Compassionate Nursing Care in the Context of Digital Health Technologies: A Scoping Review

by

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Abstract

Background: Nurses are increasingly being challenged to preserve compassion while providing care in technologically rich practice environments. While compassion has been examined in the broader nursing literature and much work has been done to enhance nurses' informatics competency, little is known as to how nurses preserve compassion in the context of digital health practice.

Purpose: This study aimed to explore how compassionate care in the context of digital health is currently being addressed within the nursing literature. A secondary aim was to identify best practices that could be used to inform nursing education and practice toward achieving compassionate care in technologically enabled environments.

Method: A scoping review was conducted using the Arksey and O'Malley's framework by (1) identifying the research question, (2) identifying relevant studies, (3) selecting relevant studies, (4) extracting data, and (5) reporting the results. A search strategy was formulated and applied to multiple databases including CINAHL Plus with full text, Ovid Medline, Ovid HealthStar, Embase, APAPsychINFO, Scopus, ProQuest Dissertations and Theses, supplemented with a search of organizational reports and a hand search of reference lists of included studies. Eligibility was determined by two reviewers against inclusion and exclusion criteria using a two-stage screening process. Descriptive and content analyses were applied to summarize and report findings in narrative and tabular formats according to the PRISMA-ScR guidelines.

Results: Twenty-eight records were included in this review. Preliminary synthesis of findings revealed three themes: 1) digital health technology, 2) digital health education and competence, and 3) behaviors, values, and actions associated with compassionate care in digital contexts.

However, a clear definition of compassionate nursing care in the context of digital health and strategies to support nurses and nursing students in providing and preserving compassionate care remain underdeveloped.

Conclusion: Compassion is an essential component of quality patient-centered care. Future research should aim to articulate the definition of digital health compassion and associated competencies to enhance nurses' ability to provide and preserve compassionate care in digital health contexts. Specific implications for nursing education, research, practice, and policy were proposed.

Keywords: nurses, compassionate care, digital health technology, informatics competency, scoping review

Preface

This thesis is an original work by Shamsa Ali. No part of this thesis has been previously published.

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Compassionate Nursing Care in the Context of Digital Health Technologies: A Scoping Review

Chapter I

Introduction

Compassion is a core concept in nursing practice, yet its use in the context of digital health is an emerging phenomenon. The Oxford Handbook of Compassion Science proposes that compassion is a "discreet and evolved emotional experience" (Seppälä et al., 2017, p. 27). Compassion is also regarded as awareness of one's experience of suffering or judging that another individual may be suffering or has been engaged in a behavior that would attempt to alleviate suffering (Post et al., 2014). The Canadian Nurses Association (CNA) Code of Ethics defines compassion as "the ability to recognize and be aware of the suffering and vulnerability of another, coupled with a commitment to respond with competence, knowledge and skill" (Canadian Nurses Association [CNA], 2017, p. 20). Compassionate care is deemed an essential component of high-quality healthcare. Therefore, the Canadian Medical Association (CMA) emphasizes that our healthcare system must improve the delivery of healthcare services to provide compassionate relief of suffering (Canadian Medical Association [CMA], 2011). Not only is compassion pivotal for enhancing patients' trust in the healthcare team, but it is also an essential condition for healing. Compassionate care is a relatively different concept when compared with empathy and sympathy, as the concept of compassion is action-oriented (Catlett & Lovan, 2011). Therefore, compassion does not merely comprise of understanding a patient's thoughts and feelings and ability to express that understanding to the patient (empathy) (Olson & Hanchett, 1997) or understanding the pain of the sufferers (sympathy), but it comprises the actions that are taken to alleviate the pain of the sufferers (Schairer, 2017). Compassionate

practice is also reflected in the paradigms of health professional education. As outlined by CanMEDS framework, the quality and practice of compassion will become milestones of professionalism as health education shifts toward competency-based frameworks (Royal College of Physicians and Surgeons of Canada, 2018).

Health technology is defined as "the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to solve a health problem and improve quality of lives" (World Health Organization [WHO], n.d). Health technology may include "the whole range of interventions which can be provided within the health system as it delivers services" as well as "interventions applied to the system, ... (such as) policies organizing and financing the health system" (as cited in Velasco-Garrido & Busse, 2005, p. 2).

Digital health, or the use of digital technologies for health, has become a salient field of practice for employing routine and innovative forms of Information and Communication Technologies (ICT) to address health needs. The term digital health is rooted in eHealth, which is defined as the use of information technology and electronic communication tools within the delivery of healthcare services (Canada Health Infoway [CHI], 2018). Mobile health (mHealth) is a subset of eHealth and is defined as the use of mobile wireless technologies for healthcare services (WHO, 2019). Recently, the term digital health was introduced as "a broad umbrella term encompassing eHealth (which includes mHealth), as well as emerging areas, such as the use of advanced computing sciences in big data, genomics, and artificial intelligence" (WHO, 2019, p. ix).

Digital health has been widely adopted within the Canadian healthcare system in recent years. The Electronic Health Record (EHR) and mobile applications have improved the quality,

safety, and efficiency of healthcare (Jones et al., 2014). EHR is a complete health record under the custodianship of a healthcare provider(s) that holds all relevant health information about a person over their lifetime, which can be used by many approved healthcare providers or healthcare organizations (CHI, 2018). Tele-health, an application of digital health, is defined as "the use of ICT to support long distance clinical healthcare, patient and professional health-related education, public health, and health administration" (As cited in Schlachta-Fairchild et al., 2008, p. 131). For some patients, tele-health has increased the anonymity and distance that can support better communication with care providers than in-person consults (Preece, 1999). Technologies for monitoring patients remotely such as, tele-homecare, which "uses devices to remotely collect and send biometric sensory data to a home care agency or a remote diagnostic facility for interpretation by a healthcare provider (e.g. vital signs, glucose monitor, ECG, heart rate, blood pressure) are also regarded as components of digital health" (Schlachta-Fairchild et al., 2008, p. 134). Virtual communication with healthcare providers offers 24/7 access to physicians, who see patients via webcam for common, acute problems that do not require emergency or ongoing care such as colds, coughs, rashes, diarrhea, or allergies are also regarded as applications of digital health (Nelson & Staggers, 2018). These emerging technologies have propelled different areas of health communication, including knowledge transfer, healthcare education, decision support, and health promotion (Suggs, 2006). Although digital health may include a wide variety of technologies, this review will focus on applications such as information and communication systems, remote patient monitoring, electronic health records, telehealth technologies, mobile devices, smart devices, virtual or online communication tools that are commonly used by nurses.

