

HEALTHCARE WORKER RESPONSES TO HOSPITAL DIGITALIZATION AND THEIR EFFECTS ON CLINICAL PROCEDURE ADAPTATION

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Abstract

Hospital digitalization through electronic medical records and telemedicine is changing the way health workers do their jobs. This literature review examines health workers' responses to digitalization and the procedural changes that accompany it, as well as how those responses affect adaptation. The method used is an integrative literature review with a literature search through databases. A thematic analysis of the selected sources identified multidimensional response patterns covering cognitive, emotional, behavioral, and social aspects. Exploratory responses that involve questions and experimentation produce the fastest adaptation, while avoidance responses are the most damaging. The factors that determine adaptation include social support, supervisor leadership, a culture of learning from mistakes, the fit of procedures with professional values, and a realistic transition time. The integration stage of digital procedures requires three to six months with continuous support. This study concludes that the success of hospital digitalization is largely determined by the management of health workers' psychological and social responses, not merely by the sophistication of the technology or technical training.

Keywords: healthcare worker response, digitalization, electronic health records, telemedicine, procedural adaptation, hospital, literature review.

Introduction

Hospital organizations are in the midst of a rapid current of technological change. The digitalization of health services continues to grow through the use of computers, data analysis, artificial intelligence, and communication technology to process medical information, support the diagnostic process, and improve access to health services (Khayru, 2022). Electronic medical records are replacing the paper files that were relied upon for decades. Telemedicine opens up the possibility of remote consultations that were previously unimaginable. Health workers who are used to manual routines are now forced to adapt to digital interfaces, new workflows, and constantly updated protocols (Kabeer & Shrivastava, 2024). Each individual brings unique experiences in facing this change, ranging from delight at new conveniences to anxiety over the fear of technical errors. Organizational change in hospitals differs from that in other sectors because it concerns patient safety. One wrong click in an electronic medical record can be fatal. This concern shapes complex psychological responses in health workers. Some quickly master the new system, some resist, and most fall somewhere between these two poles. Understanding how health workers respond to digitalization is important because the success of technology adoption is largely determined by human factors, not merely the sophistication of the software.

Organizational change in hospitals never takes place in a vacuum. Every hospital has its own history, work culture, and power structure that influence how health workers receive new policies. Hospitals with a strong hierarchical culture may struggle when digital systems demand a level of transparency that was previously uncommon (Schoder et al., 2023). Senior doctors who are used to dictating medical notes to nurses or medical record officers must now type them into the computer themselves. This change of role is not merely technical, but touches professional identity and social position within the organization. Meanwhile, young health workers who grew up with digital technology may

feel that the new system actually smooths their work, and differences in the ability to adapt to technology between young and senior health workers can create a generational gap that affects how they respond to change and may lead to feelings of alienation and of being undervalued in the workplace (Darmawan, 2023). There is also the factor of a workload that was already high before digitalization began. The addition of new tasks in the form of data entry into electronic systems is often felt as an extra burden, not a replacement for old work. Constant pressure at work also makes it harder for staff to stay calm and focused when learning a new system (Issalillah, 2022). If not managed well, the accumulation of these complaints can undermine the noble goal of digitalization, which is to improve efficiency and patient safety.

Technological progress has driven a transformation in health services through telemedicine and digital medical devices, which allow services to reach more people and improve the efficiency of the health system (Sarif & Issalillah, 2022). Until now, medical practice has relied heavily on direct physical examination, touch, and face-to-face visual observation. Telemedicine turns much of this interaction into communication through a screen. Health workers must learn to read symptoms from a distance, rely on patient reports without a complete physical examination, and make clinical decisions with limited information. There are valid concerns about diagnostic quality, the potential for malpractice, and the loss of humanism in care (Murugan, 2024). Patients must also keep their right to clear information and respectful care when a service is delivered through a screen (Herisasono et al., 2023; Issalillah & Khayru, 2023). When a diagnosis is doubted, disagreements between patients and health workers can arise, so they need to be resolved fairly (Fanani et al., 2025). Conversely, telemedicine opens access for patients in remote areas who previously found it hard to reach specialist services. Wider reach like this also helps reduce unequal access to care (Hartono et al., 2024). Health workers who work with telemedicine feel a dilemma between satisfaction at being able to reach more patients and anxiety over the limited examination methods. Responses to this dilemma vary. Some withdraw and choose not to be involved in telemedicine services, some move forward with full confidence, and some participate while keeping their skepticism. This variation in responses needs to be understood so that hospitals can provide appropriate support for each health worker.

