

Short Communication

Neurocognitive Effects of Prolonged Virtual Consultation (Zoom Fatigue) in Clinicians

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Abstract

With the rapid shift to telemedicine during the COVID-19 pandemic, clinicians have faced unprecedented demands in adapting to prolonged virtual consultations. This has given rise to “Zoom fatigue,” a form of mental and emotional exhaustion associated with extended video-based interactions. While the Zoom Exhaustion and Fatigue Scale (ZEFS) has been widely applied in studies involving students and office workers, there is limited research on its relevance to clinicians. Physicians, in particular, often conduct hours of uninterrupted virtual patient care, which can potentially lead to significant neurocognitive strain. This study explores the impact of prolonged virtual consultations on clinician well-being, employing ZEFS alongside the Depression, Anxiety, and Stress Scale (DASS-21) and Satisfaction with Life Scale (SWLS) to assess emotional and cognitive outcomes. Findings suggest that the increased cognitive load, reduced non-verbal communication, and digital interface stress contribute to higher levels of fatigue, anxiety, and dissatisfaction, highlighting the urgent need for systemic support and ergonomic telehealth practices.

Introduction

With the rise of telemedicine during the pandemic, virtual consultations have taken over frontline clinical practice. As a result, Zoom fatigue—the term used to describe the mental and emotional exhaustion caused by extended video-based interactions—is receiving increased attention. The Zoom Exhaustion & Fatigue Scale (ZEFS) has been used to measure this phenomenon in office workers and students [1]. The Zoom Exhaustion & Fatigue Scale (ZEFS) has been validated to measure this phenomenon, with studies during the COVID-19 pandemic confirming that students and office workers experienced significant cognitive and emotional exhaustion, reduced productivity, and difficulty maintaining concentration [2]. Recent research among undergraduate nursing students also reported high levels of Zoom fatigue, with common symptoms including impaired concentration, eye strain, and emotional exhaustion, which in turn affected academic performance and psychological well-being [3]. However, the majority of studies have ignored the specific impact on clinicians. Physicians frequently devote hours to virtual patient visits, often without adequate rest. Since there is no clear neurocognitive insight into these effects on

healthcare providers, it is crucial to understand this under-researched area. The rapid transition to telehealth created significant workflow challenges for clinicians, as it required adaptation to new technologies and care delivery methods, hence contributing to increased provider burden and stress [4].

Cognitive and emotional demands of virtual consultations

Virtual consultations require clinicians to balance the demands of multitasking with the absence of non-verbal cues. They also entail extended screen time and the persistent sense of being “on camera”. Together, these factors increase cognitive load, leading to decision fatigue, mental tiredness, and difficulty focusing. Objective data support this concern: eye-tracking studies of virtual nurses revealed that cognitive fatigue emerged within the first 10–12 minutes of patient encounters, underscoring how virtual care workflows may accelerate fatigue onset and compromise sustained clinical focus [5]. According to telemedicine research, maintaining empathy and interpreting subtle nonverbal cues during video consultations requires more cognitive effort. This causes increased mental fatigue and cumulative exhaustion

More Information

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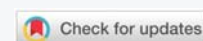
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Abbreviations: ZEFS: Zoom Exhaustion and Fatigue Scale; DASS-21: Depression, Anxiety, and Stress Scale; SWLS: Satisfaction with Life Scale





among clinicians. A service evaluation further revealed that both patients and clinicians perceived reduced rapport and challenges in interpreting subtle emotional or behavioral cues during video consultations, raising concerns about diagnostic confidence and the therapeutic relationship [6].

Recent evidence further indicates that the unique nonverbal dynamics of video-conferencing—such as prolonged gaze, restricted mobility, and constant self-view—intensify Zoom fatigue, with women reporting disproportionately higher levels of exhaustion [7]. Broader research in cyberpsychology highlights that while digital platforms enhance connectivity and create new opportunities for communication, they are also linked to negative psychological outcomes, including addictive behaviors and emotional strain, underscoring the dual impact of technology-mediated interactions on human well-being [8]. Despite growing recognition of these challenges, research on their impact on various specialties is limited [9].

