5. Data Collection and Instruments

This research was carried out between October 2021 and January 2022 using an online, self-report survey format. Following the necessary ethical approvals, the questionnaire link was shared with eligible individuals via email. Participants provided their responses using Google Forms, a secure and widely used online data collection tool. The students completed the forms in 5 to 10 min.

Student Information Form: This form, created by the researchers, consists of 10 items aimed at gathering demographic data. It includes variables such as age, gender, academic performance etc.(Karaca et al., 2014; Akduman, 2021).

The Zoom Exhaustion & Fatigue Scale (ZEF Scale): The scale was developed by Fauville et al. in 2021. The Turkish reliability and validity study of the scale was carried out by Akduman in 2021. The scale consists of 15 items and 5 subscales. The subscales of the scale are general fatigue, visual fatigue, social fatigue, motivational fatigue, and emotional fatigue. The highest score is 5 – the lowest score is 1: 5-1=4/5=0.80; 1-1.80: strongly disagree, 1.81-2.60: disagree, 2.61-3.40: undecided, 3.41-4.20: agree, 4.21-5.00: strongly agree. The Cronbach's alpha coefficient of the scale was found to be 0.94. The Cronbach's alpha value of this study was found to be 0.92.

Nursing Education Stress Scale (NESS): The nursing education stress scale, originally developed by Gray-Toft and Anderson (1981), was adapted for Turkish nursing students by Karaca et al. (2014) and includes 32 items across two subdimensions: academic stress and clinical stress. These subscales aim to capture stress arising from both theoretical and hands on components of nursing education. Each sub-dimension of the scale is scored on a range from 0 to 48, yielding a total score between 0 and 96. Higher total scores reflect greater levels of perceived stress. The Cronbach's alpha coefficient of the scale was found to be 0.90. In this study, the Cronbach's alpha coefficient for internal consistency was determined to be 0.92.

2.6. Ethical considerations

Ethical approval was obtained from the "Noninvasive Clinical Research Ethics Committee of Agri Ibrahim Cecen University" (approval number: E.18535). The research was carried out in compliance with the ethical principles outlined in the Declaration of Helsinki. Prior to data collection, students were informed about the aim of the study, and written consent was obtained based on voluntary participation. All responses were collected anonymously, and there was no way to trace IP addresses back to individual participants.

2.7. Data Analysis

Data analyses were conducted using SPSS version 22. Descriptive statistics (frequency, mean, standard deviation, percentage) were used to evaluate the demographic characteristics of the participants. The Kolmogorov-Smirnov test was performed to assess whether the data followed a normal distribution. Since the data were normally distributed, the independent samples t-test was used for comparisons between two groups, and one-way anova was used for comparisons among more than two groups. Pearson correlation analysis was employed to examine the relationships between variables, and a p-value of <0.05 was considered the threshold for statistical significance.

3. Results

Descriptive analysis showed that 65% of the participants were female, 49.8% were second-year students, and 58.3% reported a moderate level of academic achievement. Additionally, 69.1% stated that they had willingly chosen the nursing department. The mean age of the participants was 21.18 years (SD = 2.82) (Table 1).

Table 1. Demographic characteristics of the sample (N = 223)

Demographic characteristics		n	%
Gender	Female	145	65.0
	Male	78	35.0
Educational year	2nd year	111	49.8
	3rd year	97	43.5
	4th year	15	6.7
Video viewing time (within one day)	Less than 1 hour	168	75.3
	1-2 hours	49	22.0
	More than 3 hours	6	2.7
Academic achievement level	Low	84	37.7
	Medium	130	58.3
	High	9	4.0
Did you choose the nursing department willingly?	Yes	154	69.1
	No	69	30.9
	Mean ± SD (Min-Max)		
Age (Years)	21.18±2.82 (18-38)		

Min = Minimum value, Max = Maximum value, Mean = Average, SD = Standard deviation

ZEF Scale total score was 3.49±0.89, General Fatigue subscale was 3.85±1.04, Visual Fatigue subscale was 3.40±1.21, Social Fatigue subscale was 3.51±1.08, Motivation Fatigue subscale was 3.16±1.18 and Emotional Fatigue subscale was 10.54±3.54, NESS total score was 71.23±14.01. Practical Stress subscale was 35.46±7.68 and Academic Stress subscale was 35.77±7.14 (Table 2).