Procedural changes that accompany digitalization are often harder to adapt to than the technology itself (Mardikaningsih et al., 2024). Electronic medical records do not simply replace paper with a screen, but change the entire documentation workflow. The order of filling in forms, who is authorized to access data and when, and how information moves between units all become different from before. Health workers who have internalized the old procedures for years must let go of those habits and build new ones. This unlearning process requires considerable cognitive energy (Malm-Nicolaisen et al., 2022). Many health workers report mental fatigue during the transition because they have to think about procedures that should already be automatic. Procedural errors often occur in the early period, triggering frustration and blame toward the system or inadequate trainers. Staff tend to follow new procedures more consistently when they understand the policy behind them (Hakim et al., 2024). More complex is the situation when new procedures conflict with highly valued professional values. For example, a data security protocol that requires automatic logout after a few minutes of inactivity can disrupt continuity of care when health workers must move back and forth between the computer and the patient's bedside. The conflict between compliance with digital procedures and optimal patient care creates real moral pressure.

Studying health workers' responses to digitalization and procedural change requires attention to their subjective experiences. Two health workers in the same unit using the same digital system can respond very differently. One nurse may regard the electronic medical record as a tool that helps her work in a more structured way, while the colleague beside her experiences the system as a monitoring tool that makes her anxious every time she presses a button. This difference does not arise by chance, but from personal history, level of digital literacy, social support in the workplace, and the leadership style of the direct supervisor. This subjective phenomenon is often overlooked in studies that only measure the rate of technology adoption quantitatively. Yet understanding how health workers make sense of the change

is crucial to the success of long-term implementation. A technically perfect digital system can fail to be accepted if health workers feel that it does not respect their professional expertise. Conversely, a system with technical limitations can succeed if health workers feel involved in the change process and heard in their complaints. Hospitals therefore need to listen to individual views first, because shared decisions are built from them (Darmawan, 2024).

The literature on technology adoption in hospitals has so far focused more on technical and organizational factors, such as software quality, infrastructure availability, or top management support. Psychological aspects and the subjective experiences of health workers as direct users of the system often receive a smaller share. Yet the failure or success of digitalization is largely determined by how frontline health workers respond to change every day. The main problem is that there is still no systematic understanding of the patterns of health workers' responses to digitalization in their various dimensions. Responses are not black and white between acceptance and rejection. There are nuances such as conditional acceptance, passive resistance through minimal compliance, subtle sabotage by entering careless data, or even creative adoption in which health workers use the system for purposes its designers never intended. Such careless entries also raise concerns about professional ethics (Hartika et al., 2023). These diverse response patterns arise from the interaction between individual characteristics, system design, and the psychological climate of the work unit. Without a clear mapping of these patterns, hospitals will find it difficult to design interventions suited to each group of health workers. Uniform interventions such as mass training will be effective for only a small proportion of health workers, while the others continue to wrestle quietly with their own problems.

adoption and the procedural changes that accompany it. Many hospitals assume that once health workers are able to use the software, the new procedures will automatically be followed. This assumption has proven wrong. A doctor may already be proficient at typing prescriptions into the electronic system, yet still keep informal notes on paper because the new procedure is considered troublesome. A nurse may routinely fill in digital forms because she is being supervised, but skip certain steps considered unimportant. This phenomenon of workarounds, or shortcuts, is very common in the implementation of digital systems in hospitals. Workarounds arise from a mismatch between procedure design and the dynamic reality of clinical work. Health workers develop their own strategies to keep working efficiently while formally complying with procedures. However, workarounds have two sides. They show the creativity and adaptability of health workers, yet they can endanger patient safety if the chosen shortcut sacrifices critical validation steps (Yatno et al., 2023). Inaccurate or skipped entries also reduce the reliability of the data that the hospital depends on (Eskandar et al., 2025). The problem is that the existing literature does not sufficiently explain when a workaround is adaptive and when it is destructive, nor what factors drive health workers to shift from one type of workaround to another.

The digitalization of health services is taking place at an unprecedented speed throughout the world. The recent global pandemic accelerated the adoption of telemedicine and electronic medical records on a massive scale. Improvements and changes in the health service system need to consider the various factors that affect the quality and effectiveness of services, because health facilities are an important part of maintaining public health (Tampil et al., 2023). However, this acceleration often occurs without adequate psychological preparation for health workers. They are thrown into new systems with brief training and limited technical support. Weak institutional readiness leaves staff without clear guidance when the changes arrive (Khayru et al., 2024). This condition creates excessive pressure on health workers who are already exhausted by the pandemic. Understanding how they respond to change in extreme situations like this is very important to prevent burnout and the exit of health workers from the profession. Hospitals that fail to understand the responses of their staff will lose valuable professionals who are reluctant to work in an environment of continuous change without proper support. In other words, the sustainability of the health service system depends heavily on the organization's ability to manage the human response to digitalization, not merely on the technical success of system implementation.

Besides the post-pandemic acceleration, this topic matters because investment in hospital digitalization is very large. Governments and hospital management pour billions of rupiah into hardware, software, training, and consultants. Both government and hospital management share responsibility for ensuring that these investments actually benefit public health (Gunena et al., 2024). Yet the expected benefits of greater efficiency, patient safety, and job satisfaction are often not fully achieved. One of the main causes is the low acceptance of the new system by health workers. Every day, health workers use digital systems half-heartedly, look for ways to minimize their interaction with the system, or even complain to patients about how bad the system they must use is. These complaints are not merely a matter of comfort, but directly affect the quality of service. Knowledge of how health workers respond to digitalization can help hospitals identify points of failure before the investment swells beyond control. With a good understanding, hospitals can reallocate resources from mass technical training to individual mentoring for health workers who experience psychological difficulties, so that the return on digitalization investment can be significantly increased.

