

Digitalized Versus Non Digitalized Doctors- Emergence Of Digital Medical Care Via Tech Savvy Doctors: A Systemic Review

Dr. Sheenu Jain¹, Dr. Rahul VC Tiwari², Dr. Heena Dixit Tiwari³, Dr. Zaheer Ahmed shaik⁴, Dr. Deepak Rohella⁵, Dr. Anil Managutti⁶

1. Ph.D., MBA, MSc Applied Psychology, M.Com, Associate Professor, IIHMR University, Jaipur, Rajasthan, India. sheenujain007@gmail.com
2. MHA Student, IIHMR University, Jaipur, Rajasthan, & PhD Scholar, OMFS, NPDCH, SPU, Visnagar, Gujarat. drrahulvctiwari@gmail.com
3. BDS, PGDHHM, MPH, Consultant Dental Surgeon, Smile Care Dental Hospital, NRI Hospital Road, Visakhapatnam, Andhra Pradesh, India. drheenatiwari@gmail.com
4. Department of conservative dentistry and endodontics, GSL dental college and hospital, Rajhamundry, Andhra pradesh. zaheerskahmed@gmail.com
5. Consultant Orthopedic Surgeon, AMRI Hospital, Bhubaneswar. deepakrohella@gmail.com
6. Prof. & HOD, Dept of OMFS, Narsinhbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, Gujarat, 384315. dranilman12@rediffmail.com

Corresponding Author: Dr. Rahul VC Tiwari, OMFS, FOGS, (MHA), PhD Scholar, OMFS, NPDCH, SPU, Visnagar, Gujarat & MHA Student, IIHMR University, Jaipur, Rajasthan, India. drrahulvctiwari@gmail.com

Abstract

Introduction: A review of healthcare professionals' digitalization skills is necessary given the concerns about patient safety and the incorporation of digitalization into the workplace. In order to explain the skills of healthcare professionals in these areas, identify factors that affect their competence, and identify essential areas of competence for digitalization in healthcare settings and to update job expectations and workflows, digitalization demands changes to healthcare practises, rules, and activities this study was taken.

Methodology: PRISMA was followed when conducting the systematic review. Web of Science, Academic Search Premiere (EBSCO), CINAHL (EBSCO), and Medline (Ovid) were the four databases that were searched for pertinent original peer-reviewed research published between 2012 and 2017. Five quantitative studies and seven qualitative investigations, which underwent narrative and thematic synthesis, were chosen for the final analysis out of a total of twelve.

Results: The knowledge of digital technology, digital skills necessary to provide quality patient care, including related social and communication skills, and ethical considerations of digitalization in patient care have been identified as the key competence areas regarding digitalization from a healthcare perspective. Healthcare personnel must be driven and willing to learn about digitalization and apply it to their work. Support from colleagues and an organization appears to be crucial for creating positive digitization experiences for healthcare practitioners.

Conclusion: If healthcare companies wish to improve their reaction to digitalization, they should both pay attention to the social environment of a workplace and foster a good attitude. The support of the company and its employees is necessary for the successful introduction of new technologies.

Keywords: Competence, Digitalization, Healthcare Professional, Public Healthcare Specialist, Specialized Healthcare

Introduction

The fast integration of digital technology into an ever-widening range of spheres of professional and personal life is known as digitalization (Reis et al., 2018). Healthcare is progressively using quickly evolving digital information and communication technology, among other things (Dowding, 2013; Murphy, 2010; Nohl-Deryk et al., 2018; Sensmeier, 2011). This trend's components include the digitization of many healthcare practises and services (Wu et al., 2009; Sensmeier, 2011), which has facilitated the creation of and access to telehealth and telemedicine, wearable technology, health portals, and personalised medicine (European Commission, 2012; Sensmeier, 2009). According to reports, digitalization can also boost hospital performance by enabling tailored patient care, lowering costs, and enhancing cost-effectiveness (Murphy, 2009; Gastaldi & Corso, 2012, Tresp et al., 2016).

The WHO (2016) views digital competence as a component of human capital that necessitates ongoing education to keep existing skills current with new information and technology advancements. A related notion called "digital health" is the use of theoretical, technological, and methodological expertise to address issues with healthcare prevention, diagnosis, and treatment by incorporating digital technology (Aakhus et al., 2018; Zhang et al., 2018). Competence is a contentious concept, and there is little agreement on what it entails, but in this context it is understood to be a comprehensive combination of the knowledge, performance, skills, values, and/or attitudes needed for the successful completion of particular tasks or activities (Cowan et al., 2005).

