Kurniawan MB et al., JPKI, 2024;13(1): 1-7
doi: 10.22146/jpki.83827

ORIGINAL RESEARCH

JPKI

# Zoom Fatigue Among Undergraduate Nursing Students: A Descriptive Study

**Moh Bagus Kurniawan[1], Sutono[2], Totok Harjanto[2*]**
[1]School of Nursing, Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada, Yogyakarta, Indonesia
[2]Department of Basic and Emergency Nursing, Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada, Yogyakarta, Indonesia

Submitted: 11 Apr 2023, Final Revision from Authors: 30 Dec 2023, Accepted: 23 Feb 2024

## ABSTRACT

**Background:** The COVID-19 pandemic has disrupted the global education system. The School of Nursing at UGM enforced a transition from face-to-face to blended learning. Delivery of synchronous online learning by utilizing video conferencing applications can trigger fatigue, hereafter referred to as Zoom fatigue. Fatigue may pose a physical and mental risk to students' social functioning and perceived safety; it may also decrease their ability to deal with problems and limit opportunities for fulfilling social needs. Therefore, evaluating Zoom fatigue among nursing students at the Faculty of Medicine, Public Health, and Nursing UGM is necessary. This study aims to describe Zoom fatigue among undergraduate students at the School of Nursing at UGM during the COVID-19 pandemic based on Zoom fatigue dimensions.

**Methods:** This research is a quantitative descriptive study with a cross-sectional design. A total of 188 students from the second, third and fourth years were recruited with stratified random sampling. The Zoom Exhaustion and Fatigue Scale (ZEF) questionnaires tested for content validity and reliability with Cronbach alpha=0.909 were distributed to the students through Google Forms. Retrieved data in this study was explored using computer-based data analysis.

**Results:** A total of 98 students (52.1%) were reported to have severe Zoom fatigue. Based on the five dimensions of fatigue, most participants (72.9%) suffered from general fatigue. Emotional fatigue was indicated in 122 students (64.9%), followed by social fatigue with 115 students (61.2%), motivational fatigue with 102 students (54.3%), and eyestrain with 99 students (52.7%).

**Conclusion**: Undergraduate students at the School of Nursing at UGM suffered from severe Zoom fatigue, especially in the general fatigue dimension.

**Keywords:** nursing students, online learning, Zoom fatigue

## PRACTICE POINTS

- Contribute to the body of knowledge and provide an overview regarding Zoom fatigue experienced by students during online learning.
- Present an excerpt of the fatigue level of nursing students in association with online-based learning, notably through video conference, to improve learning methodology.

*corresponding author, contact: toharjanto506@ugm.ac.id

## INTRODUCTION

The coronavirus disease (COVID-19) pandemic has enormously affected many aspects of human life, including education. Ninety-four per cent of students worldwide, representing 1.58 million learners from pre-school to tertiary education in 200 countries, were overwhelmed by the pandemic.[1] Medical and nursing education worldwide has also been disrupted. Lectures and patient-based learning modes had to be organized in a limited setting.[2,3] Indonesia adopted online learning and working from home to prevent the spread of COVID-19 as mandated by the Ministry of Education and Culture in Circular Letter number 36962/MPK.A/HK/2020. Responding to the national policies, educational institutions massively introduced information and communications technology (ICT) services by utilizing various electronic devices and the internet for online learning.[4,5] Online learning is generally categorized into asynchronous, synchronous and blended learning. Synchronous learning is done in real-time using video conferencing applications such as WhatsApp Group (WAG), Google Classroom (GC), Edmodo, and Zoom.[6,7]

The use of Zoom as a video conferencing application had increased rapidly from around 10 million daily users in December 2019 to 200 million people in March 2020 and 300 million in April 2020.[8,9] Exponential use of the platform inadvertently has presented negative consequences, one of which is Zoom fatigue.[10] Zoom fatigue is a feeling of exhaustion due to prolonged video conferencing activities. This type of fatigue is derived from Zoom, a video conferencing platform widely used for online activities. However, this terminology also applies to discomfort caused by other video conferencing applications. The preliminary study has been conducted on nursing students at Universitas Muhammadiyah Jember, and the results show a correlation between zoom fatigue and learning duration (p-value = 0,013).[11] The fatigue is characterized by physical or psychological exhaustion, which is influenced by the duration of learning.[11,12]