Digital health represents a transformational shift in the context, process, and delivery of healthcare. Digital technologies can be leveraged to facilitate the transition toward efficiency and accessibility of healthcare (Lee et al., 2016). On the other hand, it has been suggested that the shift toward efficiency in healthcare services poses limitations to the requirements of compassionate practice (CMA, 2011). The provision of care through digital means could lack emotional signals and cues to convey compassionate care that may be present in the traditional in-person encounter (Swinglehurst et al., 2011). To address these transitions in the healthcare systems, the Associated Medical Services (AMS), a Canadian based organization, proposed a strategic plan 2018-2021(AMS, 2018). The goal of AMS is to narrow its strategic focus squarely on compassion in a technological world with three interrelated directions: promoting the education and practice of compassionate care, fostering new models of compassionate care delivery, and facilitating the leadership needed to realize the promise of technology while safeguarding humanistic care in fast-evolving sectors (AMS, 2018).

Purpose

The purpose of this scoping review was to map the literature to identify what is known about providing compassionate nursing care in the context of digital health technologies. A secondary aim was to identify best practices that could be used to inform nursing education and practice toward achieving compassionate care in technologically enabled environments. As per my assumptions, the advancement in technology and unprecedented impact of COVID-19 pandemic has shifted the healthcare system to a remote delivery of care services without preparing the workforce for digital care practices. In all these circumstances, it is essential to ensure that the value of compassion is not missed while providing services to care recipients.

Significance

Compassion is a topic of great interest in the healthcare environment. Scholars, healthcare professionals, and patients across healthcare disciplines have agreed that compassion is a necessary and critical component of health services (Clayton, 2013). Despite the prevalence of compassion in the current discourse, there is a growing disparity between what is known about compassion in the healthcare services and the feedback from service users and providers about the lack of compassion in the current health system. Given that healthcare systems are currently being transformed by digital health technologies at an exponential rate, it is imperative to understand how compassionate nursing care in the context of digital health occurs or can be promoted. Identifying and addressing gaps in the current literature on how compassionate care can be preserved in the context of digital health nursing practice is vitally important to inform nursing education, practice, research, and policy on best strategies to incorporate and promote compassionate care.

Chapter II

Review of Relevant Literature

Although providing safe, compassionate, competent, and ethical care is one of the primary nursing values as per the CNA Code of Ethics, there are no explicit guidelines for nurses to uphold and preserve compassion in the field of digital health (CNA, 2017). In 2012, the Canadian Association of Schools of Nursing (CASN) developed and approved the Nursing Informatics Entry-to-Practice Competencies for Registered Nurses in Canada (Canadian Association of Schools of Nursing [CASN], 2012). These competencies include the following dimensions: information and knowledge management, professional and regulatory accountability in using digital technologies, and the ability to use various digital health technologies in the delivery of patient care (CASN, 2012). While some of these competency indicators do emphasize nurses' clinical judgment when using the technology and the importance of not allowing the technology to interfere with nurse-patient relationships, the concept of compassion is not explicitly stated in these indicators. This suggests that practicing and future nurses may not be fully prepared to provide compassionate care in the context of digital technology. There is a need to create learning opportunities to inform students about informatics and digital health and how it pertains to nurses' roles, as well as to assist them in acquiring and developing required nursing informatics competencies (Canadian Nurses Association & Canadian Nursing Informatics Association [CNA/CNIA], 2017; Nagle et al., 2020; Kleib et al., 2013). Furthermore, it would be vitally important to begin to examine what "digital compassion" means and how it relates to health professionals' practice (Wiljer et al., 2019), including nurses.

In this digital era, healthcare technologies have increased the potential for patient engagement and activation and have changed the nature of the therapeutic relationship (Jones et al., 2014). Through web-based platforms, patients are engaging in computer-based

communication with their providers. With this increased digital patient engagement, the boundaries of professional ethics and expectations are changing as the capabilities for real-time two-way communication between health professionals and patients are now available electronically through email, texting, in-application chats, and video calling (Gagnon et al., 2016). This has led to a call for defining the term "digital compassion" in the delivery of healthcare (Wiljer et al., 2019).

Some authors discussed the impact of technology on nurses' ability to sustain compassion. It was noted that nurses experienced fatigue and stress as they used technology in care provision (Yoder, 2010), influencing their ability to provide compassionate care. Other studies explored how nurses could gain a sense of satisfaction, often referred to as "compassion satisfaction", by providing compassionate care to their patients (Sacco et al., 2015, p. 32).

Further, some authors suggested that the education of students in healthcare professions lacks adequate focus on the integration and use of technologies into practice and its impact on humane aspects of care and compassion (Terry & Cain, 2016). Wiljer et al. (2019) emphasized the importance of understanding the concept of "digital compassion" and the need for identifying strategies for integrating this concept in the healthcare system and in education of healthcare providers.

The shift in healthcare practice requires new competencies to ensure that providers are able to sustain a patient-centered approach while using digital health applications creatively and flexibly. Some researchers reported that improved communication skills, self-reflection, and reflexivity are examples of competencies to help health professionals examine their interactions and express compassion in a digitally enabled healthcare environment (Swinglehurst, 2014).