Previous studies on the integration of digitalization into patient care (Sewerin et al., 2018; Kuhn et al., 2018; Zhang et al., 2018) and medicine (Kuhn et al., 2018) have heavily emphasised topics pertaining to medical science. However, organisational structures and conflicting or impeding stakeholder-specific interests have been recognised as barriers to

effective digitalization in healthcare (Nohl-Deryk et al., 2018). Healthcare personnel need to be able to integrate new technological solutions into clinical practise, but the skills necessary for successful digitalization in healthcare settings have not been clearly identified. This is another potential issue that has received less attention (Sensmeier, 2009). In light of the aforementioned definition of competence, this study focuses on the knowledge, abilities, and attitudes that healthcare professionals need to adopt in order to incorporate digital technology in the context of patient care. According to the WHO (2013), healthcare workers include dental technicians, occupational therapists, physical therapists, employees from nursing homes, medical technology specialists, and others.

There are a number of contextual elements that affect how competent healthcare practitioners are with digitalization. For instance, it has been claimed that digitalization is accepted by healthcare professionals when they believe it will benefit patients and support workflow processes. In contrast, negative attitudes and experiences, as well as a lack of competence, are said to frustrate and prevent people from embracing new technologies (Murphy, 2009). De Veer and Francke (2010) discovered, for instance, that the type of healthcare organisation a staff member works for, their prior exposure to EPRs, the number of hours they work per week, and their perception of the usefulness of EPRs in relation to the calibre of care all had an impact on their attitudes toward electronic patient records (EPRs). Similar to this, Buntin et al. (2011) discovered a link between dissatisfaction with technical implementation and unfavourable results. To identify the educational and organisational requirements to increase the efficiency of digitalization, it is necessary to have a wider understanding of the skill areas and experience in digitalization of healthcare professionals. This knowledge gap is addressed by the systematic review that is described here.

Material and methods

Aims

By identifying crucial areas of competency for digitalization in healthcare settings, outlining the competencies of healthcare professionals in these areas, and identifying factors associated to their competence, this systematic review seeks to close the knowledge gap mentioned above.

Three particular research inquiries were answered:

1. In terms of digitalization in healthcare settings, what are the main areas of expertise?
2. What elements influence the digital proficiency of healthcare professionals?
3. What kind of digitalization-related experiences do healthcare professionals have?

Search techniques

The PRISMA flow diagram in Figure 1 and the subsequent sections both provide illustrations of the search and selection techniques used. We looked for pertinent material in four databases: Academic Search Premiere (EBSCO), Medline (Ovid), Web of Science, and CINAHL (EBSCO). According to the PICOS review process, inclusion criteria were established based on participants (P=participants), outcomes or phenomena of interest (O=outcomes / I=phenomena of interest), context (C=context), and type of research (S=type of studies) (CRD, 2009; JBI, 2014). Studies' eligibility was evaluated using the inclusion criteria (Aromataris & Pearson, 2014). Healthcare settings, including primary and specialised healthcare sectors, served as the context. Original peer-reviewed research that were either quantitative or qualitative and published between 2012 and 2017 were the papers that were selected for the review. The only language allowed was English, Japanese and Finnish. According to the PICOS inclusion criteria, which were paired with Boolean operators, the search terms were divided into four distinct sets of keywords (Aromataris & Riitano, 2014). (Figure 1).

A final of 12 original research in all, five quantitative and seven qualitative, were evaluated for quality. Two researchers independently conducted the procedure of choosing the studies, and then they reached an agreement. Throughout the selecting procedure, there was no disagreement between the two researchers.

Data gathering

Table 1 lists information taken from the original articles about the author, year, country of origin, purpose of the study, participants, method of data collecting and analysis, and key findings. Data extraction is intended to make it simple for other researchers to find out the relevant details regarding study characteristics and results (CRD, 2009).

By categorising data in accordance with digitalization competence categories, quantitative findings were assessed. The analysis comprised studies with various foci, designs, methods, samples, data processing techniques, and outcomes. In this systematic review, meta-analyses were not allowed because none of the identified factors were related to the same result in all of the included papers.

Results

The five initial quantitative studies were carried out in Finland (Koivunen et al., 2014), Australia (Sands et al., 2012), Turkey (Secginli et al., 2014), Thailand (Kijsanayotin et al., 2009), and the United States (Wilson et al., 2013). The seven initial qualitative studies were carried out in Finland (Anttila et al., 2008), Sweden (Holmström & Höglund, 2007; Munck et al., 2011), the Netherlands (van Houwelingen et al., 2016), Australia (O'Connell et al., 2007), the United States (Zuzelo et al., 2013), and the United Kingdom (Zuzelo et al., 2013). (Snooks et al., 2008). These studies covered tele-health (n=2), telephone triage (n=1), telenursing (n=2), electronic health records (n=1), wireless communication devices (n=1), computerised equipment (n=1), information technology-

based patient education (n=1), and health information technology (n=1). A wide spectrum of healthcare professionals, including registered and licenced practical nurses, midwives, healthcare workers, public healthcare specialists, and nurse managers, participated in the original studies.

