RESEARCH PAPER

A Scoping Review of Burnout, Digital Workload, and Technostress Among Nurses in the Post-Pandemic Era

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ABSTRACT

Background: The rapid expansion of digital technologies in healthcare has transformed nursing practice, but it has also introduced new sources of occupational strain, including digital workload, technostress, and burnout. Nurses are increasingly required to adapt to electronic systems, digital communication platforms, and technology-driven workflows, which may negatively affect their well-being and job performance.

Aim: This scoping review aimed to map the existing evidence on burnout, digital stress, and technostress among nurses, and to examine the relationship between technology-related workload and burnout in hospital settings.

Methods: The review was conducted using the Arksey and O'Malley scoping review framework. Studies were identified through PubMed, Scopus, and Web of Science between January 1 and January 30, 2026. Primary quantitative studies published in English and focused on nurses working in hospital settings were included. After screening 210 records and removing duplicates, 13 studies met the inclusion criteria. Data were charted and narratively synthesized to identify prevalence patterns, contributing factors, and correlations among burnout, digital stress, and technostress.

Results: The included studies showed that burnout remains highly prevalent among nurses, with reported rates ranging from 35% to 68%, depending on clinical setting and geographical context. Technostress and digital stress were generally reported at moderate levels, especially in acute care, intensive care, and psychiatric settings. Common technostress dimensions included techno-overload, techno-complexity, techno-unreliability, and lack of technical support. Several studies reported positive correlations between technostress and burnout, while organizational support, emotional intelligence, and psychological safety appeared to buffer these effects.

Conclusion: This scoping review indicates that digital workload and technostress are important and growing occupational stressors among nurses. The findings suggest that digital transformation in healthcare should be accompanied by adequate training, technical support, and workplace strategies that protect nurse well-being. Future research should use standardized measures, include diverse healthcare settings and low-resource contexts, and examine causal relationships more robustly.

Keywords: Burnout, Technostress, Digital Stress, Digital Workload, Nurses, Nursing, Scoping Review, Occupational Stress, Healthcare Technology, Post-Pandemic

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INTRODUCTION

Digital technologies in healthcare aim to cut down paperwork and improve data sharing between different areas. This can save time and make communication better. It is believed that this will lessen the workload for nurses and improve the quality of care.(1) Nurses are frequently required to adjust to new applications and workflows, which can lead to feelings of frustration, an increased workload, and fatigue.(2) As healthcare systems continue to embrace digital technologies, nurses are increasingly susceptible to technostress—a psychological strain associated with the use of technology.(3)

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The incorporation of digital technologies into healthcare environments, particularly within the ambulatory care sector of general practitioners, is becoming increasingly prevalent, with the potential to enhance the efficiency of daily operations. However, while these technological advancements hold promise, their adoption may also introduce new stressors for healthcare professionals, potentially adversely affecting their performance and well-being.[4] The phenomenon of burnout among general nurses has been thoroughly investigated in academic literature. A multitude of studies consistently emphasize a significant occurrence of burnout symptoms and persistent stress within this demographic.[5]

The use of digital technologies in healthcare has changed how nurse leaders run clinical operations, communicate, and do administrative work. These tools promise to make things more efficient and improve patient outcomes, but they also bring up problems. Nurse leaders need to know how to use digital platforms, keep track of electronic communication, and deal with a constant stream of information. This digital demand has caused digital stress, which is the stress that comes from working with technology all the time. Burnout is a risk that nurses face at work. It includes feeling emotionally drained, losing touch with others, and not feeling like they are doing well. The connection between digital stress and burnout is not well understood, especially among nurse leaders who have to balance clinical, administrative, and technological roles. This connection has traditionally been linked to heavy workloads and a lack of staff. It's important to know this because nurse leaders shape the culture of the organization, help staff, and make sure that patients are safe.[6]