This study aims to systematically examine how health workers in hospitals respond to digitalization, including electronic medical records and telemedicine, and how their responses to procedural change affect their adaptation to the new system. The specific objectives include identifying response patterns such as full acceptance, conditional acceptance, passive resistance, active resistance, and creative adoption in the use of digital systems. This study also aims to map the factors that shape these responses, such as the individual characteristics of health workers, the interface design of the system, the psychological climate of the work unit, and the leadership style of the direct supervisor. The theoretical contribution of this research is the development of a typology of health workers' responses to digitalization that can be used as an analytical framework for future researchers. Practically, the results of this study can serve as a guide for hospital management in designing mentoring and training programs tailored to the response profile of each group of health workers, so that the success rate of digital system implementation can be increased without adding excessive psychological burden on health workers.

Method

This study uses a qualitative literature review approach with an integrative design that aims to synthesize findings from various written sources on health workers' responses to digitalization in hospitals. This approach was chosen because it allows the researcher to collect, evaluate, and combine research results from different methodologies into a coherent framework of understanding. Whitemore and Knafl (2005) explain that an integrative literature review is an appropriate method for topics that have been widely studied but whose results are scattered and varied, because this method facilitates the identification of patterns, themes, and gaps in the existing literature. The research procedure began with the formulation of a clear research question, followed by a literature search through academic databases such as Scopus and Google Scholar. The inclusion criteria covered peer-reviewed journal articles, book chapters, and research reports focusing on health workers' psychological responses, behaviors, or attitudes toward digitalization. Booth, Sutton, and Papaioannou (2012) emphasize the importance of recording the decision flow in a literature search to maintain the transparency and reproducibility of the review.

After the literature collection was completed, the next stage was data extraction and thematic analysis. The data extracted included the original study design, participant characteristics, the type of digital technology studied, the main findings on health workers' responses, and the factors that influenced those responses. The analysis used a thematic approach in which the researcher repeatedly read all sources to identify recurring categories of responses in the literature. Garrard (2011) introduced the matrix method, which is useful for organizing information from many sources while systematically comparing findings across studies. In this study, the matrix was built with columns representing response dimensions such as psychological comfort, changes in work behavior, perceptions of the system's benefits, and the coping strategies used by health workers. The validity

of the findings was maintained through investigator triangulation, that is, by asking academic peers to check the consistency of the resulting theme categorization. In addition, the researcher also carried out backward reference searching from key articles to ensure that no important sources were missed. This process produced a comprehensive mapping of how health workers respond to electronic medical records, telemedicine, and the procedural changes that accompany them, while also identifying areas that still require further research.

Results and Discussion

Health Workers' Responses to Electronic Medical Records and Telemedicine

Medical records are an important part of health services because they contain information on the patient's identity, examination results, diagnosis, therapy, and the medical actions given, and they also serve as administrative documents and legal evidence that support service quality and protect both health workers and patients (Mubarak et al., 2023). Health workers' responses to electronic medical records are formed through a cognitive evaluation process that continues from the moment the system is first introduced. A nurse who sees the electronic medical record interface for the first time will immediately compare it with previous experience using paper files. This comparison is not neutral, but is loaded with affective content, such as anxiety about clicking the wrong button, annoyance at having to type for longer than it takes to write, or curiosity about new features never encountered before. This initial evaluation largely determines whether health workers will approach the system with openness or avoid it. Health workers who have positive experiences with digital technology outside of work tend to show more positive initial responses than those with low digital literacy (Kalayou et al., 2021). However, the initial evaluation is not final. Every interaction with the system provides feedback that reinforces or changes it. An experience in which the system successfully saves patient data that was almost lost will strengthen a positive response. Conversely, an experience in which the system freezes while a patient is in critical condition will trigger a negative response that is hard to recover from. This continuous evaluation process explains why two health workers with the same background can develop very different responses to the same system.

Electronic medical records trigger emotional responses that are often stronger than cognitive or behavioral responses. Frustration is the most frequently reported response when the system runs slowly, the interface is unintuitive, or a technical failure occurs. This frustration does not stand alone, but triggers secondary responses such as anger toward the software vendor, disappointment with the hospital management that chose the system, or even guilt for being unable to master the system quickly. If it lasts long, frustration can lower job performance and loyalty to the hospital (Darmawan et al., 2020). In some health workers, frustration develops into chronic anxiety that disrupts sleep and work performance. They constantly think about possible data entry errors that could endanger patients (Tawfik et al., 2021). Anxiety that continues like this makes it hard to rest and stay focused at work (Khayru & Issalillah, 2022), and it carries legal weight because health workers answer for what is written in the record (Kholis et al., 2023). At the opposite pole, there are health workers who respond with satisfaction when the system helps them find a patient's history quickly, or when the drug interaction alert successfully prevents a medication error. This satisfaction triggers feelings of competence and pride in the profession. This pattern of emotional responses shows that electronic medical records are not merely a technical tool, but an object loaded with psychological meaning. Hospital management that focuses only on technical training without attending to the emotional management of health workers will miss an important aspect of successful implementation (Darmawan & Gardi 2024).