There is a need to identify what competencies are required for caring practices within the context of digital health; compassion needs to be recognized as a distinct competency in the "digital realm" (Wiljer et al., 2019, p. 1). Furthermore, frameworks for health professionals' education presently lack consideration or guidance on how compassionate care in the context of digital health technologies can be maintained.

There is limited literature as to how nurses use, express, and preserve compassion in relation to digital health technologies commonly used in clinical practice. A preliminary search conducted in one database (Ovid Medline) to identify any published reviews or reviews currently in progress, identified only two reviews. The first was a scoping review protocol related to defining compassion in the digital health age (Wiljer et al., 2019). In this protocol, the authors aimed "to define what it means to provide compassionate care in the digital sphere, that is, 'digital compassion' " (p. 3); however, their review was focused on all healthcare professionals, not nurses specifically. In another recent scoping review by Kemp et al. (2020), the authors synthesized the literature on the delivery of compassionate mental healthcare to address three objectives:

> Identify existing digital technologies being used by patients and health professionals in the delivery of mental healthcare, understand how digital technologies are being used in the delivery of compassionate mental healthcare, and determine the facilitators of and barriers to digital technology use among patients and health professionals in the delivery of compassionate mental healthcare (Kemp et al., 2020, pp. 1-2).

No reviews focusing on nursing and compassionate care in the context of digital health were located; therefore, this review was warranted.

Chapter III

Method

This study followed the Arksey and O'Malley (2005) methodological framework for scoping reviews to allow a broad exploration of the literature on how nurses provide compassionate care in the context of digital health technologies. Additionally, a scoping review method is considered appropriate for investigating emerging evidence about the phenomenon of interest, identifying gaps in knowledge, and providing direction for future research (Arksey & O'Malley, 2005; Levac et al., 2010) in relation to compassionate care in the context of using digital health tools.

The review included the following steps: (1) identifying the purpose and research questions to cover broad literature, (2) identifying relevant studies by searching keywords from research questions in different sources, (3) selecting studies based on inclusion and exclusion strategy, (4) extracting and charting the data based on key issues or themes, (5) collating, summarizing, and reporting the results; and discussing implications of study findings to education, research, practice, and/or policy (Arksey & O'Malley, 2005; Levac et al., 2010).

Identifying the Research Questions

In this review, the following research questions were addressed:

1) What is known about compassionate care in relation to digital health technologies within the nursing literature?
2) What are the interventions/strategies nurses in education and clinical practice could provide/use to enhance compassionate care in technologically enabled environments?

Identifying Relevant Studies

Relevant peer-reviewed literature was identified using a comprehensive search strategy applied to multiple databases including CINAHL (Cumulative Index of Nursing and Allied

Health Literature) Plus with full text, Ovid Medline, Ovid HealthStar, Embase, APAPsychINFO, Scopus, and ProQuest Dissertations and Theses (See Appendix A for a detailed Search Strategy/conducted on June 18, 2020). A hand-search of reference lists of all included studies was also performed to identify any additional articles that were not captured through database searches. Relevant organizational reports were also searched. The range of databases captured comprehensive literature from healthcare, allied health, nursing, education, research, and information system disciplines.

Because 'compassion' and 'digital' include a range of concepts that are described in different ways in the literature, this search was conducted using subject headings and appropriate keywords to capture literature reporting on several dimensions, as follows: (1) Compassion, compassionate care, nursing care/caring; (2) Digital health technologies, informatics/nursing informatics, and (3) Communication, interaction or relationship between patient and nurse, client and nurse, and nurse and human. Keywords included:

> "compassionate care or healthcare" or "nurse-patient relation*" or communication* or [(person or patient* or client* or people or human) (centr* or center*)] AND
> computer* or monitor or screen or online or (e-health or ehealth)or (mhealth or m-health) or (telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*) or (eportal or e-portal or patient portal) or (electronic health record* or electronic medical record* or EHR or clinical information system* or health information technolog*) or (virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled) or [(mobile or smartphone* or iphone* or android) (app or apps or applications*)] or digital technolog* or virtual healthcare or nursing informatics AND
> nurs* or future of nursing or nursing education.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) chart was used to present the findings and ensure transparency and rigor in reporting the methodology (Tricco et al., 2018) (Appendix C).

Inclusion/Exclusion Criteria

The process started with an iterative approach at the beginning of the review and upon screening abstracts, the criteria were further developed to enhance the screening process as per the focus of this review. Table 1 below shows the detailed inclusion and exclusion criteria guiding this review.

Table 1: Inclusion/Exclusion Criteria

Aspect	Inclusion Criteria	Exclusion Criteria
Year of publication	No limit	
Geographic context	No limit	
Language	English	Other than the English
Population	Advanced Practice Nurses (APN), Nurse Practitioners (NP), Registered Nurses (RN), Licensed Practical Nurses (LPN), Nurse educators, Nurse faculty, Student nurses or Graduate nurses etc.	Other than nurses (e.g. healthcare aids, technicians, medical students, medical practitioners, etc.) Other than nurses (patients, family members, caregivers)
Study designs	Different research methods (i.e. quantitative, qualitative, and or mixed methods)	All types of reviews (e.g. systematic, scoping, integrative, literature).
Type of published reports	Peer-reviewed and scholarly research articles and discussion pieces. Thesis dissertation identified through ProQuest dissertations and theses; and reports identified from relevant organizational websites.	Book chapter, editorial, web page, keynote of a speaker, reports, opinion or perspective pieces, commentaries, abstract only, feature story, blogs, web page, column, meeting archive

