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Research Article

Screen Fatigue During Online Learning Among First Grade of Nursing Students

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Abstract

Aims: Online learning causes mental health problems in students. Fatigue among students can hinder concentration, memory retention, and cognitive functioning, leading to decreased academic productivity, heightened stress, and disrupted personal and social lives. Screen fatigue among students can be attributed to factors such as prolonged screen exposure, inadequate breaks, poor ergonomics, multitasking, content nature, sleep deprivation, screen brightness, glare, visual discomfort, and reduced physical interaction during online classes.

Method: This study used a quantitative descriptive design. The population in this study were first-year nursing students during online learning. The sample technique used total sampling. The sample in this study amounted to 180 respondents. Data collection used the Zoom Exhaustion & Fatigue Scale (ZEF Scale). Univariate data analysis to describe the frequency of screen fatigue levels in students.

Results: The results of this study indicate that the majority of students have a moderate level of screen fatigue, namely 77 respondents (42.8%). Then respondents with low screen fatigue category were 45 people (25%). Then respondents with high screen fatigue category were 58 people (32.2%). This shows that student screen fatigue is still high, so lecturers and students must care about each other's mental health problems during online learning.

Conclusion: Screen fatigue is a problem experienced by students during online learning, this data becomes data for universities to develop learning methods that are effective in reducing the problem of screen fatigue in students.

Nursing Implications: The implication of this research is that there is data for universities and lecturers in providing psychological services to students during online learning.

Keywords:

Nursing, Online Learning, Screen Fatigue, Students

INTRODUCTION

The COVID-19 pandemic has changed many things in people's lives, including education (1). Learning is still mostly done online, or a hybrid of online and offline learning, despite the end of the COVID-19 pandemic. Online learning is learning conducted through telecommunication platforms that offer video conferencing features (2). Video

conferencing is a type of online meeting that allows two or more participants from different locations to communicate and cooperate directly through multi-directional audio-visual (3).

Online learning also causes mental health problems for students, particularly in terms of anxiety, stress and depression. Previous research shows that there is a significant

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relationship between online learning and increased student anxiety, especially as a result of social isolation and academic uncertainty (4). In addition, other studies have shown that the imbalance between academic workload and personal life while studying online contributes to increased stress (5). This is in line with previous studies showing that the absence of direct interaction and peer-to-peer support in online learning environments can exacerbate depressive symptoms among university students (6).

The reduced interaction and social isolation that result from online learning contribute to increased fatigue among college students. Furthermore, other study have shown that information overload and lack of boundaries between study and personal life exacerbate mental fatigue (7). The absence of face-to-face learning structures that usually provide natural breaks and transitions in the learning process can increase the risk of academic fatigue (8).

Fatigue during virtual meetings, known as Screen fatigue, arises not just from extensive use of online platforms, but also due to numerous challenges encountered in video conferences (9,10). This term has gained attention globally as a recent phenomenon, particularly since the onset of the COVID-19 pandemic. Screen fatigue refers to the exhaustion experienced from engaging in video conferencing (11). Various elements contribute to this condition, including the strain of maintaining prolonged eye contact during these sessions (12).

Screen fatigue is also defined as a form of computer-mediated fatigue or commonly called Computer Mediated Communication (CMC) (13). Fatigue due to video conferencing can be categorized as Screen fatigue if someone is video conferencing at least once a day. Screen fatigue is not only limited to fatigue due to excessive use of the Zoom application, but also includes various video conferencing platforms used by students such as Google meet, Cisco Webex, Whatsapp Group (WAG), Microsoft Teams,

skype and other video conferencing platforms (9). The term Screen fatigue was chosen because the Zoom video conferencing platform is the most widely used platform. However, as long as the fatigue is caused by video conferencing activities, it can be called Screen fatigue (14).

