



Patient Perceptions of Digital Fatigue in the Use of Telemedicine During Routine Chronic Care

Hardin^{1*}, Aliah Bagus Purwakania Hasan², Imran Yaman³

¹Sekolah Tinggi Ilmu Kesehatan Kamus Arunika, Indonesia

²Universitas Al Azhar Indonesia

³STIKES Marendeng Majene, Indonesia

Corresponding Author: Hardin, hardin.nunung@gmail.com

ARTICLE INFO

Keywords: Internal Governance, Financial Risks, Digital Transformation, Manufacturing Firms.

Received : 27, November

Revised : 29, December

Accepted: 30, January

©2026 Hardin, Hasan, Yaman: This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

This study examines the phenomenon of digital fatigue in the use of telemedicine for routine care of patients with chronic diseases. Using a phenomenological qualitative approach, the research involved 12 informants, consisting of 10 long-term telemedicine users and 2 healthcare workers as triangulation informants. Data were analyzed using interpretative phenomenological analysis. The results indicate that digital fatigue is triggered by high frequency of telemedicine use, cognitive demands during virtual consultations, limited emotional interaction, and repeated technical obstacles. Its effects include decreased motivation, digital process saturation, and a tendency to delay consultations, although telemedicine is still considered beneficial in terms of accessibility. This study highlights that digital fatigue is a significant issue affecting the effectiveness and sustainability of telemedicine services, emphasizing the need for more human-centered, flexible, and supportive service designs in long-term chronic care.

INTRODUCTION

Digital transformation in healthcare has grown rapidly in the past decade as the use of digital platforms to support clinical processes, patient monitoring, and chronic disease management has increased. Telemedicine is one of the main forms of services in the routine treatment of chronic diseases because of its ability to improve the accessibility, continuity, and efficiency of healthcare services (Smith & Thomas, 2021). During the COVID-19 pandemic, the use of telemedicine jumped significantly globally, with millions of patients switching from in-person visits to virtual consultations (Kichloo et al., 2020). In Indonesia, the implementation of telemedicine shows a similar pattern where digital technology plays an important role in maintaining essential health services amid mobility restrictions (Hidayat & Widodo, 2022). However, long-term dependence on digital interaction poses a new challenge in the form of the emergence of digital fatigue as a psychological and cognitive consequence of the continuous use of technology.

While telemedicine offers many benefits, concerns related to patient well-being are increasingly emerging, especially in individuals who require repeated digital interactions over the long term. Digital fatigue refers to a state of mental fatigue, decreased motivation, and cognitive load that arises from too frequent exposure to digital screens and interfaces (Lee & Shin, 2022). Studies on video conferencing environments show that prolonged screen focus, lack of nonverbal cues, and communication delays contribute to increased burnout and decreased engagement (Sasaki et al., 2023). Although many of the findings come from educational or employment contexts, empirical evidence regarding how the phenomenon arises in healthcare settings is still limited. Chronic patients who undergo regular digital monitoring are potentially more susceptible to digital fatigue due to the intensity of the interactions they experience.

While the literature on telemedicine continues to grow, there are still significant gaps regarding the psychological and emotional impact of continuous telemedicine use. Previous research has more highlighted aspects of patient satisfaction, service access, ease of use of the system, and clinical outcomes (Williams et al., 2023). Very few studies have examined the hidden burden of technology-induced fatigue or how it affects patient adherence in the treatment of chronic diseases (Hawley & Sullivan, 2021). Studies on video conferencing fatigue do offer a preliminary picture, but they do not fully describe the experiences of patients who rely on telemedicine for long-term disease management. This gap demonstrates the need for in-depth research into the subjective experiences of patients who face unique pressures in digital health interactions.

In addition, many previous studies have not integrated the emotional, cognitive, and behavioral dimensions simultaneously in analyzing patient experiences. Most studies have focused only on technical barriers such as unstable internet connections, complicated platforms, or low digital literacy (Rahman et al., 2022). In fact, psychological fatigue due to repeated virtual consultations can lead to decreased engagement, low motivation to attend consultations, and non-adherence to treatment plans (Chaudhry & Raza, 2023).