Nurses worldwide face a high risk of burnout, low job satisfaction, and a strong desire to leave their positions, which are key indicators of their overall well-being and professional outcomes. These issues have gained significant attention due to the ongoing shortage of nursing staff. The work environment within hospitals plays a crucial role in influencing these nurse-related outcomes.[7,8]

In the bustling realm of professions where human interaction is the lifeblood, burnout syndrome emerges as a formidable adversary, casting its shadow over many. Among the ranks of healthcare warriors, nurses stand as some of the most vulnerable to this relentless foe. This insidious syndrome weaves its way into the very fabric of nursing, affecting myriad facets of their vital work.[9] A nurse ensnared by burnout may find themselves grappling with a tapestry of physical frailty, sleepless nights, simmering hostility, prickly irritability, and the heavy cloak of depression. The ripple effects of this condition extend beyond the individual, touching the lives of patients who, in turn, experience a decline in the quality of care they receive.[10–12]

Technostress refers to the stress experienced by individuals when interacting with digital technologies. Initially coined in the 1980s to describe the challenges some individuals faced in adapting to computers in the workplace, the concept of technostress has evolved significantly.[13] In recent decades, it has emerged as a complex and pervasive issue, particularly as technology has become ubiquitous and deeply integrated into various aspects of daily life. In contemporary work environments, digital systems, artificial intelligence, automation, and real-time communication platforms play a crucial role. These technologies necessitate continuous adaptation and cognitive engagement from individuals. This persistent interaction with technology can lead to significant stress.[14]

Digital tools in healthcare aim to cut down paperwork and improve communication, but they often lead to frustration, fatigue, and technostress for nurses learning to use new systems. Choosing this topic for a scoping review makes sense because it focuses on the recent rise in digital technology after the pandemic. Nurses are especially vulnerable to burnout due to staffing shortages and changing roles. While many studies explore nurse stress, few connect this to technology use. A scoping review is ideal here to gather and summarize the diverse and emerging research without needing a meta-analysis, fitting the varied nature of the evidence on nurse well-being.

Despite abundant study on general nurse burnout and stress, there is little on digital workload and technostress, especially among nurse leaders who manage clinical, administrative, and technological obligations. Discrepancies in the definition of technostress, which have evolved since the 1980s, and inconsistent attention to various healthcare settings, such as ambulatory care, contribute to this gap. Due to global nurse shortages, little is known about how these factors affect work satisfaction and retention. A scoping review should identify research trends, geographical or methodological shortcomings, and influence future targeted efforts.

AIMS

This study aimed to discover existing studies on the incidence of nurse burnout and the digital workload experienced by nurses, as well as its impact on technostress among nurses in diverse environments. The review specifically examines the correlation between burnout and technostress associated with digital workload among nursing workers.

METHODS

This scoping review, based on the framework developed by Arksey and O'Malley1, aimed to examine the substantial evidence regarding the influence of diverse technologies on the workload of nurses in rural environments. The review followed five steps: 1) coming up with the research question, 2) finding relevant studies, 3) choosing studies, 4) charting the data, and 5) collecting, summarising, and presenting the results. This systematic methodology was essential for revealing a comprehensive range of data, identifying gaps in the existing literature, assessing the studies performed in this field, and acquiring the necessary insights to improve the comprehension of

the relationship between nurses' burnout and digital workload and technostress.

Research Questions

This scoping review aimed to map the existing scientific evidence on burnout, digital stress and technostress among nurses. The review was guided by the following research questions:

What is the prevalence of burnout among nurses?

What are the causes for the nurse's digital stress?

What is the impact of technostress among nurses?

How the burnout, digital stress and technostress were correlated among nurses?

Eligibility Criteria

The PCC mnemonic, which stands for "Population, Concept, and Context," was used to define the eligibility criteria:

Population: Nurses working in the Multi-Speciality Hospitals

Concept: Burnout, Digital Stress and Technostress

Context: Hospital Settings

This review included primary studies with quantitative methodologies, written in English, irrespective of publication date. Only published literature were considered.