Screen fatigue, a form of exhaustion associated with video conferencing, is attributed to various factors such as intense eye contact, an increased cognitive load, constant self-viewing, and limited physical movement. Research has categorized the causes of Video Conference Fatigue, or Screen fatigue, into four primary dimensions: Personal, Organizational, Technological, and Environmental (11,15). Studies have found that women tend to have lengthier meetings and shorter breaks in between compared to men (16). Furthermore, it has been observed that women experience a higher level of fatigue than their male counterparts in these settings.

First-year students who are in the transition period from high school education to the world of lectures certainly need time to adapt well to the world of lectures. In addition, first-year students are also required to be able to adapt to the conditions of the academy that are still happening today (17). Many activities must be undertaken by first-year students starting from new student admission activities, student orientation period, regeneration activities, to lectures which, especially for the faculty of health clumps, one of which is the Faculty of Nursing itself, is unique compared to non-health faculties, because the lectures themselves have several activities, such as; laboratory lectures, practical lectures, tutorial activities with lecturers, and lecture activities conducted by lecturers (18).

Interviews carried out by the researcher with seven new students revealed that five of them experienced fatigue stemming from online learning. This fatigue was primarily due to monotonous online lectures and a

notable lack of social interaction both among students and between students and lecturers. These findings have prompted the researcher to investigate further into the phenomenon of Screen fatigue, particularly focusing on first-year nursing students at Padjadjaran University. The research aims to provide a detailed understanding of how Screen fatigue manifests in this specific group of new students.

METHODS

Study Design

Descriptive research is a type of study aimed at systematically and detailedly describing a phenomenon, condition, or situation. Its main objective is to provide a clear overview of the characteristics or nature of the research subjects. This method was chosen to gain a profound understanding of screen fatigue levels and exhaustion during online learning among first-grade nursing students at Universitas Padjadjaran.

Sample

The inclusion criteria for this study encompass first-grade nursing students enrolled at Universitas Padjadjaran who are actively engaged in online learning throughout the current semester. Conversely, the exclusion criteria involve students who are either not actively involved in online learning or express unwillingness to partake in the research. These criteria are established to ensure that the selected participants accurately represent the target population and are willing participants in the study, thereby enhancing the validity and reliability of the research findings. The targeted population comprised 190 students from the Faculty of Nursing, with a total sampling method employed for selection. The final sample size was 180 students, as 10 declined to participate.

Data Collection

Data will be collected through online distribution of the Zoom Exhaustion &

Fatigue Scale questionnaire, specifically designed to measure screen fatigue and exhaustion levels during Zoom usage in the context of online learning. The primary tool for data collection was the Zoom Exhaustion & Fatigue Scale (ZEF Scale), developed by Fauville et al. in 2021. This instrument consists of fifteen items across five constructs, utilizing a 1-5 Likert scale, where 1 represents 'not at all' and 5 signifies 'very much'. The outcomes measured by the ZEF Scale are categorized into three levels of fatigue: low, medium, and high. The validity of this instrument was confirmed with a score of 0.88, and its reliability was established at 0.83, making it suitable for this research. Data taken in January 2023.

Data Analysis

Data analysis will employ descriptive statistics, including univariate analysis such as frequency distribution. This will provide a comprehensive overview of the distribution and characteristics of screen fatigue levels and exhaustion during online learning among nursing students. Data analysis was conducted through univariate analysis to describe demographic data and the frequency distribution of students across different categories of screen fatigue. The analysis was performed using the Statistical Program for Social Science version 24 (SPSS 24). The study received ethical clearance from the Ethics Commission of Padjadjaran University, under the number 86/UN6.KEP/EC/2022. In alignment with ethical research practices, the dignity and rights of the subjects were a priority. This was achieved through informed consent forms and guaranteeing the confidentiality of the respondents by using codes during data analysis. The research ensured that data access was restricted solely to the research team, upholding the autonomy and privacy of the participants.

RESULTS

Researchers conducted the number of all respondents in this study was 180 students. The grouping of research samples is grouped based on gender, age, and internet connection used (Table 1).