The ability to make ethical decisions regarding the use of digital technology in patient care has been identified as a key area of competence from quantitative and qualitative studies, including knowledge of digital technology (Sands et al., 2012), digital skills needed to provide good patient care (Kijisanayotin et al., 2009), social and communication skills (Munck et al., 2011), and the ability to use digital technology in patient care. According to reports, healthcare workers also require the drive and willingness to gain experience with digitization in their professional setting (Koivunen et al., 2014; O'Connell et al., 2007). (Anttila et al., 2008; Snooks et al., 2008; Zuzelo et al., 2008). Additionally, according to reports, organisational and collegial support are crucial elements in creating great experiences for healthcare practitioners (Munck et al., 2008; Secginli et al., 2014; van Houwelingen et al., 2016; Zuzelo et al., 2008).

Areas of Digitalization Competence and Related Factors

The knowledge of telephone triage and telenursing, the use of health information technology skills, attitudes regarding intention to use health information technology, beliefs regarding the advantages or disadvantages of technology, and motivation were used to define the areas of competence in digitalization. Job position, workplace, team climate, and attitudes toward wireless communication devices were all factors that were associated to healthcare professionals' competency in the digitization of healthcare.

According to Sands et al. (2012), skills (Kijisanayotin et al., 2009), and attitudes (Sands et al., 2012), healthcare personnel are competent in digitization (Koivunen et al., 2014; Secginli et al., 2014; Wilson et al., 2013). According to a study on the core competencies of mental health telephone triage (MHTT), both telenursing and mental health

telephone triage require a specific level of competence. Additionally, competency in digitalization is directly related to competence in a clinical expertise area. According to Kijisanayotin et al. (2009), healthcare personnel must be proficient in using health information technology (IT) in their daily work. According to Kijisanayotin et al. (2009), attitudes towards digitalization in healthcare were described in terms of performance and effort expectations regarding technology and voluntariness, beliefs held by healthcare professionals regarding the advantages or disadvantages of technology, and motivation to use health information technology (Koivunen et al., 2014).

Three studies covered relevant topics (Koivunen et al., 2014; Secginli et al., 2014; Wilson et al., 2013). The job title (Koivunen et al., 2014; Secginli et al., 2014), employment at a hospital (Secginli et al., 2014), team climate (Koivunen et al., 2014), perceived behavioural control (Wilson et al., 2013), and attitude toward using wireless communication devices were the statistically significant factors mentioned in these studies (Wilson et al., 2013). According to Koivunen et al. (2014), nurse managers were more likely (89 percent) than both registered nurses (85 percent) and licenced practical nurses (80 percent) to be highly motivated to use information and communication technologies. According to Secginli et al. (2014), job status also affects how healthcare professionals view the advantages of electronic health records. For example, 89 percent of participating physicians thought that EHRs reduced the need for paper-based documentation, compared to 77 percent of participating nurses and midwives ($p=0.05$).

The incentive to use information and communication technology, according to Koivunen et al. (2014), was linked to perceptions of support for creativity and task orientation as well as experiences of a team climate and safe involvement. According to respondents, safe participation—which includes perceived safety at work, influence over decisions, information sharing, and frequency of interactions—was evaluated as the most crucial component (72 percent, $p=0.02$). Task orientation (67 percent, $p=0.04$), which explains how team members interact to foster superior teamwork, was the second most significant factor impacting motivation to use information and communication technology. The importance of support for innovation (65 percent, $p=0.04$), which includes time, cooperation, practical

assistance, and resources for the implementation of innovative ideas and proposals, was also highly rated (Koivunen et al. 2014).

Experiences of healthcare workers with digitalization

Three primary themes—professional knowledge and abilities, healthcare professionals' attitudes, and psychosocial and organisational factors—were used to characterise how healthcare professionals experienced digitalization.

Strong professional knowledge and skills are necessary to be proficient in digitalization.

Healthcare professionals must recognise ethical issues and make independent decisions, have knowledge of clinical practise, and possess a wide variety of professional skills, according to statements in the articles chosen for the first theme (competence in digitalization requires strong professional knowledge and skills). Healthcare workers must respond with independent and instinctive decisions when using technology because it can lead to ethical issues. Because patients' independence, integrity, and autonomy as well as identification verification were seen to be problematic (Holmström & Höglund, 2007; van Houwelingen et al., 2016), some authors highlighted the ethical concerns linked to telenursing. Healthcare personnel must be proficient in digitalization and have a working understanding of clinical practise. For instance, telenurses require strong analytical abilities in addition to clinical procedure and pharmacology expertise (van Houwelingen et al., 2016). (Sands et al., 2012).