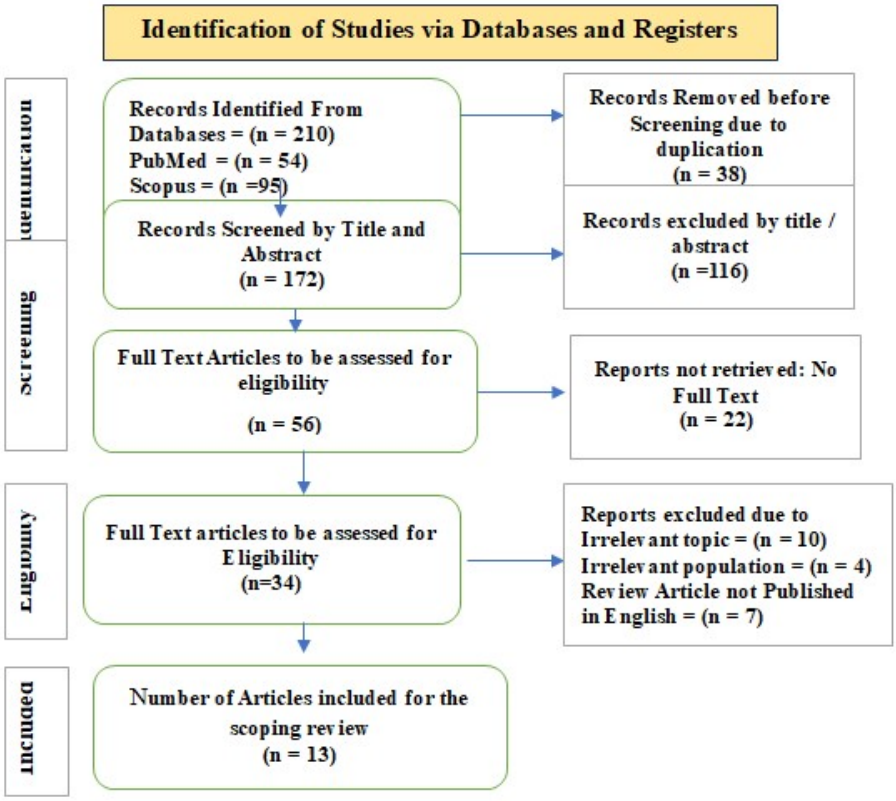

Figure – 1: The PRISMA flow diagram of identification and selection of systematic review done on nurses 'burnout, digital stress and Technostress

Databases and Search Strategy

From January 1 to January 30, 2026, three authors (SR, KM, and JJ) searched many databases, including PubMed, Scopus, and Web of Science, to find papers on the prevalence of burnout, digital stress, and technostress among nurses. The following search phrases were used: "Digital Stress" OR "Burden" AND "Burnout" OR "Technostress," "Nurse" OR "Nurses" AND "Prevalence."

Screening and Eligibility of Studies

Using the Arksey and O'Malley framework, we chose studies by going through a two-stage screening process over and over again to find relevant evidence on burnout, digital stress, and technostress among nurses. Three reviewers independently screened the titles and abstracts of 172 records (after removing 38 duplicates from 210 initial records across PubMed, Scopus, and Web of Science) using the PCC eligibility criteria: nurses (population) in hospital settings (context), focusing on burnout, digital stress, or technostress (concept), limited to primary quantitative studies published in English.

One hundred sixteen of these records were not relevant to the topic or population, so only 56 full-text articles were left for eligibility assessment. Full texts were reviewed iteratively, with criteria refined as familiarity with the literature increased; exclusions included irrelevant topics (n=10), irrelevant populations (n=4), non-English reviews (n=7),

Data Extraction

Data pertaining to authorship, publication year, study population, the number of quantitative research studies, sample size, and the prevalence of nurse burnout, digital stress, and technostress were systematically extracted using a Microsoft Excel spreadsheet. Furthermore, any determinant factors influencing nurse burnout were also identified and extracted.