Amid the pandemic, the School of Nursing Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada (UGM) introduced synchronous, asynchronous, and blended learning methods. In a synchronous environment, a video conferencing application was chosen to facilitate interaction between lecturers and learners, which requires the active use of a camera. A preliminary study conducted in March 2022 involving 60 students from 2018-2021 classes indicated that 37 students (61.7%) felt exhausted due to online learning. The highest reported fatigue was associated with online lectures (85%) and online exams (50%). These data highlighted the need to conduct research related to Zoom fatigue in the School of Nursing UGM.

## METHODS

A quantitative descriptive study using a cross-sectional approach was conducted in October 2022 at the School of Nursing UGM. The inclusion criteria in this study were nursing students who participated in online learning activities for more than 15 minutes and were willing to participate. Students who were ill and took part in the validity and reliability test were excluded from this study. A proportionate stratified random sampling, Slovin sample calculation and fraction per cluster sampling were performed. A total of 188 students participated and were randomized with Microsoft Excel. Ethics approval was obtained from the Medical and Health Research Ethics Committee (MHREC) FK-KMK UGM (project number KE/FK/1041/EC/2022).

This study used the Indonesian version of the Zoom Exhaustion and Fatigue Scale (ZEF), which has been tested for internal validity and reliability. The reliability test yielded Cronbach's alpha value of α=0.901. This study conducted repeated validity and reliability tests to obtain I-CVI=1.00. A trial was conducted on 45 participants from three classes, with 15 students in each batch. All questions had an r count greater than the r table and Cronbach Alpha (α=0.909).

The digital survey was created with Google Forms and distributed to the students for data collection.[13] Univariate descriptive analysis using a median was performed in the datasets due to abnormal data distribution. Severe Zoom fatigue was determined if the score was above the median value.

## RESULTS AND DISCUSSION

From a total of 188 returned responses, female participants (93.6%) were dominant, aged between 20 and 22 years (72.3%), and sophomore students (35.6%). The majority of the participants had online learning 3-4 times (77.7%) a day with a duration of >60 minutes (89.9%). They used laptops/computers (89.9%), did not wear reading glasses (56.4%), and turned off the camera during online learning (97.3%). Most of them were also self-attentive when the camera was on (83.0%), self-attentive when the camera was off (73.9%) and multitasked during the session (89.4%).