The range of professional abilities required for a healthcare worker to be proficient in digitalization is extensive. For use of teletechnology, communication and social interaction skills are necessary. Additionally crucial for engaging with many stakeholders and patients' families are social interaction skills (Munck et al., 2011; Sands et al., 2012). A variety of practical skills are also required for healthcare practitioners. For instance, telenurses need to be able to identify drug and alcohol problems, manage various therapeutic approaches and de-escalation techniques, promote patients' empowerment and self-management, and manage time (Sands et al., 2012; van Houwelingen et al., 2016). (Sands et al., 2012). Telenurses must also record calls, report them, and compile data (Sands et al., 2012). Additionally, using technology in

healthcare environments typically necessitates users to be adept at ahead planning, managing a variety of scenarios, and identifying the requirements of patients and their families (Munck et al., 2011). The attitudes of healthcare workers that are founded on experiences affect their competency in digitalization.

The fact that many healthcare professionals have unfavourable attitudes toward technology education is a key finding in relation to the second theme (the competency of healthcare professionals in digitalization is influenced by their unique attitudes, which are created via experiences). For instance, Anttila et al. (2008) discovered that information technology education was perceived as being time-consuming, meaningless, and underresourced (offering poorly understood advantages). Additionally, they discovered that prejudices and a lack of motivation prevented patients from using technology, and interestingly, a patient's lack of motivation grew when they had more advanced information technology skills and when using the technology either required extra effort or was not considered to be the main task (Anttila et al., 2008). Prejudices that may prevent people from using technology include concerns about privacy and being overheard (Wilson et al., 2013), a lack of comprehension of the technology's function, and feelings of difficulty or discomfort (Anttila et al., 2008). The knowledge and confidence that healthcare workers have in using technology is allegedly influenced by their experiences as well (Munck et al., 2011; O'Connell et al., 2007). According to O'Connell et al., on the other hand, a lack of experience reduces familiarity with technology (2007). The degree of technology usage is negatively impacted by age (Snooks et al., 2008; Zuzelo et al., 2008), resistance to change (Wilson et al., 2013; Zuzelo et al., 2008), and prior experiences with technology usage (Zuzelo et al., 2008).

Technologies have a variety of reported consequences on the standard of care and the relationships between caregivers. According to Anttila et al. (2008), the use of technology can improve the patient-nurse connection, but it can also damage it by diverting attention away from the patient to the technology (Munck et al. 2011; O'Connell et al. 2007). Technology can break up care (Zuzelo et al., 2008). Technology can make healthcare professionals feel uncertain (Munck et al., 2011; O'Connell et al., 2007; Zuzelo et al., 2008), and using it may cause stress (Munck et al., 2008;

Snooks et al., 2008) and frustration (O'Connell et al., 2007; Zuzelo et al., 2008). However, Munck et al. (2011) found that secure use of technology While some healthcare workers may worry about losing their clinical judgement and practical abilities,

others may get inspiration from technology (Zuzelo et al., 2008). (Snooks et al., 2008; Wilson et al. 2013; Zuzelo et al., 2008). While using technology, some medical professionals have experienced negative feelings like worry and anxiety (Snooks et al., 2008).

Figure 1: Flow chart of the selection of the studies.