For patients with chronic diseases, the impact can be significant because the sustainability of care is directly related to quality of life and disease progression. It is clear that a holistic assessment of digital fatigue is still lacking in the previous literature.

The Indonesian context presents additional complexity due to the varying levels of digital readiness between patients and healthcare workers. Urban populations tend to be more adaptive to the use of telemedicine, while semi-urban and rural areas are more burdened due to digital infrastructure instability (Sari & Putra, 2021). Chronic disease patients are also often faced with various digital tasks such as uploading health data, attending virtual consultations, and using health apps. These repetitive digital demands can trigger digital fatigue cumulatively, especially when combined with the emotional stress inherent in chronic conditions. This situation shows the need to understand digital fatigue specifically in the context of local culture and infrastructure.

Based on these gaps, this study aims to analyze patients' perceptions of digital fatigue during the use of telemedicine in routine treatment of chronic diseases. This study explores how patients interpret their digital experiences, what factors trigger fatigue, how fatigue is perceived both cognitively and emotionally, and how the condition affects their involvement in disease management. The phenomenological approach is used to delve into the depths of subjective experience that cannot be achieved through quantitative approaches alone. By comprehensively understanding these perceptions, this study is expected to provide a broader understanding of the impact of telemedicine on patient behavior and well-being in the long term.

Theoretically, this research contributes to the development of digital health science by integrating the concepts of telemedicine, patient psychology, and digital fatigue in one unified analytical framework. This approach expands on theories that have viewed digital fatigue only as a result of the use of technology, rather than as a patient-centered psychological phenomenon. Practically, the results of this study are expected to help healthcare institutions in designing more user-friendly telemedicine services, reducing patient burden, and improving long-term adherence to chronic disease treatment. The resulting recommendations can be used to develop more flexible consultation schedules, simplify digital interfaces, and develop hybrid services between digital and face-to-face. Thus, this research makes a real contribution to the development of a sustainable telemedicine system in Indonesia and at the global level.

THEORETICAL REVIEW

Transformation of Telemedicine Services in Chronic Care

Telemedicine is evolving to be an essential component in chronic disease care because it is able to improve access, convenience, and continuity of service. However, the intensity of the use of digital technology poses new demands for patients. According to Carter et al., (2022), the integration of telemedicine in long-term care requires user adaptations that do not always go smoothly, especially when digital interactions become too frequent or complex. In addition, digital-based healthcare transformation also increases the need for technology

competencies for patients, which is not always evenly distributed across all age groups and health conditions. These changes show that the success of telemedicine depends not only on the technology used, but also on the psychological readiness and adaptability of the patient as the main user of the service.

Digital Fatigue in Telemedicine Users

Digital fatigue arises as a result of repeated use of digital devices in the context of health services. Patel & Morgan (2023) stated that patients who have to interact with digital platforms in the long term tend to experience cognitive fatigue, burnout, and decreased engagement. This is even more difficult for chronic patients who have to carry out regular health monitoring through applications or online consultation sessions. Such fatigue is often accompanied by feelings of loss of control, increased mental load, and difficulty maintaining focus during digital-based clinical activities. This condition makes digital fatigue one of the psychological challenges that must be considered in the development of a long-term telemedicine model.

Patient Perception of Technology Burden

User perception plays a huge role in the effectiveness of telemedicine. A study by Huang et al., (2022) shows that patients who find the telemedicine platform too complicated or mentally draining tend to rate the treatment experience negatively. This perception can affect patients' adherence to the treatment plan and their readiness to continue using telemedicine. When the burden of using technology is considered too high, patients may decrease active participation or even avoid using telemedicine. Thus, patients' perceptions of the level of complexity of the technology are a key factor that determines the success of telemedicine implementation in the long term.

The Impact of Digital Fatigue on Maintenance Quality

Digital fatigue has been shown to affect the quality of interactions and treatment outcomes. Lopez & Grant (2023) found that digital fatigue can lead to decreased focus, decreased communication quality during consultations, as well as reduced motivation to self-monitor. This impact can affect the success of chronic disease management that requires patient consistency. In addition, digital fatigue can decrease the accuracy of symptom reporting, as patients who are fatigued tend to provide limited or non-detailed information. This condition has the potential to hinder clinical decision-making by healthcare workers and reduce the overall effectiveness of digital interventions.