Surveys, evidence, and parallels with burnout

Recent surveys found that 40% of physicians reported that virtual care required greater preparation and effort. Meanwhile, 47% experienced decreased job satisfaction and challenges with diagnostic accuracy [10]. Furthermore, systematic reviews of electronic health record use show that usability issues and the lengthy time commitment contribute significantly to clinician stress and burnout. These parallels suggest that Zoom fatigue may represent a distinct yet under-recognized source of cognitive burden, particularly in telehealth-intensive fields such as psychiatry and internal medicine [11]. Importantly, qualitative research in renal services indicates that while virtual care improved convenience and reduced patient travel, it also disrupted trust-building and limited clinicians’ ability to assess patients’ broader physical and social well-being, highlighting that specialty-specific challenges extend beyond fatigue alone [12]. This highlights an urgent need for a formal investigation into how such virtual interactions influence clinicians’ well-being and decision-making capacity. Notably, even beyond the pandemic, psychosocial strains such as ‘Zoom fatigue’ continue to persist in academic settings, underscoring the enduring relevance of environmental stressors on student well-being [13].

Neurocognitive gaps and risks to care quality

According to research, virtual meetings are frequently perceived as the most cognitively taxing modality [14]. However, there is a significant and concerning gap in our understanding of how these interactions may be reshaping clinicians’ neurocognitive functioning. Recent experimental work comparing EEG and ECG signals during video versus in-person lectures showed that 50-minute videoconferences produced significantly greater physiological indicators of fatigue, lending neurophysiological support to the subjective claims of digital exhaustion [15]. We are navigating this digital shift with limited empirical evidence about whether virtual consultations gradually erode cognitive abilities such

as memory recall, attention span, and mental flexibility, all of which are required for sound clinical decision-making. The potential consequence? A subtle but significant threat to both clinicians’ well-being and the quality of patient care.

Measurement tools and future directions

To ensure the sustainable integration of telehealth, we must act decisively and without delay. Safeguarding clinicians’ cognitive and emotional health demands the development of targeted research and mitigation strategies to address digital fatigue. Several validated tools—such as the Zoom Exhaustion and Fatigue Scale (ZEFS), the Depression, Anxiety, and Stress Scale (DASS-21), and the Satisfaction with Life Scale (SWLS)—are already available to quantify Zoom fatigue [6]. Ultimately, recognizing digital fatigue as a legitimate occupational health issue is imperative to building a resilient healthcare workforce, delivering high-quality virtual care, and protecting patient safety in the digital era. Table 1 shows the summary of Measurement Tools for Assessing Zoom Fatigue and Well-being.

Table 1: Measurement Tools for Assessing Zoom Fatigue and Well-being.		
Tool	Measures	Application Study
Zoom Exhaustion and Fatigue Scale (ZEFS).	Mental/ emotional exhaustion from video calls.	Specific to video-based fatigue.
Depression, Anxiety, Stress Scale (DASS-21).	Psychological distress.	Identifies stress and anxiety burden.
Satisfaction with Life Scale (SWLS)	Overall life satisfaction.	Evaluates broader well-being impact.

Conclusion

Research indicates that virtual meetings are often perceived as the most stressful meeting modality, leading to significant neurocognitive burdens on the clinicians characterized by intensified multitasking and exceptional efforts. It systematically erodes their cognitive abilities and warps critical decision-making processes. These virtual interactions are fundamentally altering the neurocognitive landscape of our clinicians, particularly acute in specialties like psychiatry and internal medicine. Strategies to alleviate digital fatigue and measures for targeted research are imperative to ensure sustainable integration of telehealth and prioritizing clinician well-being. Several assessment tools, such as the Zoom Exhaustion and Fatigue Scale (ZEFS), the Depression, Anxiety, and Stress Scale (DASS-21), and the Satisfaction with Life Scale (SWLS), are available to quantify Zoom fatigue. This issue must be promptly acknowledged as a legitimate occupational health concern to maintain a resilient healthcare workforce, deliver high-quality virtual care, and uphold patient safety standards in this digital era.

Ethics statement

The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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