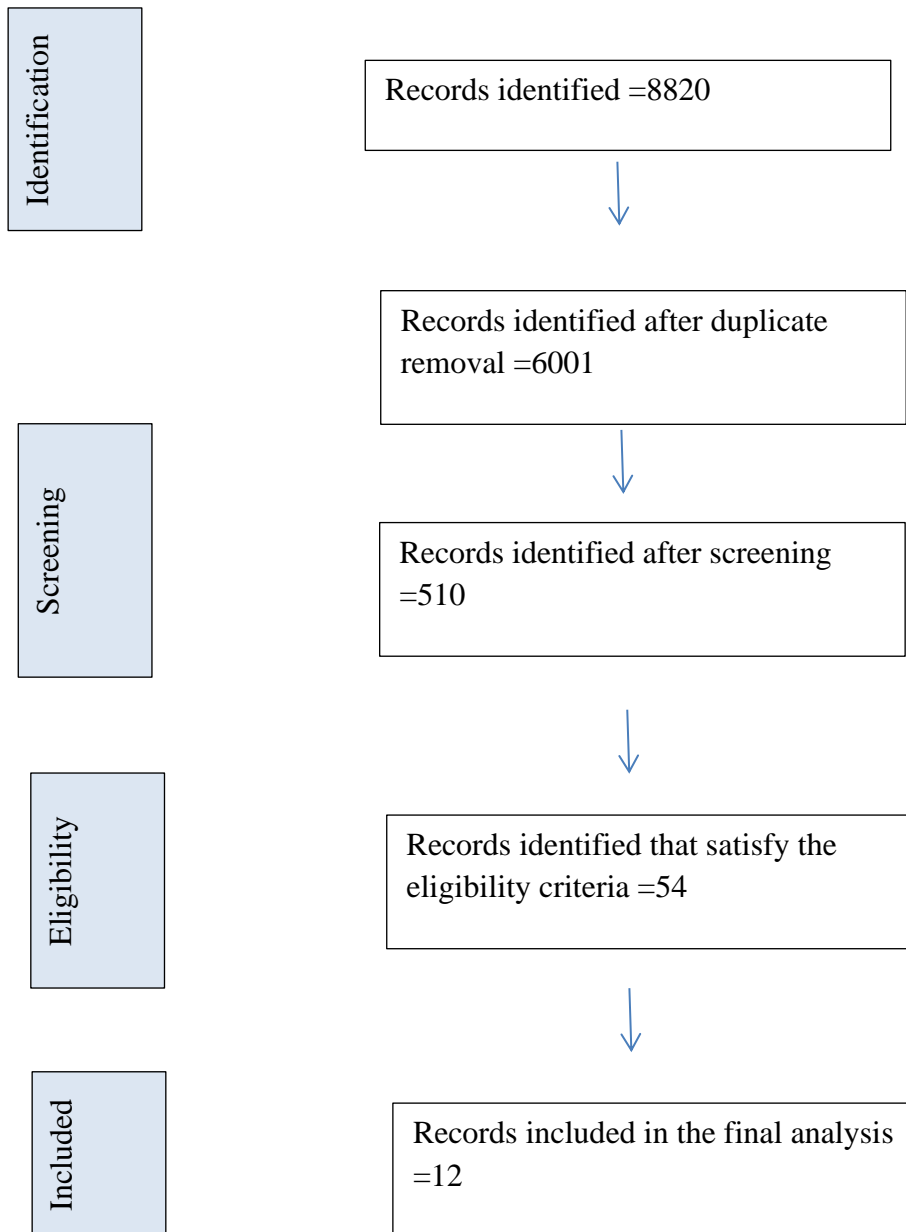


TABLE 1: INCLUDED STUDIES

Authors , year, and country	Purpose	Participants	Methodology, Data collection, and Data analysis	Key findings / Results	Quality assessment
Kijsanayotin, B., Pannarunothai, S., Speedie, S.M., 2009, Thailand	<p>To understand factors that influence health informational technology (IT) acceptance and use in community health centers in Thailand, as well as to validate the tested IT adoption model in the context of healthcare in a developing country.</p> <p>To identify factors that predict survey respondents' intention to use health IT and how they use this technology in Thai community health centers</p>	Health workers, nurses and public health specialists (n=1607).	<p>An observational research design;</p> <p>A cross-sectional national survey by self-administered questionnaire;</p> <p>Statistical analysis;</p>	<p>Response rate 82%. Intention to use health IT is a function of the perception of health IT's utility (performance expectancy), ease of use (effort expectancy), as well as how important it is to others that an employee uses health IT (social influence) and whether one has a choice in the use of IT (voluntariness). The predictive power of these four factors was substantial, accounting for more than half of the variance in the intention to use IT. Among these four influencing factors, performance expectancy was by far the strongest predicting factor.</p>	MAStARI 5/9