Concept	Compassion, compassionate care or caring, patient or human-centered care, nurse-patient interaction or communication or relations or relationship or engagement in relation to digital health technologies	Self-compassion, compassion satisfaction, compassion fatigue due to working in end of life or palliative contexts, and compassion fatigue associated with burnout within nurses' work environments, empathy, and sympathy. Articles that missed the concept of either digital health technologies or compassion-related concepts.
Outcome	Impact of digital health technologies on compassion of nurses using these technologies.	Historical aspects of technology are discussed, impact of using technology in healthcare settings and not on nursing care practices, administrative, regulatory, legal concerns with the use of technology.
Digital health technologies	Telemedicine or telehealth or teleconference or telecommunication tools, e-portal or patient portal, electronic health record or electronic medical record or electronic patient record, information and communication technology or health information technology, virtual or mobile or online or technology-assisted or computer-based or internet-based or web-based or technology-mediated or technology-enabled, mobile or smartphone or i-phone or android applications	Technology discussed is not classified as digital health technology (e.g. Intensive care unit technologies; In Vitro Fertilization (IVF) technologies, etc.)
Setting	healthcare settings (i.e. hospitals, clinical settings, nursing homes, patients' homes etc.) and educational settings (such as nursing schools, colleges, universities, etc.)	Any other setting

Study Selection

Once the search was complete, search results were exported into the Covidence Program to enable the screening process. The Covidence program removed duplicates upon importing. Two reviewers including the primary investigator (SA) and the supervisor (MK) independently determined the eligibility of articles against the inclusion and exclusion criteria using a two-stage screening process consisting of a title and abstract scan followed by a full-text review. The RefWorks citation manager was used to manage references.

Charting the Data

An initial data extraction template was developed based on recommendations from the Arksey and O'Malley (2005) and Levac et al. (2010) identifying elements to be extracted from included studies, such as name of first author, year of publication, country of publication, study aim, method, population and setting, core concepts (as identified by the study author), type of technology used, key findings, and strategies/implications for research. Additional fields within the template were added depending on the study design (qualitative vs. quantitative). For qualitative studies, an explicit guided theory or framework and a brief explanation of themes and categories were documented. For quantitative and mixed method studies, the following additional information was documented: description of interventions or control conditions; and brief explanation of outcome variables (if different from core concepts). The template was piloted on three articles to ensure accuracy and adequacy in capturing relevant data. An open access Google excel sheet was used to organize the data. Frequencies were calculated to describe the characteristics of included studies.

Chapter IV

Results

Results were reported in narrative and tabular formats and in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (Appendix B) (Tricco et al., 2018). As shown in the PRISMA chart (Appendix C), 8181 records were identified through databases and 1585 records were identified from ProQuest Dissertations and Theses and organizational reports. After removing the duplicates, a total of 6871 records were screened for the title and abstract; 6722 records were excluded following the screening at level 1. After full-texts screening of 149 records, 126 records (Appendix D) were excluded at the second stage of the screening process. 22 records from databases, 1 record from ProQuest Dissertations and Theses, and 2 organizational reports were included in this review. A hand search of reference lists of included studies revealed 3 more records, which were added to the list of included studies. The final list of records included in this review comprised 28 records that have undergone abstraction (Appendix E). A numerical analysis was presented in a tabular format to allow for describing study characteristics and the extent and nature of studies available. Results were also reported narratively as pertaining to research questions followed by the discussion of findings and implications for research, practice, education, and policy.

Characteristics of Included Studies

The range of publication year was between 2004-2020. The majority of these studies reported on qualitative (n=15: 53.57%) research of various designs: descriptive (n=2), exploratory (n=1), ethnography (n=3), phenomenology (n=2), grounded theory (n=3), interpretive (n=1), appreciative inquiry (n=1), naturalistic inquiry (n=1), and case study (n=1). Three studies reported on quantitative research (n=3: 10.71%): experimental (n=1),

quasi-experimental (n=1), and nonexperimental (n=1) designs, one used a mixed method study design, seven were discussion papers, and two organizational reports (Appendix E).

As shown in Table 2, the majority of the research was conducted in North America: United States (n=13: 46.43%) and Canada (n=6: 21.43%); with less research in South America (n=1: 3.57%) and Europe (n=8: 28.57%). The study population mainly consisted of nurses (n=25: 89.29%) including managers, specialists, nurse educators, registered nurses, district nurses, staff nurses, charge nurses, project support nurses, teleconsultation nurses, telenurses, senior critical care nurses, advanced practice nurses, and midwives, whereas only two (7.14%) studies focused on nursing students and only one (3.57%) focused on both nurses and nursing students. The majority of research was conducted in various patient care units in hospitals (n=18: 64.29%), only a few (n= 10: 35.71%) were conducted in telehealth care settings, community teaching hospitals, healthcare centers, care facilities for older people and home care settings.

Table 2: Characteristics of Included Studies

Country	United States	(n=13) 46.43%	Buckner & Gregory, 2011; Duffy et al., 2010; Gaudet, 2016; Gomes et al., 2016; Jones & Richards, 2013; Lynott et al., 2012; Misto et al., 2018; Nixon, 2015; Rentmeester, 2018; Sandelowski, 2002; Spencer & Lunsford, 2010; Tuxbury, 2013; Varghese & Phillips, 2009;
	Canada	(n=6) 21.43%	AMS, 2018; Campbell & Rankin, 2017; Foster & Hawkins, 2004; Macdonald, 2008; Nagel et al., 2013;