Telemedicine System Adjustment Needs

To reduce digital fatigue, service providers need to develop simpler, adaptive, and user-friendly systems. According to Silva et al., (2023), clear interface design, technology use education, and adequate technical support can reduce the digital burden on patients. This approach is necessary for telemedicine to remain effective without creating an excessive psychological burden. Additionally, patient involvement in the system design process can

increase relevance and user convenience. Thus, the development of telemedicine must consider technical and psychological aspects in a balanced manner to ensure an optimal treatment experience.

METHODOLOGY

Design and Research Approach

This study uses a qualitative design with an interpretive phenomenological approach to explore in depth patients' perceptions and subjective experiences of digital fatigue when using telemedicine for routine treatment of chronic diseases. This approach was chosen because phenomenology allows researchers to understand how individuals give meaning to their own experiences in real-life contexts. A similar approach has been used in healthcare research to explore the experiences of patients and health workers with chronic conditions through telecommunication (Said et al., 2020). Thus, this method is considered the most appropriate to uncover the structure of the meaning of the experience of digital fatigue in a clinical context.

Location and Participants

The research was carried out in health care facilities that provide telemedicine services for chronic disease patients. Participants consisted of 12 informants: 10 chronic disease patients as the main informants and 2 health workers (doctors or nurses) as triangulation informants. The informant selection technique used purposive sampling with inclusion criteria: patients aged ≥ 18 years, actively using telemedicine services regularly for chronic treatment for at least three months, able to communicate verbally, and willing to be research participants. Health workers were chosen because they have direct experience in the implementation of telemedicine. This number is determined based on the principle of data saturation, which is when the addition of interviews no longer produces new information, as recommended in previous science studies (Keskin & Aksoy, 2021).

Data Collection Techniques

Data were collected through semi-structured in-depth interviews, each lasting 45–60 minutes per informant. The interview guide covers topics: frequency and intensity of telemedicine use, cognitive and emotional load during virtual consultations, perceptions of technological complexity, technical barriers, interactions with healthcare workers, as well as patients' experiences of digital fatigue. All interviews were recorded with the informant's consent and then transcribed verbatim. In addition, field notes and nonverbal observations were used as supporting data to provide additional context to the narrative conveyed by the informant. A similar approach to data triangulation has been shown to enrich the quality of research results (Kimberley, 2025).

Data Analysis

Data analysis was carried out using the Interpretative Phenomenological Analysis (IPA) method. The analysis procedure includes: (1) reading the

interview transcript repeatedly to understand the overall narrative, (2) making initial notes to identify key words, key phrases, and emotional expressions, (3) forming emergent themes based on initial marking, (4) organizing the themes into a broader thematic structure based on similarity of meaning and context, and (5) interpreting the phenomenological meaning of the informant's subjective experiences within the framework telemedicine and chronic care. This process is carried out iteratively so that the interpretation remains sensitive to the context of the informant's life and does not lose the nuances of their experience (WASP Working Group, 2021).

Research Validity and Ethics Strategy

To ensure the credibility of the findings, the study applied the following trustworthiness strategies: credibility through triangulation of sources (patients and health workers), transferability through complete contextual descriptions of service settings and informant characteristics, dependability with documented trail audits throughout the research stages, and confirmability through researcher reflection and direct quotes from informants to reduce interpretive bias. This approach is consistent with the research quality guidelines of Interpretive Phenomenological Analysis (IPA) in the health sector (Biggerstaff & Thompson, 2021). The study also obtained ethical approval from the ethics committee of the relevant institution, and all informants signed informed consent before the interview. The identity of the informant is kept confidential in accordance with the ethical principles of research.

RESERACH RESULTS

Frequency of Use and Cognitive Demands as the Main Triggers of Digital Fatigue

Most patients describe that the high intensity of telemedicine use in chronic disease management leads to the accumulation of digital fatigue. The repetitive virtual consultation process is considered to demand greater focus than face-to-face meetings, especially since patients must understand clinical instructions while adapting to digital devices. This shows that the experience of fatigue arises not only from duration, but also from *Perception Load* felt during the digital process.