Outcome measurement of the study

This scoping review examined three primary outcome variables: nurse burnout, digital stress, and technostress.

Table – I: General Characteristics of Included the Study done on nurse burnout, digital stress and technostress

Author and Publication Year	Countries of author	Study Population	Mean Age of Participants	Sample Size	Tool Used
Li L et al., 2024	China	Nurses working in healthcare settings, China	NA, majority were aged 26–35 years (48.7%)	4865	Maslach Burnout Inventory – Human Service Survey (MBI-HSS)
Owuor RA et al., 2020	Kenya, Uganda, South Africa	Nurses and midwives	28.6–40.3 years (varied by study)	2,543	Maslach Burnout Inventory, ProQOL, Copenhagen Burnout Inventory
Dyrbye LN et al., 2019	United States	Registered nurses across the U.S.	52.3 years (SD 12.5)	637 nurses	Maslach Burnout Inventory (MBI), WHO Health and Work Performance Questionnaire (HPQ), PRIME-MD
Bruyneel A et al., 2021	Belgium	ICU nurses in French-speaking Belgium during the first wave of COVID-19	36.9 years (SD ±10.3)	1,135 ICU nurses	Maslach Burnout Inventory (French version)
Wirth T et al., 2024	Germany	Nurses working in acute care hospitals in Germany	Majority between 40–49 years (30%) and 50–59 years (27.4%)	303 nurses	Digital Stressors Scale (DSS) for technostress indicators; Copenhagen Burnout Inventory (CBI) for burnout
Kräft J et al., 2024	Germany	Hospital nursing staff in inpatient acute care settings	Majority between 40–49 years (30.1%) and 50–59 years (28.0%); overall mean age distribution across 20–60+ years	239 nurses (final analyzed sample)	Digital Stressors Scale (subscales: techno-invasion, social environment); Copenhagen Burnout Inventory (personal burnout subscale); Work-Family Conflict Scale (work-privacy conflict); Health-Oriented Leadership (HoL) instrument
Golz C et al., 2021	Switzerland	Health professionals in Swiss psychiatric hospitals	41 years (SD 12.3)	493 health professionals	Technostress Questionnaire (Gimpel et al. model, 12 items); In-house Digital Competence Questionnaire (5 items); STRAIN Questionnaire (including COPSOQ, Nurses' Early Exit, von Korff, Workability

					Index)
Shaban M et al., 2025	Egypt	Registered critical care nurses working in ICUs	Majority between 31–40 years (42.8%); overall distribution 20–50+ years	180 nurses	Technostress Questionnaire (20 items, 5 dimensions), Copenhagen Burnout Inventory (CBI), Wong and Law Emotional Intelligence Scale (WLEIS)
Demir Y et al., 2025	Türkiye	Nurses working in a public hospital in Samsun province, Türkiye	32.7 years (SD ±6.42)	477 nurses	Perceived Occupational Stress Scale (POSS); Psychological Safety Scale (PSS); Digital Fatigue Scale (DFS); Job Performance Scale (JPS)
Cecere L et al 2023	Italy	Critical care nurses working in ICUs (≥6 months experience)	41.8 years (SD ±11.0)	140 nurses	Nurse Quality of Life Scale (NQoLS); Maslach Burnout Inventory (MBI); Depression Anxiety Stress Scale (DASS-21); Pittsburgh Sleep Quality Index (PSQI)
Helena C et al (2023)	Germany	Hospital employees	NA	1,004 hospital employees	Maslach Burnout Inventory (MBI)
Wu C et al., 2025	China	Radiology nurses working in tertiary hospitals	30.6 years (approx.; burnout group mean 32.1 ±4.7 vs. non-burnout group 29.4 ±5.0)	219 nurses	Nurse Stressor Scale (CNSS); Effort-Reward Imbalance (ERI) Scale; Maslach Burnout Inventory–General Survey (MBI-GS)
Wang J, et al., 2020	China	Registered nurses from 11 tertiary hospitals across multiple regions of China	Majority between 26–35 years; overall mean age not explicitly reported, but distribution: 18–25 (31.5%), 26–35 (52.3%), 36–50 (16.1%)	1,044 nurses	Professional Quality of Life Scale (ProQOL-CN, version 5: compassion satisfaction, burnout, secondary traumatic stress)