			Nagel et al., 2017 ;
	Sweden	(n=4) 14.29%	Johnson et al., 2014; Marchesoni et al., 2017; Nilsson et al., 2010; Sävenstedt et al., 2004
	United Kingdom	(n=3) 10.71%	Barrett, 2016; Curtis & Brooks, 2020; The Royal Society, 2006
	Brazil	(n=1) 3.57%	Barbosa & Silva, 2017
	Denmark	(n=1) 3.57%	Pors, 2018
Population	Nurses (managers, specialists, nurse educators, registered nurses, district nurses, staff nurses, charge nurses, project support nurses, teleconsultation nurses, telenurses, senior critical care nurses, advanced practice nurses, and midwives) Note: The designation midwife is used in some countries (e.g. Sweden; Denmark) and it indicates these individuals should also have a registration as a nurse title.	(n=25) 89.29%	Barbosa & Silva, 2017; Barrett, 2016; Buckner & Gregory, 2011; Campbell & Rankin, 2017; Curtis & Brooks, 2020; Duffy et al., 2010; Foster & Hawkins, 2004; Gaudet, 2016; Gomes et al., 2016; Johnson et al., 2014 Lynott et al., 2012; Macdonald, 2008; Marchesoni et al., 2017; Misto et al., 2018; Nagel et al., 2013; Nagel et al., 2017; Nilsson et al., 2010; Nixon, 2015 Rentmeester, 2018; Sandelowski, 2002 Sävenstedt, et al., 2004; Spencer & Lunsford, 2010; The Royal Society, 2006; Tuxbury, 2013; Varghese & Phillips, 2009
	Nursing students (senior-level undergraduate)	(n=2) 7.14%	Jones & Richards, 2013; Pors, 2018
	Both nurses and students	(n=1) 3.57%	AMS, 2018

Settings	Patient care units or health care units or clinical areas in hospitals or health care facility	(n=18) 64.29%	AMS, 2018 Barrett, 2016; Buckner & Gregory, 2011; Campbell & Rankin, 2017; Duffy et al., 2010; Foster & Hawkins, 2004; Gaudet, 2016; Gomes et al., 2016; Lynott et al., 2012; Macdonald, 2008; Nagel et al., 2013; Nixon, 2015; Pors, 2018; Rentmeester, 2018; Sandelowski, 2002; Spencer & Lunsford, 2010; The Royal Society, 2006; Varghese & Phillips, 2009;
	Telehealth care setting or hospital providing telehealth services	(n=2) 7.14%	Barbosa & Silva, 2017; Johnson et al., 2014
	Community teaching hospital	(n=1) 3.57%	Misto et al., 2018
	Healthcare centers	(n=1) 3.57%	Nilsson et al., 2010
	Care facilities for older people or nursing homes	(n=3) 10.71%	Curtis & Brooks, 2020; Marchesoni et al., 2017; Sävenstedt et al., 2004;
	Home care settings or Agencies	(n=2) 7.14%	Jones & Richards, 2013; Tuxbury, 2013
	Different care facilities	(n=1) 3.57%	Nagel et al., 2017

Research question 1: What is Known about Compassionate Care in Relation to Digital Health Technologies within the Nursing Literature?

Digital Health Technologies

The focus of this review was on the use of digital health technologies by nurses only.

Findings from this review identified different types of digital health technologies used by nurses in various healthcare settings (Table 3). Electronic records (patient, medical and health records), electronic point-of-care, personal digital assistant, or smart card linked to electronic records were most commonly used (n=12: 42.86%) by nurses. Telecommunication tools (n=8: 28.57%), hand-held devices (n=4: 14.29%), remote patient monitoring (n=1: 3.57%) and electronic messaging program (n=1: 3.57%) were also used in the practice settings.

Table 3: Digital Health Technologies Used by Nurses

Electronic records (patient, medical and health records), electronic point-of-care, personal digital assistant, smart card linked to electronic records	(n=12) 42.86%	Campbell & Rankin, 2017; Duffy et al., 2010; Foster & Hawkins, 2004; Gaudet, 2016; Gomes et al., 2016; Jones & Richards, 2013; Lynott et al., 2012; Macdonald, 2008; Misto et al., 2018; Pors, 2018; Rentmeester, 2018; Spencer & Lunsford, 2010;
Telehealth, teleconsultation, telecommunication (non-video via phone calls and video via Skype, FaceTime)	(n=8) 28.57%	Barbosa & Silva, 2017; Barrett, 2016; Johnson et al., 2014; Nagel et al., 2013; Sandelowski, 2002; Sävenstedt et al., 2004; Tuxbury, 2013; Varghese & Phillips, 2009;
Handheld or mobile devices (mobile computers, smartphones, tablets, iPads, and iPhones)	(n=4) 14.29%	Buckner & Gregory, 2011; Curtis & Brooks, 2020; Marchesoni et al., 2017; Nixon, 2015
Remote patient monitoring	(n=1) 3.57%	Nagel et al., 2017
Electronic messaging program	(n=1) 3.57%	Nilsson et al., 2010

Different digital health technologies	(n=2) 7.14%	AMS, 2018; The Royal Society, 2006

Compassionate Nursing Care in Digital Health Contexts

While the concept of compassion is widely used in nursing, no theoretical classification or model describing the concept of 'digital health compassion' was identified in the broader nursing literature or the studies included in this review. However, authors of included studies have proposed a number of definitions that could help illuminate the concept of compassion in the context of digital health. To synthesize these findings, a theoretical concept analysis of distinguishing characteristics of compassion within a healthcare context (Taylor et al., 2017), was used. In this work, Taylor et al. (2017) created a WORDLE by stating the key words and phrases used in conjunction with the concept of compassion to outline the antecedents associated with compassion. WORDLE is a supplementary research tool used to produce a word cloud (McNaught & Lam, 2010). A word cloud is an appealing "visualization of text in which the more frequently used words are effectively highlighted by occupying more prominence in the representation" (McNaught & Lam, 2010, p. 630).