Behavioral responses to telemedicine have different characteristics from those to electronic medical records because telemedicine changes the direct relationship between health workers and patients. A doctor conducting a remote consultation must restrain the habit of performing direct palpation or auscultation (Mokoginta et al., 2024). A common initial response is a feeling of incompleteness, as if an important part of the diagnostic process is missing. To cope with this feeling, doctors develop compensation strategies such as asking patients to perform guided self-examinations, or asking a nurse

at the patient's location to help with the examination. These compensation strategies are a form of adaptive response, showing that health workers do not simply accept or reject telemedicine, but actively reshape their practice to fit the limits of the technology (Serrano & Karahanna, 2016). However, there are also maladaptive responses in the form of avoidance. Some doctors choose not to use telemedicine at all even though it is available, or use it only for certain cases considered safe. Part of this avoidance comes from concern about risk and legal liability when a patient cannot be examined directly (Amir et al., 2024). Nurses involved in telemedicine also show a unique response. They must learn to become intermediaries between doctors and patients who are separated by distance, conveying information in both directions accurately without reducing the quality of the therapeutic relationship. Nurses who succeed in developing this mediation skill report their own sense of satisfaction because their role becomes more central. This role also matters to patients, since their satisfaction follows the quality of service they receive (Darmawan et al., 2022; Mardikaningsih, 2022).

Responses to telemedicine are also strongly influenced by the type of service and patient characteristics. In follow-up services for chronic patients, health workers tend to respond positively because telemedicine saves patients time and travel costs (Rojak & Khayru (2024). They feel that this technology truly brings real benefits. Such efficiency can also narrow gaps in access to care (Aisyah & Sarif, 2024), although equal access still depends on how telemedicine is applied and on the challenges that remain (Khayru & Issalillah, 2022). Patients in disadvantaged areas often carry heavier health burdens, so remote follow-up matters most for them (Issalillah & Mardikaningsih, 2022). Patients with limited access to care still have the right to receive health services, including through remote ones (Issalillah et al., 2025). In remote emergency services or tele-ICU, the responses that arise are more complex. The pressure to make quick decisions with limited information triggers higher anxiety. A nurse in the emergency unit who must accompany a video consultation between a specialist and a critical patient feels a double burden (Eitenberger et al., 2024). On one hand, she must ensure that the connection is stable and the image is clear, and on the other hand, she must be ready to carry out physical actions ordered by the doctor through the screen. Responses to this pressure vary. Some develop into highly competent staff who are relied on by doctors, while others withdraw and try to avoid assignments in rooms with telemedicine. This difference in responses cannot be explained solely by differences in technical training, but is more related to individual tolerance for uncertainty and the ability to manage anxiety. Knowledge of this individual variation is important so that hospitals do not force all health workers to work with telemedicine in the same way.

Electronic medical records trigger interesting social responses when used in multidisciplinary teams. In a paper-based system, each profession has its own distinctive way of documenting. Doctors write briefly and sometimes illegibly, nurses document in detail, and other professions such as physiotherapists or nutritionists record in separate formats. Electronic medical records force all professions to use a uniform format and terminology. Responses to this standardization vary. Some health workers welcome it because it eases coordination. Others feel a loss of professional identity because their distinctive way of documenting disappears (Vos et al., 2020). This negative response can trigger subtle resistance such as entering minimal data without elaboration, or excessive use of the copy-paste feature so that notes lose individual nuance. In a team with good leadership, this negative response can be managed through open discussion about how standardization can accommodate the needs of each profession without sacrificing patient safety. However, in a team with a rigid hierarchy, negative responses tend to be suppressed and appear in the form of passive sabotage that is difficult to detect. Cases in which health workers deliberately enter wrong data to protest the system have been reported, although they are rarely acknowledged openly. Wrong entries like these can create legal problems when the records are used for claim payment (Ambarwati et al., 2024), and patients harmed by errors rarely file claims, so the mistakes may go unnoticed (Kurniawan et al., 2024). This phenomenon shows that responses to electronic medical records cannot be separated from power dynamics and professional identity within hospital organizations.