Quality Appraisal of Selected Reviews

Most of the thirteen studies reviewed showed strong methods, especially in using validated tools like the Maslach Burnout Inventory, Copenhagen Burnout Inventory, and Technostress Questionnaires. The Joanna Briggs Institute's critical appraisal tools for cross-sectional studies rated them highly. Most studies supported their findings with appropriate statistical analysis and clear inclusion criteria. However, some studies did not adjust enough for confounding factors that could influence burnout and technostress, such as staffing levels, organisational culture, and personal coping strategies. Smaller studies from Egypt and Germany (Helena et al.) scored lower than larger studies from China, Germany, and the US, which used more thorough measurement and sampling methods.

Narrative Analysis

Study participants

The studies included nurse groups from many countries and clinical settings, so they covered a lot of ground, but not all of it evenly. Li et al. (2024) looked into 4,865 nurses in public hospitals; Wang et al. (2020) looked into 1,044 registered nurses in tertiary hospitals; and Wu et al. (2025) looked into 219 radiology nurses in tertiary hospitals. It looked at acute-care, intensive-care, and psychiatric settings in Belgium (1,135 ICU nurses during the first COVID-19 wave; Wirth et al., 2024; 303 acute-care hospital nurses; Kräft et al., 2024; 239 inpatient acute-care nursing staff; Helena et al., 2023; 1,004 hospital employees); Switzerland (493 health professionals, mostly nurses, in psychiatric hospitals; Golz et al., 2021; Celere et al., 2023; 140 critical-care nurses with at least six months'

ICU experience); and Italy (Cecere et al., 2023; 140 critical-care nurses with at least six months' ICU experience). More information came from Turkey (477 nurses in a public hospital; Demir et al., 2025; Shaban et al., 2025; 180 registered critical-care nurses in ICUs); the US (637 registered nurses; Dyrbye et al., 2019); and sub-Saharan Africa (2,543 nurses and midwives; Owuor et al., 2020). The average age of the participants in the African study was between 28.6 and 40.3 years, while the average age of the participants in the US study was 52.3 years (SD 12.5). Most of the studies reported that the workforce was mostly women, which is usual for nursing. The samples mostly came from hospital settings like general wards, intensive care units, radiology departments, and psychiatric units. This allowed for a range of digital technology exposure and task intensities to be measured.

Measurement tools

The instruments used to measure burnout were verified and well-established. Studies from China, the US, Belgium, Italy, and Germany used the Maslach Burnout Inventory (MBI) and its variations (MBI-HSS, MBI-GS, and language-specific versions) the most frequently (Helena et al.). The Egyptian and German technostress research, along with a number of European and African-related studies, used the Copenhagen Burnout Inventory (CBI). An extra burnout dimension was included to the Chinese and multi-country African review using the Professional Quality of Life Scale (ProQOL). More recent, specially created scales were used to measure technostress and digital stress. The two German investigations (Wirth et al.; Kröm et al.) used the Digital Stressors Scale (DSS) and its subscales (techno-overload, techno-complexity, techno-unreliability, and lack of technical help). The Egyptian ICU study (Shaban et al.) employed a 20-item Technostress Questionnaire spanning five dimensions (techno-overload, techno-complexity, techno-insecurity, techno-uncertainty, and techno-invasion), whereas Golz et al. (2021) utilised a single-item global technostress rating (0–100). The Turkish sample's digital-stress-related fatigue was measured using the Digital Fatigue Scale (DFS) (Demir et al.). When pertinent to explanatory pathways, additional instruments evaluated associated constructs like effort-reward imbalance, emotional intelligence, psychological safety, and job performance.