Table 1.
Distribution of Respondents (n=180)

Characteristic	Frequency	Percentage
Gender		
Male	15	8.3
Female	165	91.7
Age		
17 years	8	4.4
18 years	102	56.7
19 years	60	33.3
20 years	10	5.6
Internet Connections		
Wifi	68	37.8
mobile hotspot	23	12.8
Wifi and mobile hotspot	89	49.4

Based on Table 1. it can be seen that the characteristics of respondents based on gender are mostly female as many as 165 respondents (91.7%). Furthermore, based on the majority of respondents' age, they are at the age of 18 as many as 102 respondents (56.7%). Meanwhile, the internet connection that is widely used by respondents is using wifi and mobile hotspots with a total of 89 respondents (49.4%).

Researchers conducted descriptive testing using computer software with the aim of knowing the description of the level of screen fatigue experienced by first-year students of the Faculty of Nursing, Padjadjaran University as respondents in this study. The description of screen fatigue in first year students of the Faculty of Nursing, Padjadjaran University can be seen in the table below (Table 2).

Table 2.
Result of Classification of Screen fatigue

Category	Frequency	Percentage
High	58	32.2%
Moderate	77	42.8%
Low	45	25%
Total	180	100%

In table 2 it can also be seen that the majority of respondents who experienced screen fatigue with were in the medium category as many as 77 respondents (42.8%). Then respondents with low screen fatigue category were 45 people (25%).

Then respondents with high screen fatigue category were 58 people (32.2%).

DISCUSSION

The study conducted with first-year nursing students at Padjadjaran University revealed

a significant level of Screen fatigue among the participants. The data indicated that a considerable proportion of respondents experienced moderate to high levels of Screen fatigue, with 77 students falling into the moderate category and 58 students experiencing high levels of fatigue. This prevalence of high Screen fatigue among students is likely to adversely affect their academic skills.

Consistent with prior research, the findings suggest that Screen fatigue can lead to diminished concentration during activities, potentially resulting in a decline in the academic competencies of students. The fatigue associated with Zoom is attributed to the complex dynamics present in video conferencing, which demand increased cognitive effort during interactions with others (19). Additionally, previous studies have identified four potential nonverbal factors contributing to Screen fatigue, indicating a multifaceted nature of this issue. The implications of these results underscore the need for strategies to mitigate Screen fatigue in order to preserve the academic performance and well-being of students engaged in online learning (16).

The prolonged duration and high frequency of video conferencing sessions, often exceeding individuals' tolerance limits for such activities, play a significant role in contributing to Screen fatigue. A key factor exacerbating this issue is the requirement for participants to keep their cameras on during these sessions. This leads to a situation where direct eye contact is maintained throughout the video conference, irrespective of whether a person is speaking or listening. Such extended periods of direct gaze can lead to physiological responses associated with arousal and anxiety (14). The continuous engagement in this type of visual interaction is not only unnatural compared to face-to-face meetings but also places additional stress on individuals, potentially leading to heightened levels of discomfort and anxiety, thus contributing to the overall

experience of Screen fatigue (7). Prolonged and inappropriate video conferencing may also have enormous stress potential. Previous research has also shown that students' fatigue level after learning through video conferencing plays a role in students' mental health (20). In addition, previous research shows that seeing oneself during video conferencing continuously will also make a person become more critical of themselves which can have negative consequences (21). Video conferencing technology can affect users' perception, cognitive load, interaction and communication which may lead to stress, fatigue and burnout (22).

The study highlights several factors contributing to Screen fatigue among students, particularly during prolonged video conferencing sessions. One significant aspect is the low mobility experienced by students, as remaining in a single position for extended periods can lead to physical soreness. This lack of movement not only causes discomfort but can also adversely affect cognitive performance (8). Previous research supports this finding, indicating that restricted mobility can lead to increased fatigue due to physical discomfort (23).