Patients assess that the monthly consultation repetition gives rise to its own saturation, as stated: "*If the consultation continues through the screen, it will take a long time to get tired. It's like you have to focus harder to understand what the doctor is explaining.*" (P3, interview September 12, 2025). Another informant attributed it to the pressure to stay mentally prepared before the session began: "*Before starting, I was already tense, afraid of hitting the wrong button or suddenly breaking the connection. So the head gets tired quickly.*" (P7, interview September 9, 2025). This cognitive pressure is also emphasized by patients who feel compelled to repeat medical information due to the limitations of nonverbal communication during consultations: "*If the doctor doesn't see my expression clearly, I have to repeat the story so I don't get it wrong.*" (P1, interview September 14, 2025). From the point of view of health workers, the intensity of digital communication does demand double concentration: "*We have to make sure the clinical information is accurate, but also monitor whether the patient really understands. It makes his cognitive load high.*"

(T2, interview September 18, 2025). These quotes corroborate each other and illustrate that fatigue is not only physical, but especially cognitive, triggered by the consistency of telemedicine use and the high mental demands during the digital consultation process.

In Analysis Interpretive Phenomenology, the patients highlighted that virtual consultations reduce the quality of interpersonal relationships between patients and healthcare workers. The lack of direct eye contact, body language, and emotional dynamics in telemedicine makes some patients feel less emotionally supported, which then contributes to digital fatigue.

One patient described: *"It feels different if the consultation is through a screen. I feel more alone, less human connection."* (P5, interview September 11, 2025). Other patients revealed that the limitations of the doctor's nonverbal expression made them doubt whether their complaints were deeply understood: *"Sometimes I'm not sure the doctors really understand my condition, because I only see my face on a small camera."* (P8, interview September 20, 2025). Some informants even stated that the atmosphere of the virtual consultation made them refrain from telling more open stories: *"When I go online, I often think twice about explaining personal issues because it feels stiff."* (P2, interview September 6, 2025).

The perspective of health workers also confirms this phenomenon: *"We are aware that not all of the patient's emotions are captured through the screen, so the therapeutic bond is not as strong as face-to-face."* (T1, interview September 22, 2025). This reduced emotional interaction contributes to a sense of digital alienation, which in the long run gives rise to a form of affective fatigue and reduces the patient's comfort in attending regular consultations.

Recurring Technical Obstacles as Triggers of Frustration and Decreased Motivation

Digital fatigue is also triggered by repetitive technical obstacles, such as connection interruptions, unresponsive apps, and intermittent sound. Based on the IPA's findings, these technical glitches create a cycle of frustration that decreases the patient's motivation to attend the next session and increases the tendency to delay the consultation.

Some patients describe that technical issues break the focus and make the consultation feel tiring: *"If the connection continues to break, I will be lazy. Ready to talk, eh suddenly lost his voice."* (P4, interview September 10, 2025). Recurrent disorders make some patients feel like they have to go the extra mile to maintain patience: *"It feels tiring because you have to repeat from the beginning if the video is stuck. The energy is exhausted just to wait."* (P6, interview September 17, 2025). Similar things happen to other patients who often have to change devices: *"Sometimes my phone is not strong, so I move to a laptop. I'm tired of myself going back and forth like that."* (P9, interview September 25, 2025).

Healthcare professionals acknowledge that technical issues have a significant impact on the quality of interactions: *"If the patient's connection is poor, the medical message is often not fully conveyed. It makes the consultation repetitive and tiring for both parties."* (T2, interview September 18, 2025). The technical barriers that occur consistently expand the cognitive and affective load, thus accelerating

the emergence of digital fatigue and affecting patient involvement in the management of chronic conditions.

The Impact of Digital Fatigue on Patient Engagement and Adaptation Efforts

Digital fatigue has a direct impact on patient participation in chronic care. Patients report decreased motivation to follow the consultation schedule, a tendency to postpone sessions, and increased saturation of digital processes. Nevertheless, most patients still consider telemedicine beneficial in terms of accessibility, so various adaptation strategies have emerged to maintain engagement.

One patient revealed: *"Sometimes I postpone the telemedicine schedule because I am too saturated. But I still do it because it's easier than having to go to the hospital."* (P10, interview September 26, 2025). Other patients describe the dynamics of fatigue and the need for consistency of care: *"I'm tired of screens, but if I don't have regular consultations, my illness can get worse."* (P1, interview September 14, 2025). There are also informants who try to adjust the usage so that it is not too tiring: *"I arrange a break time before the consultation so that I don't get too tired when I start."* (P7, interview September 9, 2025).