Prevalence of burnout

The reported rate of burnout differed significantly among research, indicating discrepancies in measuring thresholds, clinical environments, and the time of the pandemic. In the largest Chinese sample, 50.7% of nurses exhibited moderate to high emotional tiredness, 32.8% demonstrated moderate to high depersonalisation, and 80.4% reported low to moderate personal accomplishment. During the initial wave of COVID-19 in Belgium, 68% of ICU nurses were at danger of burnout. 38.8% of Chinese radiology nurses had moderate to severe burnout, with emotional weariness being the most common type. The prevalence estimates for US registered nurses were between 35% and 45%, which is in line with national data. The systematic analysis of sub-Saharan Africa showed that rates were consistently higher than in other parts of the world, even if the exact pooled numbers were not always published in the papers that were combined. The Egyptian critical-care group showed moderate levels of burnout overall, with a mean CBI total score of 4.05 on a 5-point scale. These numbers show that the burden is always there and depends on the situation. Higher rates are commonly seen in high-acuity settings like ICUs and when workloads are high.

Prevalence of digital stress

The majority of studies reported continuous scale scores rather than categorical thresholds, which resulted in a lack of direct prevalence estimates for digital stress. The mean Digital Fatigue Scale score in the Turkish public-hospital sample was 3.08 (SD 1.14) on a 5-point Likert scale, which suggests that moderate digital fatigue is associated with protracted device exposure and insufficient technology familiarity. However, no other study included in the analysis provided explicit prevalence percentages for digital stress as a standalone construct. Rather, it was defined as a continuous exposure variable that contributed to broader occupational strain. Future research is required to establish clinically meaningful cut-offs for digital-stress severity among nurses, as the scarcity of categorical reporting underscores a methodological void in the literature.

Prevalence of technostress

Similarly, mean scores on continuous measures characterised technostress levels. Acute care nurses in Germany reported moderate technostress, with the highest values on the DSS subscales measuring techno-unreliability (4.26, SD1.83) and lack of technical help (4.10, SD1.90); other subscales measuring techno-complexity, techno-overload, and techno-usefulness averaged 3.20-3.80. On a scale from 0 to 100, a single-item technostress rating produced a moderate mean score of 39.23 (SD 32.54) among health professionals working in Swiss psychiatric hospitals, including nurses. Scores were substantially higher in acute-care and psychiatric settings, as well as among nurses and physicians, in comparison to other occupational groups. The average technostress score among Egyptian critical-care nurses was 3.42 (standard deviation 0.78), which is considered moderate. Taken together, these results point to moderate technostress in a variety of healthcare settings, caused more by system complexity, unreliability, and a lack of assistance than by a universally high level of severity.

Correlation between burnout, digital stress and technostress

Research on burnout and technostress/digital stress frequently found positive correlations. In the German acute-care population, all five DSS technostress indicators strongly linked with CBI personal burnout ($r = 0.187–0.329$, $p < 0.01$), with techno-overload and techno-complexity as significant independent predictors (adjusted $R^2 = 0.130–0.140$). When employers supported technical support, burnout was less likely and support was stronger. Technostress and burnout were positively correlated among Egyptian critical-care nurses ($r = 0.56$, $p < 0.01$). Emotional intelligence partially mediated this relationship

(direct path $\beta = 0.42$, $p < 0.001$; indirect effect via emotional intelligence = 0.23, $p = 0.002$; model fit indices indicated good fit). Digital tiredness adversely linked with job performance in the Turkish sample ($r = –0.536$, $p < 0.01$), partially mediating the effects of perceived occupational stress and psychological safety on performance, indicating burnout-related performance implications. The Swiss study related higher technostress to effort-reward imbalance ($\beta = 6.11$, $p < 0.001$), a precursor to burnout, however burnout was not directly quantified. Technostress and digital workload increase burnout risk, with organisational support and emotional resources as buffers. These relationships are cross-sectional and cannot be causally inferred, but they show that post-pandemic digital technology use can modify nursing burnout.