	in Thailand.				
Koivunen, M., Anttila, M., Kuosmanen, L., Katajisto, J., Välimäki, M., 2014, Finland	To describe team climate and attitudes toward ICT among nursing staff in acute psychiatric wards, as well as present how these factors are associated with each other.	Nursing staff, registered nurses, practical nurses and nurse managers (n=146)	Quantitative study design, descriptive survey; Questionnaires (TCI, Burkes' ICT attitude); Statistical analysis (SPSS);	Response rate 81%. Nurses' motivation to use ICT is positively correlated with experienced team climate, in particular, participative safety ($r=0.335$, $p=0.021$), support for innovation ($r=0.251$, $p=0.042$) and task orientation ($r=0.267$, $p=0.042$). Nurse managers' motivation to use ICT was significantly higher than that of practical nurses and registered nurses ($p=0.006$).	MAStARI 6/9
Sands, N., Elsom, S., Gerdtz, M., Henderson, K., Keppich-Arnold, S., Droste, N., Prematunga, R.K., Wereta, Z.W., 2012, Australia	To identify the core competencies of mental health telephone triage, including the key roles, tasks, skills, knowledge and responsibilities necessary to perform safe and effective triage. To produce findings that may contribute to the	Mental health triage healthcare workers (n=18)	Quantitative study design, observational design; MHTS instrument with 42- items; MHTTCOT instrument with 58-item instrument; Statistical analysis;	Over a three-year period, 197 occasions of mental health telephone triage (MHTT) were observed. Clinicians participating in mental health telephone triage must be competent in: opening the call; mental status examination; risk assessment; planning and action; call termination; referral and reporting; and documentation. In addition, healthcare workers require specific skills (crisis assessment/intervention, therapeutic approaches/interventions, negotiating, time management, resource management communication/information transfer) and knowledge (community resources, psychopharmacology, co-morbidity and complexity, youth- and age-specific, drug and alcohol, legal) relevant to effective MHTT.	MAStARI 5/9

	evidence base for mental health triage practice, which is currently underdeveloped.				
Secginli S., Erdogan S.,	To understand healthcare professionals' attitudes	Healthcare professionals from 129 Family Health	A cross-sectional, descriptive study design;	Response rate 43%. The majority of respondents agreed with benefit items, but physicians were more likely to agree that EHRs decrease paper-based	MAStARI 6/9
Monsen K.A., 2014, Turkey	towards, and satisfaction with, electronic health records (EHRs) in primary health care settings.	Centers (FHCs): (n=325)	Questionnaires; Statistical analysis;	documentation (p=0.007). The majority of respondents disagreed with most of the barrier items, with physicians and nurses/midwives providing significantly different responses regarding data security and cost (p=0.01). Physicians were more likely to agree that EHR costs are barriers to use.	
Wilson, R., Duhn, L., Gonzales, P., Hall, S., Chan, Y.E., VanDenKerkhof, E.G., 2013, USA	To document the perceptions and attitudes of nurses in an ICU (intensive care unit) before and after the implementation of WCDs (wireless communication devices).	Nurses in the ICU before (n=40) and after implementation (n=36)	Cross-sectional study design; Structured questionnaires; Statistical analysis;	Forty (32%) and 36 (29%) registered nurses (RNs) completed the questionnaire before and after WCD implementation, respectively. There were significant differences in both attitudes toward using the WCD (p<0.01) and perceived behavioral control (p<0.01) pre- and post-implementation.	MAStARI 5/9

Anttila M., Koivunen M., Välimäki M., 2008, Finland	To describe nurses' experiences of the IT- based standardized patient education program in inpatient psychiatric care from both the nursing and patient perspectives.	Nurses (n=56) working in acute wards in two psychiatric hospitals (n=9) that participated in the IT- based patient education program.	Qualitative research; Questionnaire with open- ended items; Qualitative content analysis;	IT added value to the patient-nurse relationship. IT education was a motivating method, as well as innovative and inspiring for nurses. The method could modernize nursing and was shown to be a promising new tool. Participants were also able to add a new dimension to their professional skills, to receive new information about diseases and their treatment options and to develop their technology skills. The portal was a supportive, fast and thorough information source which was pleasant for nurses to use. A lack of IT skills was found to prevent healthcare workers from deriving the maximum benefit from computers and the Internet.	QARI 7/10
Holmström I., Höglund A.T., 2007, Sweden	To describe the ethical dilemmas, in the form of conflicting values, norms and interests, which telenurses experience in their work.	Female telenurses (n=12)	Qualitative approach Open-ended interviews, two rounds; Thematic analysis;	The study identified five themes of ethical dilemmas that are present in telenursing: talking through a third party; discussing personal and sensitive problems over the phone; insufficient resources and the organization of health care; balancing callers' information needs with professional responsibility; and differences in judging the caller's credibility. Questions of autonomy, integrity and prioritization were highlighted by the participating nurses. The study argues that telenursing is particularly sensitive to ethical demands and suggests that opportunities for ethical competence building should be provided so that telenurses can decrease moral uncertainty and distress.	QARI 9/10
van Houwelingen, C.T.M., Moerman, A.H., Ettema, R.G.A.,	To identify the competencies that nurses need to possess before they can be trusted to perform specific telenursing.	Phase II Delphi-study: round I: experts n=51 round II: experts n=32 round III: experts n=25 round IV: experts n=3, authors n=3	Qualitative research method, Delphi-study; Qualitative analysis;	All telenursing activities, except for providing psychosocial support and encouraging patients to undertake health promotion activities, require multiple knowledge sources, including clinical and procedural knowledge. Communication skills, coaching skills, the ability to combine clinical experience with telehealth, clinical knowledge, ethical awareness and a supportive attitude were seen as the most	QARI 7/10