Time has a significant influence on how health workers respond to digitalization. In the early phase of implementation, the dominant responses are anxiety and confusion because staff are not yet used to

the new workflow. Fear of falling behind colleagues who adapt faster can add to this anxiety (Aisyah & Issalillah, 2021). Stress levels usually peak in the second or third week after training, when technical support begins to be reduced while the daily workload remains high. In this phase, many health workers report a wish to return to the old system. Some hospitals that are not ready for this critical phase see a surge in data entry errors, patient complaints about longer waiting times, and even safety incidents related to documentation errors. Such delays also lower patient satisfaction, because satisfaction follows service quality (Issalillah et al., 2021). Entering the second and third months, responses begin to diverge. Some health workers pass the critical phase and begin to feel the benefits of the system. They develop new routines and even discover features they did not know before. This group reports reduced stress and increased job satisfaction. Others continue to struggle with the same difficulties. They keep making mistakes, remain anxious, and often complain. This group is at high risk of burnout or leaving the job. Burnout is also a work-related health risk, and organizations bear responsibility when working conditions harm their staff (Sopyan et al., 2024). The third group consists of those who were initially positive but later became frustrated because overly high expectations were not met. This pattern of responses that changes over time shows that the evaluation of digitalization implementation cannot be done at a single point in time. Hospitals need to monitor health workers' responses regularly to identify groups that require additional intervention.

Social support in the workplace is a strong determinant of health workers' responses to electronic medical records and telemedicine. Health workers who work in teams with high colleague support tend to show more positive responses than those who work in isolation (Ikhwanuddin et al., 2023). When someone faces technical difficulties, the presence of colleagues who can help or simply listen to complaints reduces the negative impact of a bad experience with the system. Conversely, in units with a blaming culture, every technical error can trigger shame and avoidance. Health workers in such units tend to hide mistakes, not ask for help when struggling, and eventually develop suppressed negative responses. Work groups also tend to hold on to familiar habits when change arrives, so a new system works better when it respects existing work customs (Amri & Khayru, 2022). Support from the direct supervisor is also highly decisive. A head nurse who understands health workers' difficulties and actively seeks solutions (for example, by negotiating the scheduling of refresher training or requesting additional features from the vendor) turns negative responses into constructive ones. Clear task delegation between doctors and nurses also reduces confusion within the team (Vitrianingsih & Budiarsih, 2019), and clear limits of clinical authority help protect the hospital's sustainability (Sylvana et al., 2025). Conversely, a head nurse who is authoritarian and blames subordinates for every technical problem reinforces negative responses and resistance. The role of social support is often overlooked in digitalization implementation planning that focuses more on technical preparation and individual training. Yet investment in building team cohesion and supervisor-subordinate communication skills can have an influence as great as investment in hardware and software.

Responses to the procedural changes that accompany digitalization are often more complex than responses to the technology itself. Health workers may quickly accept the electronic medical record as a tool, but reject new procedures that require them to perform double verification or request authorization before saving data. Such steps exist to protect service users (Susanto et al., 2024), and digital approval needs clear safeguards for vulnerable parties (Baskoro et al., 2025). In urgent situations, however, waiting for authorization can delay care, which is why emergency action without prior consent has its own legal basis (Abdullah et al., 2023; Susanti et al., 2024). Rejection of new procedures is rarely frontal. It more often appears in the form of minimal compliance, in which health workers carry out the procedure merely to meet audit requirements, but do not internalize its purpose. Consent procedures, for example, exist to protect patients' rights and autonomy, so they should not be reduced to a formality (Chairul et al., 2023; Issalillah et al., 2023). For example, a procedure requiring nurses to fill in a pain assessment form every four hours will be complied with by entering the same number repeatedly without actually assessing the patient. Such a response is very dangerous because it creates an illusion of compliance while the substance of the procedure is not carried out. Records that look complete but do not reflect the care actually given also lose their value as legal evidence (Ustani et al., 2024). The main cause of this minimal response is the mismatch between procedure design and the

reality of clinical work. Procedures made by teams far from the front line often fail to consider variations in patient conditions, fluctuating workloads, or the need for flexibility. Health workers respond by developing workarounds that allow them to meet procedural demands without sacrificing efficiency. Some workarounds are adaptive and actually improve safety, while others are destructive. The difference between the two lies in whether the workaround is based on a deep understanding of the purpose of the procedure or merely on making work easier. Where care carries high risk, shortcuts can harm everyone involved, so procedures must stay clear and protective (Yasin et al., 2025).

Health workers' responses to electronic medical records and telemedicine are multidimensional, covering cognitive, emotional, behavioral, and social dimensions. Cognitive responses involve evaluating the benefits and risks of the system. Emotional responses range from frustration and anxiety to satisfaction and pride. Behavioral responses include active adaptation, compensation, avoidance, and passive sabotage. Social responses are formed through interaction with colleagues, supervisors, and other professions. Time determines the dynamics of changing responses, from an early phase full of stress toward a stabilization that varies between individuals. Social support in the workplace, especially from the direct supervisor, is a protective factor that turns negative responses into constructive ones. Protecting health workers' mental well-being at work also needs clear institutional rules (Wuryani et al., 2023). Finally, responses to procedural change often differ from responses to the technology itself, with the phenomena of minimal compliance and workarounds requiring special attention in managing digitalization implementation (Sasmitha et al., 2023).