Although the paper by Taylor et al. outlined associated meanings and behaviors for understanding the concept of compassion, the paper does not define the term compassion per se. However, the authors indicated that the following five elements are defining attributes of compassion: "recognition, connection, altruistic desire, humanistic response, and action" (Taylor et al., 2017, p. 358)**.** The first attribute "recognition" refers to recognizing the experiences and events, such as loss, grief, distress, etc., that require compassion on behalf of the care provider when caring for individuals. "Connection", the second attribute, identifies antecedents including presence, active communication skills, understanding, recognition, identification etc., to

strengthen personal connection between the health care provider and the care recipients. The attribute "altruistic desire" refers to the innate characteristics, religious and/or spiritual beliefs, practice culture, and personal experience. The fourth attribute, "humanistic response" focuses on maintaining person-to-person or humane aspects of patient-provider relationship; these responses include engagement, involvement, connection, advanced communication and listening skills etc. "Action", the fifth attribute, emphasizes behaviors, actions, and responses associated with compassionate practice such as a capability to act, knowledge of appropriate responses, an environment that enables responses etc. (Taylor et al., 2017).

As the focus of this review was on understanding compassion in the context of digital health practice (e.g. technology impacting care providers' ability to provide compassionate care), the categories "recognition and altruistic desire" appear to be more relevant to context of life experiences without reference to technology in the context of care. In addition, based on information provided in the included studies, it would be difficult to identify innate characteristics, religious beliefs and cultural practices of nurses; therefore, only three attributes "connection, humanistic response, and action" were used to guide the content analysis and the synthesis in three phases as described below.

Content analysis is defined as "the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). In phase 1, each record was screened for definitions of compassion or related terms; however, across all these records, no authors have explicitly defined the concept of compassion. Therefore, the definitions of compassion related terminologies shared by the authors in the background section of the included studies were identified, then concepts in these definitions were compared against the three attributes of

compassion suggested by Taylor et al. to identify similarities and differences (Appendix G). For the attribute "connection", authors have used similar terms, including: "presence, active communication skills, understanding, recognition, and information." For the attribute "humanistic response", authors have used similar terms including: "advanced communication and listening skills, ability to manage difficult situations, connection, and cultural understanding. For the attribute "action", authors have used terms including: "knowledge of appropriate response and an environment that enables response." As suggested by Taylor et al., the similar antecedent such as communication skills was identified under two attributes; "connection" and "humanistic response." Additionally, the antecedent, connection was highlighted under the attribute "humanistic response."

In phase 2, each record of the included studies was further examined and core concepts emphasized in these definitions were also captured in Table 4 (column 3), then these concepts were documented into a WORD cloud (Figure 2), to provide a visual representation of these core concepts pertinent to compassionate care in digital health contexts as addressed by authors in the included studies. Additionally, key concepts listed in Table 4, which have specifically focused on compassion and caring, were further highlighted in Figure 1.

In phase 3, as the definitions used by authors were too broad and the included studies were quite heterogeneous to synthesize narratively; therefore, the focus of the article/record was used to assist in identifying categories, patterns, and themes (Table 4 - column 4). Based on this preliminary analysis, three themes emerged and grouped as follows: 1) Digital health technology, 2) Digital health education and competence, and 3) Behaviors, values, and actions in the context of digital health practice.

Theme 1: Digital Health Technology

As shown in Table 4, a number of authors pointed to the technology as a central theme in the context of digital health practice. In these papers, authors discussed concepts pertinent to access to technology (Campbell & Rankin, 2017; Curtis & Brooks, 2020), quality of technology (Lynott et al., 2012), effective implementation of technology (Nilsson et al., 2010), use of technology as a facilitator (Gomes et al., 2016; Misto et al., 2018) or a barrier (Duffy et al., 2010) in the context of care, and enhancing patient involvement with technology (Pors, 2018).

Theme 2: Digital Health Education and Competence

As shown in Table 4, another emerging theme was related to the importance of ensuring that nurses have the required knowledge and competence, and the value of training and education to assist nurses in acquiring these capabilities. Authors in these papers discussed educating nurses related to the effective use of digital health technologies (Nixon, 2015), the use of technology as a facilitator (Gomes et al., 2016; Misto et al., 2018) or a barrier (Duffy et al., 2010) to the provision of effective care. Further, training should also go beyond use of technology to assist nurses in acquiring and developing effective nurse-patient relationships (Foster & Hawkins, 2004; Spencer & Lunsford, 2010), nurse-patient communication (Jones & Richards, 2013), enhancing caring behaviors (AMS, 2018; The Royal Society, 2006), and acquiring professional competencies (Johnson et al., 2014; Nagel et al., 2013).

Theme 3: Behaviors, Values, and Actions in the Context of Digital Health Practice

As shown in Table 4 and Figure 1, authors emphasized the importance of caring behaviors, such as online presence (Varghese & Phillips, 2009), knowing the patient (Macdonald, 2008; Nagel et al., 2013, Nagel et al., 2017), humanized interactions (Buckner &

Gregory, 2011), attentive gaze and heart-felt listening (Sandelowski, 2002); and compassionate care values including presence, appreciation, trust, competence (Marchesoni et al., 2017).

Table 4: Synthesis of Key Concepts Pertinent to Compassionate Care in Digital Health Contexts

Author/Year/Title	**Digital Health Technology**	**Core Concepts Emphasized in the Included Records (in the definitions used by authors)**	**Categories & Patterns**
Barbosa & Silva (2017) Nursing care by telehealth: What is the influence of distance on communication?	Telehealth	Interpersonal skills Communication Cultural sensitivity	Action: Effective communication skills within online environment
Barret (2016) Rethinking presence: A grounded theory of nurses and teleconsultation	Teleconsultation via Skype, Facebook	Nursing Presence Communication Interactions	Action: Presence within online communication platforms
Curtis & Brooks (2020) Digital health technology: Factors affecting implementation in nursing homes.	Hand-held devices such as smartphones and tablets	Humanized Care Compassion	Action: Patient involvement in care Technology Access
Gaudet (2016) Electronic documentation and nurse-patient interaction	Electronic medical record	Interaction	Action: Humanizing care
Jones & Richards (2013) The impact of nursing students' use of electronic health records in the home settings	Electronic health record	Communication	Education and competence
Lynott et al. (2012) Communication and the electronic health record training: A comparison of three healthcare systems	Electronic Health Records	Communication	Quality of technology on communication