Another factor contributing to Screen fatigue is the heightened level of self-awareness and anxiety caused by constant self-observation. This phenomenon, akin to the effects of being exposed to a digital or physical mirror for extended periods, can escalate beyond mere discomfort to more serious issues like mirror anxiety and potentially even depression (24,25). The persistent focus on oneself during video conferencing, exceeding normal levels of self-attention, places an additional psychological burden on individuals (26).

Additionally, the increased cognitive load during video conferencing is a crucial factor. This is primarily due to the necessity of engaging in verbal and non-verbal cues to signify active participation, such as excessive head movements to ensure

visibility on screen. This need for continuous non-verbal communication can significantly increase the cognitive burden on participants. Supporting this, previous studies have also found a correlation between the cumulative academic load in online learning environments and the resultant student fatigue (26,27). The combined effects of physical discomfort due to low mobility, psychological stress from prolonged self-focus, and the increased cognitive demands of participating in video conferencing are key contributors to Screen fatigue experienced by students (28,29).

The online learning process makes nonverbal communication difficult to read, even though nonverbal communication plays a role in conveying information and interpreting the action or meaning behind it. As a result, a person has to work harder to send and receive nonverbal cues, which can increase cognitive load and can drain a lot of energy, which can cause fatigue (30). This burden causes students to require extra energy in understanding various online learning processes, causing screen fatigue (31).

To effectively counteract the adverse effects of Screen fatigue experienced by students, it's essential to adopt preventative strategies. One key approach is to avoid multitasking during video conferences. Focusing on a single task reduces cognitive overload and helps maintain concentration. Additionally, incorporating regular breaks is crucial (32). Taking time to stand up, move, and rest for about 5 to 15 minutes every three hours can significantly alleviate both physical discomfort and mental fatigue. Another beneficial practice is adjusting screen settings, particularly by matching the screen's lighting to the surrounding environment, thereby reducing eye strain (33). Effective time management during video conferencing is also important. Limiting the duration of sessions can prevent prolonged exposure that contributes to fatigue. Finally, using the speaker view option in video conferencing

platforms can aid in focusing attention on the current speaker, reducing the stress of processing multiple visual stimuli. Together, these measures can substantially reduce the incidence of Screen fatigue, enhancing the well-being and academic effectiveness of students in a virtual learning setting (34). These efforts need to be made to improve the online learning process for students (35,36).

One limitation of this study is its reliance on self-reported data gathered through online questionnaires. Due to the subjective nature of responses, there is a possibility of response bias, where participants may provide socially desirable answers or misinterpret questions. Additionally, the study's focus solely on first-grade nursing students at Universitas Padjadjaran may limit the generalizability of the findings to other populations or academic institutions. Furthermore, the cross-sectional design of the research provides a snapshot of screen fatigue levels during a specific period, thus limiting the ability to establish causal relationships or track changes over time. Despite these limitations, the study aims to provide valuable insights into the prevalence and impact of Zoom screen fatigue among nursing students engaged in online learning.

CONCLUSION

The findings of this study indicate that a significant majority of first-year students fall into the medium category of Screen fatigue. This highlights that numerous students are experiencing fatigue related to online learning. Such fatigue predominantly stems from the constant use of video conferencing platforms and the various challenges students face in the online learning environment. Given these findings, it is recommended for future research to delve deeper into analyzing the factors influencing the level of Screen fatigue among nursing students engaged in online learning. Understanding these factors in more detail could provide valuable insights

for developing strategies to alleviate Screen fatigue, thereby enhancing the online learning experience and overall well-being of students in such programs.

NURSING IMPLICATIONS

The implication of this research is that there is data about screen fatigue in nursing students. So that health workers and educational institutions have an overview to intervene in reducing the problem of screen fatigue in nursing students. In addition, nursing students can also have data as an effort to create a peer-support group to overcome the screen fatigue problem they experience.

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