Kort, H.S.M., ten Cate, O., 2016, Netherlands				important competencies telenurses should possess.	
Munck, B., Fridlund, B., Mårtensson, J., 2011, Sweden	To describe district nurses' perceptions of medical technology in palliative homecare.	District nurses working with palliative homecare (n=16)	A descriptive design with a phenomenographic approach; Semi-structured interviews; Data analyses were performed in a seven-step	Five distinct categories emerged: 1) medical technology led to vulnerability in district nurses' work situations because of increasing demands and changing tasks; 2) medical technology demanded collaboration between all involved actors; 3) medical technology demanded self-reliance; 4) awareness of managing medical technology in a patient-safe way; 5) medical technology provided freedom for the palliative patients. Lack of time and continuity, in combination with increased workload, created uncertainty that could potentially jeopardize patient safety.	QARI 9/10
			process according to Dahlgren and Fallsberg (1991) approach;	District nurses need regular training on medical devices, must be more specialized in this kind of care and must not fragment their working time with other specialties.	
O'Connell, M., Reid, B., O'Loughlin, K., 2007, Australia	To explore the education and training experiences of intensive care unit (ICU) registered nurses in using computerized technologies, as well as assess the relationship this education has with	Nursing staff (n=6): nurses from fully computerized ICU (n=3), nurses from partially computerized ICU (n=3)	Qualitative research method, phenomenological approach; Semi-structured, in-depth interviews; Thematic analyses, categorizing;	Participants identified a range of formal and informal education and training sources available within the ICU setting, articulating both positive and negative experiences of using computerized technologies. The level of confidence in using computerized technologies was clearly related to years of experience and differentiated clinical nursing roles, and reflected whether a nurse worked in a fully- or partially-computerized unit.	QARI 8/10

	role performance and level of clinical experience.				
Snooks, H.A., Williams, A.M., Griffiths, L. J., Peconi, J., Rance, J., Snelgrove, S., Sarangi, S., Wainwright, P., Cheung, W-Y., 2008, United Kingdom	To understand the impact of telenursing from the perspective of nurses involved in its provision as well as in more traditional roles	Nurses (n=92) working in NHSDW (National Health Service Direct Wales) Two focus groups: Telephone service nurses; other nurses (n=13)	Qualitative study design; Structured questionnaires, focus groups; Thematic analysis, inductive analysis;	Respondents represented a highly educated workforce from a range of healthcare specialties. 'Two-thirds reported improved job satisfaction after the implementation of new technologies. All focus group participants reported that decision-support software as well as the remote nature of the consultation had developed their nursing skills. Participants reported opportunities for skill development although the role could be stressful. All of the respondents agreed that the service was popular among callers, but that nurses from other sectors raised concerns about whether telenursing was 'real' nursing, the evidence base supporting the service, and access by disadvantaged groups.	QARI 5/10
Zuzelo, P.R., Gettis, C., Whitekettle Hansell, A., Thomas, L., 2008, USA	To describe the influence of technologies on registered nurses' (RN's) practice, as well as discuss which technology characteristics encourage or hinder correct use.	Registered nurses (n=31)	Qualitative research method; Focus-group interviews; Content analysis;	Content analysis revealed that technologies enhanced nursing practice by improving direct care processes, patient outcomes, and work environments. Working with inefficient systems in terms of delivery, use, and repair challenged nurses, while physically-unfriendly equipment increased burdens to nurses' work.. Technologies led to changing nurse role expectations and altered healthcare team dynamics. Technology-use systems require monitoring and regular evaluation. System gaps create problems that potentially increase error risk and contribute to nurse dissatisfaction.	QARI 9/10

Discussion

The main objectives of this systematic review were to pinpoint crucial domains of expertise for digitalization in healthcare settings, to explain the domains of expertise of healthcare professionals, and to pinpoint factors influencing these domains of expertise. The main areas of competence included having the necessary knowledge and expertise in using digital technology to deliver high-quality, ethical patient care, social and communication skills by healthcare professionals to have the expertise in applying digital technology to health prevention, diagnoses, and treatment, motivation and willingness of healthcare professionals to integrate digitalization in their professional context, and collegial and organisational support for this. According to the review's findings, clinical knowledge and abilities are closely tied to a healthcare professional's proficiency with digital technology, which can also improve clinical workflow efficiency and patient care (Sands et al., 2012; Munck et al., 2011). However, it is obvious that proper management and communication of healthcare digitalization are necessary. The findings also demonstrate that employee views of new technologies' usability and attitudes toward them have a significant impact on the implementation process (Koivunen et al., 2014; Secginli et al., 2014; Wilson et al., 2013). According to Ingebritsen et al. (2014), the readiness of healthcare personnel to use technology is a factor in its successful deployment. Therefore, it is crucial to allow medical personnel enough time and funding to adjust to new technologies. Moreover, managers should emphasise how the technologies can enhance regular clinical practises and incorporate how to utilise new gadgets into their employees' daily tasks. Additional investigation into the usage of significant health information technology is also necessary (Agarwal et al., 2010).