DISCUSSION

This scoping review synthesised evidence of thirteen quantitative studies on burnout, digital stress and technostress in nurses in different international healthcare settings. The results show a complex relationship between the use of digital technologies, work-related stress and well-being of nurses in the post-pandemic period. Of note, the review reported high prevalence rates of burnout among nurses worldwide, with rates ranging from 35% to 68%, depending on the clinical setting and geographical context. These figures show that burnout remains a serious occupational health problem, despite many efforts to improve working conditions and to implement organisational policies to support employees.

A consistent finding of this review is the positive correlation between technostress, digital workload and manifestations of burnout. All five indicators of the Digital Stressors Scale (DSS) were significantly associated with personal burnout in German acute-care settings ($r = 0.187–0.329$, $p < 0.01$). Techno-overload and techno-complexity were significant independent predictors of burnout severity. Also, Egyptian critical-care nurses had a moderate to strong positive correlation between technostress and burnout ($r = 0.56$, $p < 0.01$), mediated partially by emotional intelligence. Such findings suggest that although these digital technologies are designed to improve efficiency and alleviate the burden of healthcare delivery, their implementation may paradoxically add further stressors further exacerbating the existing risk factors for burnout. The differences in technostress manifestations between different healthcare settings, with higher scores in acute-care and psychiatric settings than in general medical units, suggest that the intensity and nature of digital tool use directly influence the stress responses of nursing personnel.

The heterogeneity of the prevalence rates of burnout found in the studies should be interpreted with caution. The prevalence of burnout in research conducted in the USA was in line with known national rates (35% to 45%). Studies in sub-Saharan Africa reported high prevalence rates, and nurses working in ICUs in Belgium were at high risk (68%) during the acute phase of the Covid-19 pandemic. This variation reflects the interaction of several contextual factors, such as staffing ratios, organisational culture, operational pressures of the pandemic, and differential exposure to digital technologies. High-acuity clinical settings, such as intensive care and acute care, reliably demonstrate elevated burnout and technostress scores, suggesting that the adverse effects of digital workload are magnified in these settings, especially when the technical support infrastructure is lacking.

Of particular note, the measurement and conceptualisation of digital stress and technostress remain methodologically inconsistent in the reviewed literature. Most studies used continuous scale measures rather than categorical diagnostic thresholds, limiting standardised prevalence estimates of digital stress as a discrete construct. The Turkish public hospital sample is one of the few studies that have explicitly measured digital fatigue in categorical terms, with a mean Digital Fatigue Scale score of 3.08 (SD 1.14) on a 5-point scale. Methodological fragmentation indicates an important gap in the literature: there is no agreement on clinically meaningful cut-off scores that would allow identification of nurses at risk of technology-related occupational strain. Future research efforts should be directed to the development and validation of standardised diagnostic criteria for digital stress severity, allowing for more systematic identification and intervention targeting.

The studies reviewed revealed that the mediating role of organisational and psychological resources was an important protective factor. The German acute-care research showed a significant reduction in the strength of the technostress-burnout association through organisational provision of technical support, implying that infrastructure investment and proper training constitute viable buffering mechanisms against technology-related occupational stress. Emotional intelligence partially mediated the relationship between technostress and burnout among critical care nurses in Egypt, indicating that psychological resources and emotional regulation skills might help to counter the detrimental effects of the digital workload. The Turkish study's results also showed that psychological safety and perceived occupational stress partially mediated the relationship between digital fatigue and job performance, suggesting that the psychosocial climate of the workplace plays a substantial role in how technology-related demands are transformed into functional impairment. This implies that digital technologies may indeed be primary stressors, but the extent to which they are experienced as adverse is largely a matter of organisational and individual psychological resilience.