Marchesoni et al. (2017) Technologies in older people's care: Values related to a caring Rationality	Using devices such as smartphones for interactions between Caregivers-care receiver's	Compassionate care	Values associated with compassionate care: Presence Appreciation Trust Competence
Nagel et al. (2017) Getting a picture - A grounded theory of nurses knowing the person in a virtual environment	Virtual remote patient monitoring environment	Connection Interaction	Action: Knowing the person: Holistic, comprehensive understanding of the person; Build interpersonal engagement with the person; Create collaborative partnerships with person
Nilsson et al. (2010) Swedish District Nurses' experiences on the use of information and communication technology for supporting people with serious chronic illness living at home – a case study	Electronic messaging program	Trusting & Caring relationships	Effective implementation of technology
Nixon (2015) Perceptions of nurses using mobile devices at the bedside	Mobile devices such as mobile computers, iPads, iPhones	Nurse use of technology	Education and Competence
Pors (2018) Digital displacements in patient-professional relations - Four modes of organizational patient involvement	Electronic patient records	Patient use of technology	Action: Patient involvement with technology
Sävenstedt et al. (2004) Being present in a distant room: Aspects of teleconsultations with older people in a nursing home	Telepresence, Nursing presence in teleconsultations	Telepresence vs. presence Nurse-patient communication	Behavior: Telepresence
Tuxbury (2013)	Non-video	Presence,	Behavior: Presence

The experience of presence among telehealth nurses	telehealth technology	connection and interaction	and interaction
Varghese & Phillips (2009) Caring in telehealth	Telehealth	Online presence	Behavior: Caring Behavior: Online Presence Education and Competence
Campbell & Rankin (2017) Nurses and electronic health records in a Canadian hospital: Examining the social organization and programmed use of digitized nursing knowledge	Electronic health record	Nursing knowledge and roles	Capability of the Technology
Gomes et al. (2016) Connecting professional practice and technology at bedside	Electronic health record	Technology as a facilitator	Technology use in the context of care Education/competence
Duffy et al. (2010) Point of care documentation - Impact on the nurse patient interaction	Electronic medical record/Documentation	Technology as a barrier	Technology use in the context of care Education and competence
Johnson et al. (2014) Improvement of communication and interpersonal competence in telenursing: development of a self-assessment tool	Telenursing	Assessing and measuring competence	Professional Competence
Misto et al. (2018) Nurses' perception of the impact of electronic documentation on the nurse-patient relationship	Nurse-patient interactions, Verbal and non-verbal communication, Nurse-patient therapeutic relationship in electronic medical record	Technology as a facilitator	Technology use in the context of care Education and competence

Buckner & Gregory (2011) Point-of-care technology - Preserving the caring environment	Mobile communication devices	Caring environment	Behaviors: Caring Humanized interactions, Individualized interactions, Presence
Nagel et al. (2013) Knowing, caring, and telehealth technology - Going the distance in nursing practice	Telehealth and telecommunication	Nurse-patient relationship	Behaviors: Caring Action: knowing the patient "See the patient" Education and Competence
Rentmeester (2018) Heeding humanity in an age of electronic health records: Heidegger, Levinas, and Healthcare	Electronic health records	Nurse-patient interactions	Behavior: Humanitarian
Spencer & Lunsford (2010) Electronic documentation and the caring nurse-patient relationship	Electronic health records	Nurse-patient relationship	Education and Competence
Sandelowski (2002) Visible humans, vanishing bodies, and virtual nursing: Complications of life, presence, place, and identity	Telecommunications and computer-mediated technology	Telepresence	Behaviors: Caring Attentive-gaze Heart-felt listening Comforting touch
Foster & Hawkins (2004) The therapeutic relationship: Dead or merely impeded by technology?	Electronic patient records, smart card, mobile phones	Nurse-patient relationship	Education and Competence
Macdonald (2008) Technology and its effect on knowing the patient - A clinical issue analysis	Electronic health records, personal digital assistants, telehealth	Nurse-patient relationship	Behavior: Caring Action: Knowing the patient
AMS (2018)	Different digital technologies (current and	Compassionate care	Education and Competence

Compassion in a technological world - Advancing AMS strategic aims.	future technologies, e.g. AI)		
The Royal Society (2006) Digital healthcare: The impact of information and communication technologies on health and healthcare.	Mobile phones, smart devices, electronic health records	Caring	Education and Competence

Figure 1: Overview of the Specific Caring and Compassionate Care Behaviors & Values