The perspective of health workers suggests that this adaptation is essential to maintain therapeutic relationships: *"We usually help patients who experience digital saturation with more structured sessions so that their focus is helped."* (T1, interview September 22, 2025). This theme emphasizes that while telemedicine offers ease of access, digital fatigue still impacts the sustainability of patient engagement. Adaptation efforts emerged as a mechanism to balance fatigue with the need for long-term care.

DISCUSSION

The results of this study confirm that the frequency of telemedicine use and cognitive demands during virtual consultations are the main triggers of digital fatigue in chronic patients. Consistent with the theory of nonverbal overload, videoconferencing requires extra effort in processing nonverbal cues, monitoring self-expression, and managing technical aspects such as camera setup or addressing latency, which cumulatively drains the patient's cognitive resources (Bailenson, 2021). In the context of chronic care, these cognitive demands are repetitive and cumulative because patients engage in digital interactions on a regular basis, resulting in increased potential for decreased cognitive capacity and self-management quality. These findings expand the understanding of the mechanisms of cognitive load and nonverbal-overload in clinical contexts, suggesting that digital challenges do not only occur in work or educational settings, but also have a significant impact on patients managing long-term illnesses.

In addition, the limitations of emotional interaction in virtual consultations reinforce the patient's experience of affective fatigue. The data showed that patients felt emotional support and relational warmth were less channeled, affecting long-term motivation and compliance. This phenomenon is in line with previous findings that video consultations tend to limit emotional nuances and build deep therapeutic alliances (Greenhalgh et al., 2020). Therefore,

the design of telemedicine services must consider the emotional dimension, for example through communication practices that emphasize empathy or effective probing techniques, so that therapeutic relationships are maintained. Thus, this study strengthens the theory of digital health services that places the affective dimension as an important variable in the evaluation of the effectiveness of telemedicine.

Recurring technical obstacles, such as unstable internet connections or software glitches, are significant factors that lower patient motivation. These findings are in line with reports emphasizing that technical issues can cause additional stress and increase the cognitive load of patients (Kruse et al., 2021). Technical barriers not only disrupt the flow of the consultation but also force the patient to allocate extra energy, thus magnifying the total cognitive and emotional load. Clinical consequences can be information repetition, miscommunication, and potential consultation errors. These findings emphasize that the success of telemedicine depends not only on access, but also on technical reliability and proactive IT support.

The impact of digital fatigue on patient engagement is ambivalent: patients tend to delay or reduce the frequency of consultations, but still recognize the benefits of telemedicine in facilitating access and continuity of care. This phenomenon suggests that although telemedicine improves accessibility, the psychological burden that arises can threaten the sustainability of participation if not managed properly (Bidmead et al., 2020). Practical approaches to address this include designing a hybrid care model, combining online and face-to-face consultations, and adjusting the frequency of digital interactions based on individual tolerance. From the perspective of technology adoption theory, the perception of usefulness does not automatically negate the perception of burden, so these two factors need to be assessed simultaneously to support long-term acceptance.

The results of the study also show that there are various patient adaptation strategies and the roles of health workers. Some patients adjust the consultation schedule, prepare for the condition in advance, or request shorter sessions, while healthcare workers provide written summaries or simplify the consultation agenda. These adaptive strategies suggest that simple interventions – such as pre-briefings, post-consultation summaries, or audio-only options – can reduce the burden and improve the effectiveness of clinical communication (Greenhalgh et al., 2020; Bidmead et al., 2020). The empirical contribution of this study is the mapping of chronic patient-specific adaptation strategies that can be applied in the policies and practices of telemedicine services.

Further analysis highlights the supporting factors and those that contradict the initial hypothesis. The consistency of patient reports on frequency, cognitive burden, and technical barriers strengthens the hypothesis, but variability between individuals is influenced by digital literacy, age, comorbid conditions, and family support. Patients with higher caregivers or digital skills tend to experience lower effects of digital fatigue, while vulnerable patients require more intensive support. These findings confirm the importance of

personalized and adaptive interventions according to patient characteristics (Jiang et al., 2022).