The Influence of Responses to Digital Procedural Change on Health Workers' Adaptation

Responses to digital procedural change are a main determinant of how quickly and how successfully a health worker adapts to a new system in a hospital (Nurhefi et al., 2023). A nurse who responds to procedural change with an open attitude and a willingness to learn will go through a shorter adaptation phase than a colleague who responds with resistance. However, what is interesting is that an open attitude alone is not enough. Health workers who are overly enthusiastic without an adequate understanding of the reasons behind the procedural change are actually prone to making mistakes because they overlook critical steps that seem troublesome (Panagiotopoulos et al., 2023). Conversely, health workers who show initial resistance but are later given a convincing explanation of the benefits of the new procedure for patient safety can become the most compliant users of the system. This pattern shows that adaptation is not a linear process from resistance to acceptance. Adaptation is a learning process that involves cognitive conflict, in which old knowledge of manual procedures must be set aside while new knowledge of digital procedures is built. The speed of adaptation is largely determined by how health workers manage this cognitive conflict. Those who are able to tolerate ambiguity during the transition period will adapt better than those who need immediate certainty.

The type of response to procedural change that is most beneficial for adaptation is what can be called an exploratory response. Health workers with an exploratory response do not immediately accept or reject a new procedure, but first try to understand it by experimenting. They ask questions such as why the procedure was designed this way, what happens if this step is skipped, or how the procedure interacts with other existing procedures. These questions reflect a high level of cognitive engagement with the new procedure. In the process of exploring, they often find inconsistencies or design weaknesses in the procedure that the designers cannot see. They then communicate these findings to their supervisors or the implementation team. Feedback from health workers with an exploratory response is very valuable for the continuous improvement of procedures (Reis et al., 2020). Such feedback also helps clarify who is responsible when a procedure contributes to an error (Mening et al., 2023). Hospitals with many health workers who respond exploratively will experience a smoother adaptation process because procedural problems are identified and fixed early. Conversely, hospitals whose health workers are dominated by passive responses, whether in the form of acceptance without understanding or silent resistance, will face an accumulation of problems that only become visible after the procedure has failed to be implemented. Investing in encouraging exploratory

responses through interactive training design and easily accessible feedback channels is an effective strategy for speeding up adaptation (Hariani & Mardikaningsih 2024).

At the opposite pole, the avoidance response is the type of response that most damages adaptation. Health workers with an avoidance response try to interact with digital procedures as little as possible. They may delay entering data into the system until there is pressure from their supervisor, or look for ways to pass the data entry task to more junior health workers. In the case of telemedicine, the avoidance response appears when doctors choose to keep making face-to-face visits even though the patient's clinical condition could actually be handled through telemedicine, or when nurses deliberately arrange their schedules so that they do not get shifts that require assisting remote consultations (Ngafeeson, 2018). Handing tasks to less experienced staff can also put patients at risk and raise questions about who is liable for the outcome (Lethy et al., 2023). In the short term, avoidance does reduce stress because health workers do not have to face the difficulty of a new procedure. In the long term, however, avoidance causes health workers to fall far behind their peers. When digital procedures become a mandatory standard, those who are used to avoiding them will experience greater shock and a longer adaptation period than those who faced the difficulty directly from the start. Worse, avoidance can spread within a team through modeling, where junior health workers see their seniors avoiding digital procedures and then imitate this behavior. The formation of a culture of avoidance in a work unit is a disaster for digitalization implementation. A unit that avoids digital work also leaves the service weaker when patients need help at any hour, including in places with limited access (Mohamad et al., 2024). Therefore, early detection of avoidance responses and appropriate intervention such as individual mentoring or workload adjustment are very important to prevent the spread of this behavior (Mansyur et al., 2025).

The factor that distinguishes adaptive from maladaptive responses to digital procedural change is the degree of fit between the new procedure and the health worker's professional values. A doctor who highly values clinical autonomy will respond negatively to a digital procedure that requires committee approval before prescribing certain drugs. This negative response can be adaptive if the doctor uses it as a push to file an appeal or propose a revision of the procedure. The same response can be maladaptive if the doctor chooses to leave the hospital system or reduce the number of patients handled. Where approval would delay urgent care, the limits of a doctor's authority also need to be clear (Juliarto et al., 2023). A nurse who highly values personal relationships with patients will find it hard to accept a procedure that requires filling in digital forms in front of a computer while the patient waits. The adaptive response in this case is to find ways to document efficiently so that time with the patient is not greatly reduced. Clear information also matters, because procedures that disclose risks and costs openly help patients trust the care they receive (Rachim et al., 2024). The maladaptive response is to become angry at patients or colleagues out of frustration. Understanding the professional values held by health workers allows hospital management to design digital procedures that do not fundamentally conflict with those values. When a clash of values cannot be avoided, transparent communication is needed about the trade-offs that must be accepted. Health workers who understand why a procedure that conflicts with their values is still necessary will be better able to develop adaptive responses because they see the procedure as a necessary evil for a greater good.