The Swiss study sheds light on the link between technostress and more general mechanisms of occupational strain. The study reported a strong link between technostress and effort-reward imbalance ($\beta = 6.11$, $p < 0.001$), a well-known precursor of burnout. The importance of this finding is that it places technostress within a broader theoretical framework of occupational stress, demonstrating that technology-related demands are not merely isolated stressors, but central to the effort-

reward imbalance paradigm. As healthcare organisations continue to digitise clinical workflows, the demands on nurses to navigate systems, continuously adapt to technology, and manage multiple digital platforms are significant. However, the recognition or compensation for these additional efforts is lagging far behind. This misalignment between technological demands and the perceived reward from the organization is a potent mechanism for perpetuating burnout, especially in resource-limited healthcare settings.

A key limitation in the reviewed studies is the lack of sufficient treatment of confounding variables likely to impact both technostress and burnout outcomes. Most of the studies we reviewed did not adequately control for confounding by staffing levels, organisational culture, approaches to institutional leadership, personal coping strategies and sociodemographic factors. Smaller sample sizes and less robust methodological designs were found in some studies from Egypt and Germany which may have introduced selection bias and limited the generalisability of the findings to broader nursing populations. Moreover, the cross-sectional design of all studies included in this review constrains causal inferences. Associations between technostress and burnout could reflect reciprocal relationships, with burned-out nurses having decreased capacity to use technology or both constructs being the result of unmeasured organisational stressors.

The geographic distribution of the evidence reviewed reveals strong research gaps. Most of the studies were from high-income (Germany, Switzerland, Italy, USA) and upper-middle-income (China) countries and there is a dearth of evidence from low-resource healthcare settings. While the sub-Saharan African studies give important insights into burnout in resource-limited settings, they did not systematically explore technostress or digital workload. This limits the understanding of how technology adoption impacts nurse well-being in these economically challenged settings. Focusing on hospital settings also omits evidence from other care settings such as ambulatory care, long-term care and community-based nursing settings where digital tool implementation and related occupational strain could manifest differently. These geographic and contextual gaps greatly limit the generalisability of current evidence to diverse global nursing populations and models of health care delivery.

LIMITATIONS

Limitations This scoping review has several limitations. Limitations to the study include a focus on quantitative research published in English, neglecting qualitative evidence and literature published in other languages that could provide further context for the findings. Comparison of studies with different measurement instruments such as the Maslach Burnout Inventory and various technostress and digital fatigue scales makes it impossible to arrive at standardised prevalence estimates. Major studies were cross-sectional, limiting the ability to draw causal inferences between digital workload, technostress, and burnout. Finally, the studies come from a lot of different places, but most of them are from China, Germany, and the United States. This means that they might not fully show how different nursing experiences are around the world, especially in places with few resources where digital infrastructure and staffing problems are very different.

CONCLUSION

In conclusion, this scoping review shows that technostress and digital workload are serious and growing work stressors among nurses in different health systems worldwide. The consistent positive associations of technology-related demands with dimensions of burnout, along with evidence that job resources (eg, organizational support and psychological factors) can effectively buffer these effects, suggest the need to develop technology implementation strategies that actively test nurse well-being alongside operating efficiency. As the digital transformation of healthcare systems stays its course, it is necessary to pay systematic attention on the occupational wellbeing affects of technology adoption. The identified research gaps require dedicated financial support for future research initiatives to resolve three specific areas which include standardization of research methods and geographic representation and determination of causal relationships. The healthcare system needs comprehensive research to achieve digital technology benefits and protect nurse mental and physical health which will result in sustainable healthcare operations and better patient results.

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