Table 2. Students' ZEF Scale and NESS Total and Subscales Mean Scores

Scales and Subscales	Mean ± SD	Min	Max
Zoom Exhaustion & Fatigue Scale	3.49±0.89	1	5
General Fatigue	3.85±1.04	1	5
Visual Fatigue	3.40±1.21	1	5
Social Fatigue	3.51±1.08	1	5
Motivational Fatigue	3.16±1.18	1	5
Emotional Fatigue	3.51±1.18	1	5
Nursing Education Stress Scale	71.23±14.01	0	96
Practical Stress	35.46±7.68	0	48
Academic Stress	35.77±7.14	0	48

Min = Minimum value, Max = Maximum value, Mean = Average, SD = Standard deviation

No significant difference was found between the students' ZEF Scale total score average and demographic characteristics ($p>0.05$). A statistically significant difference was observed in NESS total scores by gender ($p = 0.001$), with female students reporting higher stress levels (Table 3).

Table 3. Comparison of Students' Demographic Characteristics and Total Scores of ZEF Scale and NESS (N=223)

Demographic characteristics			Zoom Exhaustion & Fatigue Scale		Nursing Education Stress Scale	
		n	Mean ± SD	Test and Significance	$\overline{X}$ ±SS	Test and Significance
Gender	Female	145	3.54±0.86	t=1.229 p=0.220	73.57±13.19	t=3.476 **p=0.001**
	Male	78	3.38±0.95		66.89±14.52	
Educational year						
	2nd year	111	3.49±0.92	F=0.722	72.36±13.92	F=0.726
	3rd year	97	3.53±0.82	p=0.487	70.17±14.17	p=0.485
	4th year	15	3.23±1.15		69.73±13.84	
Video viewing time (within one day)	Less than 1 hour	168	3.51±0.86	F=0.242 p=0.785	70.92±13.62	F=0.200 p=0.819
	1-2 hours	49	3.41±0.97		72.04±15.29	
	More than 3 hours	6	3.41±1.10		73.50±16.10	
Academic achievement level	Low	84	3.65±0.87	F=2.508 p=0.084	71.79±15.05	F=0.478 p=0.621
	Medium	130	3.37±0.90		71.16±13.42	
	High	9	3.55±0.88		67.01±12.88	
Did you choose the nursing department willingly?	Yes	154	3.48±0.86	t=-0.060 p=0.952	71.05±13.82	t=-0.295 p=0.768
	No	69	3.49±0.96		71.65±14.50	

p=pearson, t= t test, F= one way anova

Statistically significant positive correlations were identified between total ZEF scores and NESS total and subdimension scores ($p < 0.05$) (Table 4).

Table 4. The Relationship Between Students' ZEF Scale, NESS Total and Sub-dimension Mean Scores

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Zoom Exhaustion & Fatigue Scale (1)	r	-								
	p	-								
General Fatigue Sub-Dimensions (2)	r	.819								
	p	.001								
Visual Fatigue Sub-Dimensions (3)	r	.690	.530							
	p	.001	.001							
Social Fatigue Sub-Dimensions (4)	r	.727	.459	.275						
	p	.001	.001	.001						
Motivational Fatigue Sub-Dimensions (5)	r	.849	.588	.412	.648					
	p	.001	.001	.001	.001					
Emotional Fatigue Sub-Dimensions (6)	r	.848	.673	.459	.507	.686				
	p	.001	.001	.001	.001	.001				
Nursing Education Stress Scale (7)	r	.423	.382	.341	.198	.288	.447			
	p	.001	.001	.001	.003	.001	.001			
Practical Stress Sub-dimensions (8)	r	.356	.326	.324	.133	.229	.378	.949		
	p	.001	.001	.001	.047	.001	.001	.001		
Academic Stres Sub-dimensions (9)	r	.447	.398	.321	.245	.319	.470	.941	.785	-
	p	.001	.001	.001	.001	.001	.001	.001	.001	-

p= pearson

4. Discussion

This section discusses the study findings in relation to existing literature on distance education, stress, and zoom fatigue in nursing student. In Turkey, distance education was rapidly adopted as an emergency response to avoid interruptions in education during the covid-19 pandemic. However, this sudden and unstructured transition to online learning has brought about several limitations and negative consequences (Sahu, 2020). Nursing students, considered the future workforce of the healthcare system, were significantly affected by the restrictions and social isolation measures implemented during the pandemic. They experienced various behavioral, social, physiological, and psychological challenges due to increased levels of stress. This period has had both positive and negative effects on different aspects of their lives. Moreover, it has been observed that students have developed ambivalent perceptions of the nursing profession during this process (Mucuk et al., 2021).

The findings of the current study revealed that students experienced a high level of zoom fatigue. In a study by Durgun et al. (2021), it was reported that students held moderate levels of both positive attitudes and concerns regarding distance education during the covid-19 pandemic. Similarly, Oducado and Estoque (2021) emphasized that nursing students encountered multiple difficulties and fatigue during online education. These findings are supported by other studies indicating that prolonged virtual classroom sessions, ineffective communication, and technical issues contribute to students' negative attitudes toward online learning, elevate their zoom fatigue levels, and hinder active engagement in the learning process (Keskin & Derya, 2020; Kurtuncu & Kurt, 2020). The mean total score obtained from the nursing education stress scale in the present study suggests a high level of educational stress among the participants. This aligns with findings from previous studies showing that nursing students generally report moderate to high levels of stress during their education (Karabulutlu Yılmaz et al., 2019; Cao et al., 2020; Savitsky et al., 2020; Wang et al., 2020). Variations in findings across studies may be attributed to differences in the sample size and characteristics, as well as the degree to which students adapted to online education during the pandemic.