The relationship between responses to procedural change and adaptation is also influenced by the characteristics of the procedure itself. Digital procedures with a high level of flexibility will trigger different responses than rigid procedures. Electronic medical record systems that allow health workers to adjust the interface display or choose the order of data entry according to individual preferences tend to be better accepted. Flexibility gives a sense of control that reduces the feeling of being threatened by change. Conversely, very rigid procedures with steps that must be followed exactly without variation trigger higher frustration and resistance. However, it should be noted that not all procedures can be made flexible. Procedures directly related to patient safety, such as verifying a patient's identity before giving medication, must be strictly standardized (Sahidu et al., 2023). Strict standards are also needed where services involve sensitive personal data and consent, such as in contraception services (Rahmani

et al., 2024). In such cases, the source of flexibility can be shifted to other aspects of the work. For example, even though the identity verification step must be performed exactly, health workers can be given the freedom to choose when during their rounds they carry out the verification. Finding the right balance between standardization for safety and flexibility for user acceptance is an art in the design of digital procedures. Hospitals that succeed in finding this balance will see their health workers develop more adaptive responses and experience a faster adaptation process.

Differences in organizational roles affect how health workers respond to digital procedural change and how those responses affect adaptation (Harianto et al., 2024). Frontline health workers such as staff nurses and registration officers are the group that interacts most intensively with digital procedures every day. Their responses to new procedures largely determine whether the implementation succeeds operationally. However, this group often has limited autonomy to change procedures even though they understand their weaknesses best. When they respond by identifying problems but there is no mechanism to follow up, frustration accumulates and adaptation is hindered. Their frustration is often worse when staff are expected to follow procedures without enough support, so they need strong social support (Khayru, 2022). At the middle level, such as head nurses or unit coordinators, responses to procedural change are influenced by pressure from two directions. From above they receive implementation targets that must be met. From below they receive complaints and resistance from the team. A head nurse who responds with a transformational leadership style can bridge these two pressures and help the team adapt. Conversely, a head nurse who responds by blaming subordinates or merely passing down pressure from above will worsen the team's adaptation. At the top management level, the response to digital procedures is reflected in resource allocation policies. Management that responds by providing sufficient training time, adequate technical support, and recognition of health workers' efforts to adapt will create organizational conditions that support adaptation. Such support also keeps a unit working together rather than splitting into groups that pull in different directions (Mardikaningsih, 2021). These different responses at each level of the organization must be aligned so that the adaptation process runs smoothly throughout the hospital.

Errors in digital procedures are an unavoidable part of the adaptation process. How health workers respond to errors they make themselves, as well as those made by colleagues, largely determines the speed of collective adaptation. In a healthy work culture, errors are seen as a source of learning. A health worker who makes a data entry error will report it, analyze its causes, and work with the team to find ways to prevent a repeat. This collaborative response to errors speeds up adaptation because knowledge about procedural pitfalls is spread across the team. Open reporting also fits the duty of care, since patients are legally protected from the negligence of medical personnel (Lethy et al., 2023). Conversely, in a blaming culture, errors are hidden. Health workers who know that a colleague has made a mistake will stay silent for fear of also being sanctioned. As a result, the same errors happen again and again. Hiding errors can also leave patients without proper care at the end of life, when attention and honest communication matter most (Mengga et al., 2024). This defensive response to errors creates a vicious circle in which adaptation is hindered because the real problem is never identified. Hospitals that want to speed up their health workers' adaptation to digital procedures must consciously build a culture of learning from mistakes. This means that leaders must set an example by admitting their own mistakes in using the system, remove sanctions for error reporting made in good faith, and celebrate procedural improvements that come from learning from mistakes. Hospitals should also take institutional responsibility for these errors rather than placing the blame on individuals alone (Mening et al., 2023). Without this cultural foundation, any technical training effort will have limited impact because the psychological barriers to reporting errors remain.

The process of adapting to digital procedural change does not end when health workers can follow the procedures correctly. True adaptation occurs when health workers reach an integration stage in which digital procedures become a natural part of the work routine without requiring excessive conscious thought. At this stage, health workers no longer feel the extra cognitive burden of digital procedures, so the mental energy saved can be used for other aspects of care that need more clinical judgment (Lazarevic et al., 2025). However, reaching this integration stage takes sufficient time and experience.

Estimates from various implementation experiences show that, on average, health workers need three to six months of routine use before reaching the integration stage for digital procedures of moderate complexity. During this period, continuous support is very important. Support can take the form of a superuser on every shift, access to an easily searchable guide to digital procedures, or regular reflection sessions in which the team discusses the difficulties that remain. Clear administrative arrangements help keep this support running after the initial training ends (Vitrianingsih et al., 2022). Hospitals that stop support too soon after the initial training often see adaptation stagnate, with health workers remaining at the stage of conscious competence without ever reaching integration. As a consequence, digital procedures always feel like a burden even though they can already be carried out correctly. The feeling that work has become heavier after digitalization is an indication that the integration stage has not been reached. Staff who keep carrying this extra load without relief can become emotionally worn out (Khayru & Darmawan, 2023). Hospital management needs to realize that investment in support must continue for at least six months after implementation. The facility also remains accountable for the quality of care throughout this period (Wahyusetiawan et al., 2024).