**Table 1. Zoom Fatigue Based on the Characteristics of Research Participants (N=188)**

| Participants' Characteristics | | n | % | Zoom Fatigue Level | | | |
|---|---|---|---|---|---|---|---|
| | | | | Severe | | Mild | |
| | | | | n | % | n | % |
| Age | 18 – 19 years | 52 | 27.7 | 31 | 59.6 | 21 | 40.4 |
| | 20 – 22 years | 136 | 72.3 | 67 | 49.3 | 69 | 50.7 |
| Gender | Male | 12 | 6.4 | 5 | 41.7 | 7 | 58.3 |
| | Female | 176 | 93.6 | 93 | 52.8 | 83 | 47.2 |
| Year | Second year | 67 | 35.6 | 37 | 55.2 | 30 | 44.8 |
| | Third year | 62 | 33.0 | 29 | 46.8 | 33 | 53.2 |
| | Fourth year | 59 | 31.4 | 32 | 54.2 | 27 | 45.8 |
| Frequency of participation in online learning | 1 – 2 Times | 19 | 10.1 | 9 | 47.4 | 10 | 52.6 |
| | 3 – 4 Times | 146 | 77.7 | 73 | 50.0 | 73 | 50.0 |
| | ≥5 Times | 23 | 12.1 | 16 | 69.6 | 7 | 30.4 |
| Duration of following online learning | <15 Minutes | 1 | 0.5 | 0 | 0.0 | 1 | 100.0 |
| | 15 – 30 Minutes | 1 | 0.5 | 1 | 100.0 | 0 | 0.0 |
| | 30 – 45 Minutes | 1 | 0.5 | 0 | 0.0 | 1 | 100.0 |
| | 45 – 60 Minutes | 16 | 8.5 | 6 | 37.5 | 10 | 62.5 |
| | > 60 Minutes | 169 | 89.9 | 91 | 53,8 | 78 | 46.2 |
| Devices Used in Online Learning | Mobile | 13 | 6.9 | 6 | 46,2 | 7 | 53.8 |
| | Tablets/iPad | 4 | 2.1 | 2 | 50.0 | 2 | 50.0 |
| | Laptops/Computers | 169 | 89.9 | 90 | 53.3 | 79 | 46.7 |
| | Others (Laptops and Mobile) | 2 | 1.1 | 0 | 0.0 | 2 | 100.0 |
| Wearing reading glasses during online learning | Yes | 82 | 43.6 | 42 | 51.2 | 40 | 48.8 |
| | No | 106 | 56.4 | 56 | 52.8 | 50 | 47.2 |
| Camera was on during online learning | Yes | 183 | 97.3 | 94 | 51,4 | 89 | 48,6 |
| | No | 5 | 2.7 | 4 | 80.0 | 1 | 20.0 |
| Self-attentive when camera was on | Yes | 156 | 83.0 | 87 | 55.8 | 69 | 44.2 |
| | No | 32 | 17.0 | 11 | 34.4 | 21 | 65.6 |
| Self-attentive when camera was off | Yes | 49 | 26.1 | 34 | 69.4 | 15 | 30.6 |
| | No | 139 | 73.9 | 64 | 46.0 | 75 | 54.0 |
| Multitasking during online learning | Yes | 168 | 89.4 | 90 | 53.6 | 78 | 46.4 |
| | No | 20 | 10.6 | 8 | 40.0 | 2 | 60.0 |

Table 1 indicates that most participants suffered from severe Zoom fatigue. These participants were between 18 and 19 years old (59.6%), female (52.8%), and second-year students (55.2%). A similar intensity of fatigue was also experienced by participants who were involved in online learning ≥5 times a day (69.6%), had more than one-hour learning session (53.8%), used a laptop/computer (53.3%), did not wear glasses (52.8%) or wore glasses (51.2%), turned on the camera (80%), paid attention when camera on (55.8%) or off (69.4%), and multitasked (53.6%).

This study discovered that the majority of the students between the ages of 18 and 19 years old endured severe Zoom fatigue (59.6%). Oducado and Masjedi presented similar findings, showing that adolescents have higher stress levels and Zoom fatigue.[13,14] In line with the research conducted by Oducado and Ratan, most female participants in this study experienced higher levels of Zoom fatigue compared to male participants.[14,15] Disparity among genders may be due to the nature of females, who tend to express more emotions than males.[16] Severe Zoom fatigue was also felt by students in their second year (55.2%) and fourth year (54.2%) of study. Reported fatigue across different years of study could be associated with students' academic responsibility, such as the subjects and time constraints determined by the number of credits.[17]

Participants who participated in synchronous online learning five or more sessions in a day encountered severe Zoom fatigue (69.6%). Higher frequency of video conferencing poses a bigger risk for Zoom fatigue.[14,18] Similarly, virtual learning with more than 60 minutes was reported by 53.8% of the participants. Extensive learning duration could burden students' cognitive capacity, aggravated by the amount of materials to be learned during the sessions.[19,2]0 Digital display of a portable computer or desktop stipulates a remote interaction with other individuals, causing discomfort, increasing cognitive load and fatigue as represented by 53.3% of the participants.[21,22]

Fifty-one point four per cent of the participants who turned off their cameras reported severe Zoom fatigue. Four out of five students (80%) of the total participants also reported severe Zoom fatigue. The same is true for self-attentive students when the video was on (55.8%), self-attentive students when the video was off (69.4%) and multitasking individuals (53.6%). Ineffective nonverbal communication due to inactivated video previews may cause emotional reception and perception limits, which could worsen the cognitive load and increase fatigue.[22] Increased cognitive load as a result of completing learning tasks and interpreting nonverbal responses of other participants may lead to exhaustion. The condition could be deteriorated by internet connection, device performance, and the speaker's volume.[21,23] Turning on cameras in virtual interaction triggers students to stare at themselves for a long time. As a consequence, increased attention to personal attitude and appearance stimulates mirror anxiety and overtiredness.[21,22] Performing parallel activities distracts students' focus and accumulated cognitive load, which may decrease productivity, stress, and fatigue.[22]