Furthermore, the present study found that female students reported significantly higher levels of nursing education stress compared to male students. This finding is consistent with previous literature indicating that female students tend to experience higher levels of stress (Buyukbayram & Ayik Bicak, 2020; Kilic Firat, 2018). However, other studies have suggested that gender does not play a significant role in educational stress (Karagozoglu et al., 2014; Khater et al., 2014). Interestingly, Watson et al. (2017) found that male nursing students in Pakistan reported higher stress levels than their female counterparts. These inconsistencies in the literature may stem from differences in cultural contexts, sample characteristics, and students' experiences with online education, particularly regarding technological and communication challenges during the pandemic.

Importantly, this study also identified a positive and statistically significant relationship between the total and sub-dimension scores of the zoom fatigue scale and the nursing education stress scale. This suggests that as zoom fatigue increases, so does the level of educational stress experienced by nursing students. The lack of previous studies directly examining the relationship between zoom fatigue and educational stress limits the ability to make direct comparisons. However, similar findings have been reported by Gurol and Ejder Apay (2021), who noted that students' perceptions of stress in educational environments were high, and that higher levels of perceived stress were associated with more negative perceptions of online learning. Additionally, pre-pandemic studies indicated that nursing students were generally reluctant to accept distance education and anticipated that online learning would be inadequate for clinical training (Kahyaoglu Sut & Kucukkaya, 2016; Koch et al., 2010).

These findings point to the compounded effects of technological difficulties, inadequate communication, and the lack of interactivity in remote learning, all of which may intensify psychological distress and hinder learning outcomes among nursing students (Durgun et al., 2021; Keskin & Derya, 2020). Therefore, in the context of nursing education, it is essential to reduce factors contributing to zoom fatigue such as prolonged virtual sessions, passive delivery of instructional content, and long periods of inactivity with constant eye contact. Course materials should be simplified and made more accessible, while instructors should pay attention to student feedback, reduce stress inducing factors, and design interactive learning environments (Can, 2020; Ilacsiz & Demiray, 2021).

5. Conclusion

This study identified a significant and positive relationship between zoom fatigue and perceived educational stress among nursing students during distance learning. These findings underscore the cognitive, emotional, and social burdens imposed by prolonged online education, emphasizing the need for proactive and supportive strategies within nursing education to protect student well being and ensure academic continuity. Accordingly, students should be equipped with digital literacy, time management, and digital wellness skills to use platforms like zoom effectively and sustainably. Educational programs should incorporate content aimed at developing stress management, psychological resilience, and self care competencies, while also ensuring secure and accessible

pathways for students to seek psychological counseling when needed. Learning processes should move beyond passive content delivery and be structured around active and engaging methods such as case-based discussions, group work, and simulations. Faculty should be trained in digital pedagogy and encouraged to revise content and methods regularly based on student feedback. Moreover, to reduce feelings of social isolation and foster a sense of belonging, institutions should establish virtual social interaction spaces and promote peer support groups and mentoring sessions. At the policy level, nursing curricula should be restructured to support blended learning models that balance synchronous and asynchronous components. Educational content should be simplified, accessible, and student-centered, while curricular planning should aim not only to enhance academic performance but also to promote psychosocial well being and professional development. In this context, opportunities for ethical, communication based, and practice oriented learning should also be expanded within digital environments. In conclusion, the increasing levels of stress and fatigue experienced by nursing students in digital learning contexts necessitate not only individual but also institutional and structural interventions. Educational strategies developed with an evidence based, student centered, and holistic approach will not only improve academic achievement but also enhance the psychological resilience of future healthcare professionals, ensuring the sustainability and quality of nursing education.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

Ethics Committee Approval

This study was approved by the Ağrı İbrahim Çeçen University Scientific Research Ethics Committee (Approval date: 08.09.2021, Decision No: E.18535 and 230).

Author Contributions

Conceptualization: A.Y., T.K.S.; Study design: A.Y., T.K.S., Ü.S.; Data collection: T.K.S., Ü.S.; Data analysis: M.Y., T.K.S., Ü.S.; Data interpretation: M.Y., Ü.S., T.K.S.; Manuscript writing: A.Y., T.K.S., M.Y., Ü.S.; Critical review: A.Y., T.K.S., Ü.S.; Final approval: A.Y., T.K.S., M.Y., Ü.S.

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