The analysis also found that a professional's job title had a substantial impact on how proficient

they were with digitalization (Koivunen et al., 2014; Secginli et al., 2014). For instance, clinical leaders' technological aptitude affects how other healthcare professionals use information technology (Ingebritsen et al., 2014). This analysis also found that the motivation of healthcare workers to employ information and communication technology is influenced by the team environment (Koivunen et al., 2014; Zuzelo et al., 2008). According to Mescó et al. (2017), when planning the implementation of technology to improve health outcomes, it is important to take cultural differences and challenges into account as well as patient needs. Additionally, digital health places the patient at the centre of point-of-care, changing the status and responsibilities of both patients and medical professionals.

Another conclusion is that organisational and psychosocial aspects have a big impact on how well-versed in digitalization healthcare workers are (Anttila et al., 2008; Munck et al., 2008; O'Connell et al., 2007; Snooks et al., 2008). According to Rippen et al. (2012), it's critical to support technology utilisation in businesses by offering enough tools and resources, as well as a positive work atmosphere. Additionally, businesses should make sure that their staff members have ample time and chances to learn how to use new technologies (Salahuddin & Ismail, 2015). Shared objectives and a supportive organisational culture are necessary for successful technology use (Cresswell & Sheikn, 2013). Because organisational climate and attitudes affect the adoption of new technologies, academic support is essential (Rippen et al., 2013). The safe use of technology is also increased by teamwork and education (Salahuddin & Ismail, 2015), however organisations should carefully evaluate the competency levels and developmental requirements of staff when organising training on its use (Wu et al., 2009).

Due to the complexity of the process and the requirement for both the organization's and its personnel's dedication and readiness, previous

studies have also underlined the necessity for organisational assistance during the adoption of technology (Cresswell & Sheikh, 2013). To elaborate, organisational support, clear procedures, and suitable resources are needed for successful implementation (Rippen et al., 2013). Because they may have either a good or negative impact on the result, factors related to the work environment are essential for successful implementation (Rippen et al., 2013). Managers should be aware that no strategy may be appropriate in every circumstance, but that many practises can be combined, adjusted, and/or exploited to speed up the adoption of new technologies (Abbott et al., 2014). But it's crucial to understand that the views and experiences of healthcare professionals will affect their desire and motivation to utilise technology, with unfavourable attitudes and experiences contributing to a lack of staff enthusiasm to use technology (Buntin et al., 2011).

It's also crucial to remember that, in order to optimise the advantages for each individual, effective technology use necessitates frequent training updates that account for differences in digitalization competencies across healthcare workers (Cresswell & Sheikh, 2013; Murphy, 2010). (Abbot et al., 2014; de Veer & Francke, 2010). Finally, since digitalization alters professionals' roles, healthcare services, and clinical practises, further clarification of the diverse competencies necessary for successful digitalization and associated factors is necessary to meet needs, take advantage of opportunities, and adjust to changes in the constantly shifting healthcare environment (Sensmeier, 2011).

This review has a number of limitations. First, the findings demonstrate that organisational and psychosocial factors have a significant impact on healthcare professionals' competency in digitization. In light of the fact that the evaluated research were carried out in various nations and that the participants had a range of socioeconomic backgrounds, questions are

raised about the validity of direct comparisons of the studies (although it may reinforce overall conclusions). Further casting doubt on the validity of this comparison is the fact that various countries' levels of digitalization vary. Additionally, the examined studies used diverse datasets, which makes data analysis more difficult (Aromataris & Pearson, 2014).

Conclusion

The findings of this review indicate that knowledge and proficiency in digital technology can improve patient care, but healthcare personnel must see the advantages of employing technology. To remove any potential barriers to the development of a loving relationship between healthcare personnel and patients, ethical decision-making about the use of digital technology in patient care should also be publicly discussed. Healthcare workers need organisational and peer support when implementing new technologies because demand for their use in the industry is always rising. Organizations are in charge of setting up the necessary tools, space, and resources for technology use as well as providing staff with the time and chances to master new technologies. Successful technology use requires ongoing education that takes participants' competencies into account.

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