**Table 2. Frequency Comparison of Zoom Fatigue Levels during Online Learning (N=188)**

| Zoom Fatigue Category | n | % | Median (Min-Max) |
|---|---|---|---|
| Severe | 98 | 52.1 | 41.00 (21-65) |
| Mild | 90 | 47.9 | |
| Total | 188 | 100 | |

Table 2 indicates that more than half of the participants (98 students or 52.1%) reported severe Zoom fatigue, with the highest score of 65 and a median of 41.00.

Table 3 indicates that participants sustained severe Zoom fatigue in all dimensions, especially in the dimensions of general fatigue (72.9%), emotional fatigue (64.9%), and social fatigue (61.2%).

Participants in this study suffered from severe Zoom fatigue on each dimension. Similarly, Mariappan reported that severe fatigue is frequently reported in the general fatigue dimension (72.9%).[24] General fatigue includes both physical and mental

exhaustion.[21] General fatigue is attributed to the limited view of the camera, which may cause a person to perceive boundaries in a constant setting. Demands to pay attention in video conferencing sessions for a long time could prompt physical fatigue, including dry eyes, irritation, and tiredness, as well as mental fatigue indicated by exhaustion, decreased motivation and performance in cognitive tasks.[21]

Severe eye fatigue was delineated in this study by 52.7% of the participants. In their study, Dossari and Sasmal documented soreness, burning sensation, red eyes, excessive lacrimation, blurred vision, and visual discomfort associated with online learning.[25] Implementing the 20-20-20 ergonomics principle during online learning could minimize the risk of eye fatigue.

Severe social fatigue in this study is in line with Shockley and Vandenberg's research, which confirmed that long video conferencing could cause participants to avoid virtual interaction and present a sense of disconnection in correlation with physical distance between participants.[26,27] Distal and proximal factors influence social fatigue. Distal factors have an indirect relationship with video conferencing activities. People uncomfortable with video conferencing activity have a high risk of stress and fatigue. Meanwhile, proximal factors directly impact individuals when online activities take place. Ease of communication, fear of rejection, and complexity of regulations are included in this factor.[28]

Motivational fatigue, mentioned frequently in this study and felt by 54.3% of 188 participants, is analogous to Oducado's research.[29] Internal and external factors highly influence motivational fatigue. Decreased motivation in online learning could be caused by a lack of support from external factors, which affects internal values and self-confidence. These are the major obstacles to online learning.[30] In addition, nearly two-thirds of the participants (64.9%) suffered from emotional fatigue-constraints related to the study pace and frequency of interaction precipitate anxiety. Individuals with a constant state of stress could feel burdened with situational demands. They may also be unable to cope with the pressure. In addition, reduced self-control may result in emotional exhaustion.[28]

The subjects in this study were drawn from three-year classes that participated in online learning. Therefore, the findings can be used to explain Zoom fatigue in nursing students properly. However, participants in this study are only from one discipline, so they cannot generalize Zoom fatigue to all students.

**Table 3. Frequency Comparison of Zoom Fatigue Levels during Online Learning Based on Fatigue Dimensions (N=188)**

| Dimensions | Category | n | % | Median (Min – Max) |
|---|---|---|---|---|
| General Fatigue | Severe | 137 | 72.9 | 9.00 (3 – 15) |
| | Mild | 51 | 27.1 | |
| Eyestrain | Severe | 99 | 52.7 | 8.00 (3 – 15) |
| | Mild | 89 | 47.3 | |
| Social Fatigue | Severe | 115 | 61.2 | 7.00 (3 – 14) |
| | Mild | 73 | 38.8 | |
| Motivational Fatigue | Severe | 102 | 54.3 | 8.00 (3 – 13) |
| | Mild | 86 | 45.7 | |
| Emotional Fatigue | Severe | 122 | 64.9 | 7.00 (3 – 15) |
| | Mild | 66 | 35.1 | |

## CONCLUSIONS

Participants in this study predominantly suffered from severe Zoom fatigue. Based on the dimensions of fatigue, severe fatigue was reported from all dimensions, including general, emotional, social, motivational, and eye fatigue.