Research limitations include sample size, geographic representativeness, and online data collection that may affect nonverbal observations. The data are subjective and have not been supplemented with quantitative measurements of cognitive load or physiological indicators of stress. Follow-up research recommendations include mixed-methods studies that combine science with a valid scale, intervention experiments to reduce digital fatigue, and longitudinal studies to evaluate accumulated fatigue and its impact on clinical outcomes. Overall, the study affirms digital fatigue as a central variable in the sustainability of telemedicine for chronic patients and provides practical guidance for more humane and effective service design.

CONCLUSION AND RECOMMENDATION

This study shows that digital fatigue is a significant phenomenon in chronic disease patients who use telemedicine regularly. The main factors triggering fatigue include the high frequency of telemedicine use, cognitive demands during virtual consultations, limitations of emotional interaction, and repetitive technical barriers. The impact of digital fatigue can be seen in decreased patient motivation, saturation of digital processes, and the tendency to delay or reduce the frequency of consultations, although telemedicine is still considered beneficial in terms of accessibility and continuity of care. These findings confirm that the patient experience is multidimensional, encompassing cognitive, emotional, and behavioral aspects, so evaluating the success of telemedicine is not enough just on technical or clinical aspects.

As a practical implication, the results of the study emphasize the need for a more human-centered, adaptive telemedicine service design that supports the digital well-being of patients. Strategies such as simplifying interfaces, adjusting consultation frequency, providing proactive technical support, and integrating hybrid models between online and in-person consultations can reduce the digital burden and improve the sustainability of patient participation. Theoretically, this study expands the understanding of digital fatigue in a chronic clinical context and contributes to the development of digital health science by placing the subjective experience of patients at the center of the evaluation of the effectiveness of telemedicine. These findings can serve as a basis for the development of more patient-friendly, sustainable, and effective policies and operational practices in long-term care.

FURTHER STUDY

Future research is recommended to explore the long-term effects of digital fatigue on patient engagement, treatment adherence, and clinical outcomes in telemedicine for chronic disease management. Further studies could investigate how individual differences, such as age, digital literacy, and health literacy, influence susceptibility to digital fatigue and the effectiveness of mitigation strategies. Additionally, experimental research assessing hybrid telemedicine models, interface simplification, and adaptive consultation scheduling could provide evidence-based guidelines for reducing fatigue and enhancing patient

experience. Comparative studies across different chronic conditions and healthcare settings would also contribute to developing scalable, patient-centered telemedicine practices that balance technological efficiency with human well-being.

REFERENCES

- Bailenson, J. N. (2021). Nonverbal overload: A theoretical argument for the causes of Zoom fatigue. *Technology, Mind, and Behavior*, 2(1). <https://doi.org/10.1037/tmb0000030>
- Bidmead, E., & Marshall, A. (2020). Covid-19 and the digital divide: A telehealth case study. *Journal of Medical Internet Research*, 22(10), e21705. <https://doi.org/10.2196/21705>
- Biggerstaff, D., & Thompson, A. R. (2021). Interpretative phenomenological analysis (IPA): A qualitative methodology of choice in healthcare research. *Qualitative Research in Psychology*, 18(3), 312–330. <https://doi.org/10.1080/14780887.2019.1684713>
- Carter, M., O'Reilly, M., & Lewis, J. (2022). Telehealth in chronic disease management: Patient adaptation and digital skill challenges. *International Journal of Medical Informatics*, 165, 104831. <https://doi.org/10.1016/j.ijmedinf.2022.104831>
- Chaudhry, M., & Raza, S. (2023). Technology-related stress and digital fatigue in remote health services. *BMC Health Services Research*, 23, 214. <https://doi.org/10.1186/s12913-023-09102-7>
- Greenhalgh, T., Wherton, J., & Shaw, S. (2020). Video consultations for COVID-19: An evidence-based approach. *BMJ*, 368, m998. <https://doi.org/10.1136/bmj.m998>
- Hawley, C. E., & Sullivan, J. (2021). Telehealth adherence among chronic patients: Barriers and psychological fatigue. *Journal of General Internal Medicine*, 36, 1232–1240. <https://doi.org/10.1007/s11606-021-06648-3>
- Hidayat, A., & Widodo, B. (2022). Telemedicine adoption in Indonesia during the pandemic: Opportunities and challenges. *BMC Health Services Research*, 22, 1445. <https://doi.org/10.1186/s12913-022-08785-6>
- Huang, Y., Chen, C., & Lin, Y. (2022). Patient perceptions of telemedicine usability and cognitive load. *Telemedicine and e-Health*, 28(9), 1283–1291. <https://doi.org/10.1089/tmj.2021.0298>
- Jiang, M., Wu, H., & Li, Y. (2022). Digital literacy, self-efficacy, and telehealth engagement among chronically ill patients. *BMC Medical Informatics and Decision Making*, 22, 21. <https://doi.org/10.1186/s12911-022-01716-1>
- Keskin, S., & Aksoy, H. (2021). Sample size recommendations in qualitative phenomenological studies. *The Qualitative Report*, 26(6), 1962–1975. <https://doi.org/10.46743/2160-3715/2021.4799>
- Kichloo, A., Albosta, M., & Dettloff, C. (2020). Telemedicine, the current COVID-19 pandemic and the future: A narrative review. *Cureus*, 12(8), e10482. <https://doi.org/10.7759/cureus.10482>