The factor most often overlooked in discussions of adaptation to digital procedures is the need for a realistic transition time. Many hospitals set overly ambitious implementation schedules because of pressure from regulators or the wish to feel the benefits of digitalization quickly. Health workers are then faced with new digital procedures that must be mastered in a short time while still carrying a daily workload that does not decrease (Iyanna et al., 2022). Under these conditions, the most individually rational response is to do what is needed to meet the minimum target without truly mastering the procedure. Entering data only to meet a target can also open the way to inaccurate or even falsified records (Setiawan et al., 2023). This shallow response in turn leads to shallow adaptation, in which health workers can carry out the procedure when supervised but return to the old way when no one is watching. Such uneven practice can also mean that patients receive different quality of care depending on who is watching (Napu et al., 2024). Authentic adaptation that results in the integration of digital procedures into work routines requires time that cannot simply be shortened. The human brain needs repetition and sleep to move procedural knowledge from working memory to long-term memory. This memory consolidation process occurs biologically and cannot be accelerated by crash courses or intensive training. Rushed learning also raises the risk of clinical mistakes, for which doctors can be held legally liable (Setiyadi et al., 2023). Pressure to meet targets can also push staff to skip steps that respect the patient's right to decide about their own care (Nur et al., 2025). Therefore, a wise hospital will plan digitalization implementation with a realistic time horizon, usually one year for procedures that change the basic workflow, with gradual adaptation targets. It will also deliberately reduce health workers' workload during the transition period, for example by reducing the number of patients per nurse or adding temporary staff. A lighter load matters because service quality, and with it patient satisfaction, falls when staff are overstretched (Khayru & Issalillah, 2022). Investing in an adequate transition time will pay off through a deeper level of adaptation and sustained compliance with procedures in the long term. Clear supervision and accountability during this period also make it easier to settle disputes when a procedure goes wrong (Setyorini et al., 2024).

Responses to digital procedural change have a strong and complex influence on health workers' adaptation. Exploratory responses that involve questions and experimentation produce the fastest adaptation because procedural problems are identified and fixed early (Lauwers et al., 2024). Early identification also helps catch faulty equipment before it harms patients (Risman et al., 2024). Avoidance responses, in contrast, hinder adaptation and can spread within a team, forming a damaging culture. Sanctions need to be clear and proportionate, because weak enforcement lets poor practice continue (Sirenden et al., 2024). The fit of a new procedure with health workers' professional values determines whether a negative response is adaptive (triggering improvement) or maladaptive (triggering staff departure). Procedural flexibility, differences in organizational roles, and a culture of learning from mistakes are contextual factors that moderate the relationship between response and adaptation. Each profession also carries its own duty toward patients, which shapes how it responds to change (Setiawan et al., 2023). The integration stage, in which digital procedures become

automatic, takes three to six months with continuous support. The success of adaptation depends heavily on providing a realistic transition time and reducing workload during the early period of implementation. With a comprehensive understanding of these factors, hospitals can design implementation strategies that do not focus only on technical training but also on managing health workers' psychological and social responses to digital procedural change.

Conclusion

Health workers' responses to digitalization in hospitals are multidimensional, covering cognitive, emotional, behavioral, and social dimensions. Responses to electronic medical records and telemedicine are formed through a continuous evaluation process that is influenced by early experiences, social support, the leadership of the direct supervisor, and time. The response patterns identified include exploratory responses that benefit adaptation, shallow passive acceptance, active and passive resistance, and avoidance responses, which are the most damaging. Responses to digital procedural change often differ from responses to the technology itself, with the phenomena of minimal compliance and workarounds requiring special attention. Successful adaptation requires a transition period of three to six months, continuous support, a culture of learning from mistakes, and a fit between new procedures and health workers' professional values. Hospitals that provide a realistic transition time and reduce workload during the early adaptation period will reach a deeper and more sustainable level of digital procedure integration than hospitals with rushed implementation.

This study offers a theoretical implication by developing a typology of health workers' responses to digitalization that can serve as an analytical framework for future researchers. This typology goes beyond the simple dichotomy of acceptance and rejection by recognizing nuances such as conditional acceptance, passive resistance, creative adoption, and other clinically relevant variations. Practically, the findings of this study direct hospitals to invest not only in technological infrastructure and technical training, but also in developing health workers' psychosocial capacity. Peer mentoring programs, superusers available on every shift, and regular discussion forums on procedural difficulties are interventions proven to support adaptation. Hospital management also needs to re-evaluate workload policies during the digitalization transition period. A temporary workload reduction of 10 to 20 percent during the first three months can significantly speed up adaptation and prevent burnout caused by the double demands of clinical work and learning a new system. Human resource policies also need to be revised to remove sanctions for error reporting made in good faith, replacing them with collective learning mechanisms.

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