## RECOMMENDATIONS

Students must anticipate Zoom fatigue by reducing multitasking, doing eye exercises and physical activities, and turning off the self-video view when the camera is on. The role of educational institutions is to guide online learning activities to lecturers and students in managing Zoom fatigue. Further research is needed to add other disciplines to describe zoom fatigue in college students generally.

## ACKNOWLEDGEMENT

The authors would like to thank the School of Nursing at UGM for providing research grants for 2022.

## DECLARATION OF INTEREST

The author declares no competing interest in this study.

## AUTHORS' CONTRIBUTION

***Moh. Bagus Kurniawan*** – Conceptualization, outlining the manuscript, developing the initial draft, and final editing.

***Sutono*** – Contributing to the manuscript writing.

***Totok Harjanto*** – Developing research concepts, contributing to the manuscript development, and script editing.

## REFERENCES

1. De Giusti A. Policy Brief: Education during COVID-19 and beyond. Rev Iberoam Tecnol en Educ y Educ en Tecnol. 2020; (26): e12. doi: 10.24215/18509959.26.e12
2. Sklar DP. COVID-19: Lessons from the Disaster That Can Improve Health Professions Education. Acad Med. 2020; XX(X): 1631-1633. doi: 10.1097/ACM.0000000000003547
3. Woolliscroft JO. Innovation in response to the COVID-19 pandemic crisis. Acad Med. 2020; 95(8): 1140-1142. doi: 10.1097/ACM.0000000000003402
4. Chabbott C, Sinclair M. SDG 4 and the COVID-19 emergency: Textbooks, tutoring, and teachers. Prospects. 2020; 49(1-2): 51-57. doi: 10.1007/s11125- 020-09485-y
5. Maatuk AM, Elberkawi EK, Aljawarneh S, Rashaideh H, Alharbi H. The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors. J Comput High Educ. 2021; (0123456789). doi: 10.1007/s12528-021-09274-2
6. Amiti F. Synchronous and Asynchronous E-Learning. Eur J Open Educ E- learning Stud. 2020; 5(2): 60-70. doi: 10.46827/ejoe.v5i2.3313
7. Rachmawati Yuanita. Studi Eksplorasi Pembelajaran Pendidikan IPA Saat Masa Pandemi COVID-19 di UIN Sunan Ampel Surabaya. Indones J Sci Learn. 2020; 2(2): 8-25.
8. Chawla A. 'Zoom' Application Boon or Bane. 2021; 13(2). http: //dx.doi.org/10.2139/ssrn.3606716%0A
9. Iqbal M. Zoom Revenue and Usage Statistics (2022) - Business of Apps. Published January 11, 2022. Accessed February 1, 2022. https: //www.businessofapps.com/data/zoom-statistics/
10. Bailenson J. Why Zoom Meetings Can Exhaust Us - WSJ. Published April 3, 2020. Accessed December 15, 2021. https: //www.wsj.com/articles/why-zoom-meetings-can-exhaust-us-11585953336
11. Zaini M, Supriyadi S. Zoom in Fatigue pada Mahasiswa Keperawatan selama Periode Pandemic Covid-19. JI-KES (Jurnal Ilmu Kesehatan). 2021; 5(1): 64- 70. doi: 10.33006/ji-kes.v5i1.257
12. Cumberlands University. The Facts About Zoom Fatigue | UC. Published May 18, 2021. Accessed December 15, 2021. https: //www.ucumberlands.edu/blog/zoom-fatigue
13. Masjedi MF, Shokrgozar S, Abdollahi E, et al. The Relationship Between Gender, Age, Anxiety, Depression, and Academic Achievement among Teenagers. J Fam Med Prim Care. 2019; 8(3): 169-170. doi: 10.4103/jfmpc.jfmpc_103_18
14. Oducado RMF, Dequilla MAC V., Villaruz JF. Factors Predicting Videoconferencing Fatigue among Hhigher Education Faculty. Educ Inf Technol. 2022; 27(7): 9713-9724. doi: 10.1007/s10639-022-11017-4
15. Ratan R, Miller DB, Bailenson JN. Facial Appearance Dissatisfaction Explains Differences in Zoom Fatigue. Cyberpsychology, Behav Soc Netw. 2022; 25(2): 124-129. doi: 10.1089/cyber.2021.0112
16. Labrague LJ, Cherry C|, Ballad A. Lockdown fatigue among college students during the COVID-19 pandemic: Predictive role of personal resilience, coping behaviors, and health. Published online 2021. doi: 10.1111/ppc.12765
17. Azwar AG, Candra C. Analisis Beban Kerja dan Kelelahan Pada Mahasiswa Menggunakan