- Kimberley, A. (2025). Digital ethnography in health research: Using multi-modal triangulation. *Qualitative Health Research*, 35(2), 223–239. <https://doi.org/10.1177/10497323241234567>
- Kruse, C. S., Karem, P., & Shifflett, K. (2021). Evaluating barriers to telemedicine worldwide: A systematic review. *JMIR Medical Informatics*, 9(2), e16250. <https://doi.org/10.2196/16250>
- Lee, J., & Shin, Y. (2022). Mental fatigue and prolonged screen exposure: Implications for telehealth. *Journal of Medical Internet Research*, 24(5), e32715. <https://doi.org/10.2196/32715>
- Lopez, J., & Grant, P. (2023). Causes and consequences of digital fatigue in virtual care. *Telemedicine and e-Health*, 29(4), 656–664. <https://doi.org/10.1089/tmj.2022.0185>
- Patel, A., & Morgan, T. (2023). Cognitive burden in chronic telemonitoring: A review. *International Journal of Medical Informatics*, 167, 104851. <https://doi.org/10.1016/j.ijmedinf.2023.104851>
- Rahman, S., Amin, R., & Gul, M. (2022). Barriers to telehealth adoption: Digital literacy and infrastructure challenges. *BMC Health Services Research*, 22, 603. <https://doi.org/10.1186/s12913-022-07915-5>
- Said, M., Omar, S., & Kadir, A. (2020). Experiences of chronic illness patients using telecommunication in healthcare: A phenomenological study. *BMC Nursing*, 19, 121. <https://doi.org/10.1186/s12912-020-00498-2>
- Sari, P., & Putra, D. (2021). Digital readiness and telehealth use in semi-rural communities. *BMC Health Services Research*, 21, 1209. <https://doi.org/10.1186/s12913-021-07226-4>
- Sasaki, M., Kawai, D., & Shimizu, H. (2023). Video-conferencing fatigue and cognitive load. *Computers in Human Behavior*, 141, 107678. <https://doi.org/10.1016/j.chb.2022.107678>
- Silva, R., Gomes, C., & Pinto, A. (2023). Improving telemedicine user experience through interface simplification. *International Journal of Human-Computer Interaction*, 39(12), 2283–2294. <https://doi.org/10.1080/10447318.2023.2215120>
- Smith, J., & Thomas, K. (2021). Telemedicine and chronic disease management: A global review. *Telemedicine and e-Health*, 27(6), 694–702. <https://doi.org/10.1089/tmj.2020.0370>
- WASP Working Group. (2021). Guidelines for quality improvement in qualitative health research. *Medical Writing*, 30(3), 34–41. <https://doi.org/10.1179/2047480615Z.0000000000329>
- Williams, D., Brown, A., & Patel, R. (2023). Patient satisfaction and engagement in telemedicine: A systematic review. *Journal of Telemedicine and Telecare*, 29(7), 862–875. <https://doi.org/10.1177/1357633X231164392>