Nasa-Tlx Dan Sofi Studi Kasus Di Universitas Sangga Buana Ypkp Bandung. ReTIMS. 2019; 1(1): 14-21.

18. Fauville G, Luo M, Queiroz ACM, Bailenson JN, Hancock J. Zoom Exhaustion & Fatigue Scale. Comput Hum Behav Reports. 2021; 4(June): 100119. doi: 10.1016/j.chbr.2021.100119
19. Jordan J, Wagner J, Manthey DE, Wolff M, Santen S, Cico SJ. Optimizing Lectures From a Cognitive Load Perspective. AEM Educ Train. 2020; 4(3): 306- 312. doi: 10.1002/aet2.10389
20. Guo Y, Lu Z, Kuang H, Wang C. Information avoidance behavior on social network sites: Information irrelevance, overload, and the moderating role of time pressure. Int J Inf Manage. 2020; 52(July 2019): 102067. doi: 10.1016/j.ijinfomgt.2020.102067
21. Bailenson JN. Nonverbal overload: A theoretical argument for the causes of Zoom fatigue. Technol Mind, Behav. 2021; 2(1): 1-16. doi: 10.1037/tmb0000030
22. Riedl R. On the stress potential of videoconferencing: definition and root causes of Zoom fatigue. Electron Mark. 2021; 2020(0123456789). doi: 10.1007/s12525-021-00501-3
23. Nuryati, Pramono AE, Desristanto P. Perspektif Mahasiswa Mengenai Kendala dalam Pembelajaran Kodifikasi Klinis Secara Daring. J Kesehat Vokasional. 2021; 6(3): 190. doi: 10.22146/jkesvo.65983
24. Mariappan S, Nordin NM. Physical, Mental, and Emotional Fatigue Experienced by IT Students During Covid-19 Pandemic. J ICT Educ. 2021; 8(3): 100-1116. doi: https: //doi.org/10.37134/jictie.vol8.sp.1.8.2021
25. Shklarski L, Abrams A, Bakst E. Navigating Changes in the Physical and Psychological Spaces of Psychotherapists during Covid-19: When Home Becomes the Office. Pract Innov. 2021; 6(1): 55-66. doi: 10.1037/pri0000138
26. Shockley KM, Gabriel AS, Robertson D, et al. The fatiguing effects of camera use in virtual meetings: A within-person field experiment. J Appl Psychol. 2021; 106(8): 1137-1155. doi: 10.1037/apl0000948
27. Vandenberg S, Magnuson M. A comparison of student and faculty attitudes on the use of Zoom, a video conferencing platform: A mixed-methods study. Nurse Educ Pract. 2021; 54(June): 103138. doi: 10.1016/j.nepr.2021.103138
28. Li B (Benjy) J, Yee AZH. Understanding Videoconference Fatigue: a Systematic Review of Dimensions, Antecedents and Theories. Internet Res. Published online 2022. doi: 10.1108/INTR-07-2021-0499
29. Oducado RMF, Fajardo MTR, Parreño-Lachica GM, et al. Predictors of Videoconference Fatigue: Results from Undergraduate Nursing Students in the Philippines. Asian J Public Opin Res. 2021; 9(4): 310-330. doi: 10.15206/ajpor.2021.9.4.310
30. Nobis PPA, Tronco CQ, Tampus DLF, Beria AMA, Iv ADV, Oducado RMF. Online Learning Barriers among First-Year Undergraduate Nursing Student in a Philippine Government-Funded University.