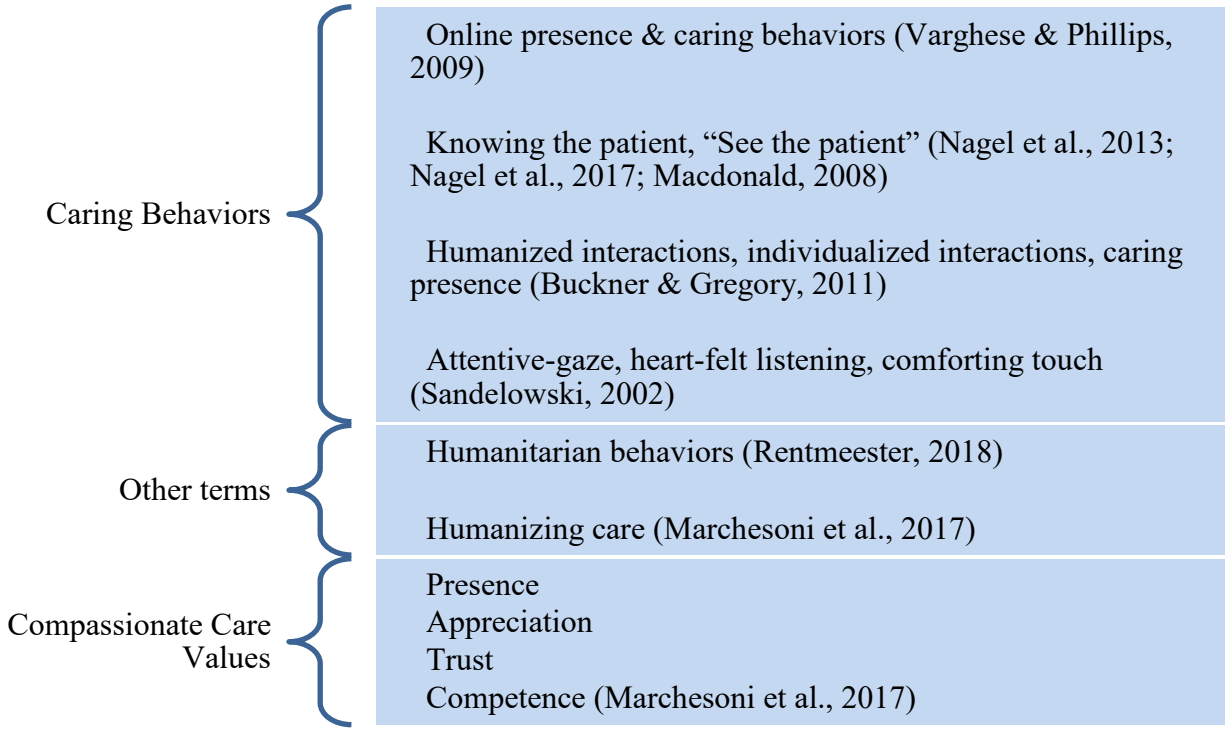

Figure 2: WORD Cloud Representing Key Concepts Associated with Digital Health Compassion

Research Question 2: What are the Interventions/Strategies that Nurses in Education and Clinical Practice could provide/use to Enhance Compassionate Care in Technologically Enabled Environments?

The review identified different strategies for enhancing the provision of compassionate care in the context of digital health technologies. Ongoing professional training as per the needs of staff could be effective in optimizing the quality of care (Buckner & Gregory, 2011; Curtis & Brooks, 2020). Sessions on maintaining digital nurse-patient interactions would help in the identification and analysis of steps that could be adopted in digital healthcare settings (Nagel et al., 2013; Tuxbury, 2013). Educational seminars could be arranged on enhancing relationship-based caring behaviors such as listening to the patient, being with the patient, patient priority,

planning the care, caring environment, emotional support, spiritual support (Gomes et al., 2016). Training sessions could also be organized on understanding effective communication skills to enhance interpersonal relationships in the digital context (Barbosa & Silva, 2017; Gaudet, 2016; Nagel et al., 2017; Pors, 2018) and strategies to overcome communication barriers encountered in an "at a distance" environment (Barbosa & Silva, 2017). Further, workshops could be arranged on developing understanding of non-verbal signals with the use of telehealth care (Barbosa & Silva, 2017; Nagel et al., 2013) with particular emphasis on how virtual presence could be developed during single interaction or over a period of time (Barrett, 2016).

Additionally, discussions and on-going dialogue on the appropriate choice of technology are necessary to improve caring practices (Marchesoni et al., 2017). The use of well-equipped technology with the spatial dimensions could enhance the experience of presence during nurse-patient communication (Sävenstedt et al., 2004). The troubleshooting of problems and data security issues with the use of digital health technologies are barriers in the provision of care (Buckner & Gregory, 2011; Curtis & Brooks, 2020). Therefore, support from technology suppliers in various formats, such as troubleshooting guides, telephone helplines, and fast-response emergency visits could be an extended assistance for the nurses in the practice settings (Buckner & Gregory, 2011; Curtis & Brooks, 2020; Nilsson et al., 2010). Further, introduction of data security measures with the implementation of digital health technology would enhance the quality of nursing care provided (Curtis & Brooks, 2020).

Other researchers suggested that academic nursing educators could teach creative ways to promote caring nurse-patient relationship in the context of digital health technologies (Spencer & Lunsford, 2010). Educators could assist students in identifying effective communication techniques that could be adopted to maintain connections with the patients in digitally enabled

healthcare environments (Lynott et al., 2012; Misto et al., 2018). Incorporating knowledge regarding digital health could prepare student nurses for the provision of nursing care via mobile devices (Nixon, 2015; Varghese & Phillips, 2009). Simulation scenarios could be an effective strategy in providing opportunities for students to engage in a scripted human interaction that can then be linked to human experiences in the clinical settings (Buckner & Gregory, 2011; Spencer & Lunsford, 2010). Further, creating opportunities for students to participate in EHR documentation practices through simulated EHR systems could familiarize students with the patients records and enable them to focus more on the patient receiving the care as opposed to focusing on how to operate the technology or complete e-charting (Campbell & Rankin, 2017; Jones & Richards, 2013). Implementation of these strategies in nursing practice and educational settings could enhance the provision of compassionate care in the digital health context.

Chapter V

Discussion

The purpose of this review was to map the literature on compassionate nursing care in the context of digital health and identify strategies/interventions to promote digital health compassion in nursing. Based on a review of the included studies, the discussion of findings is organized in relation to four areas: nature and range of evidence available; type and range of technologies used; definition of compassion in context of digital health; and strategies and interventions to promote digital health compassion.

Nature and Range of Evidence Available

Despite an extensive search of the literature completed in this review, there was a very small body of literature available on compassionate nursing care in the context of digital health technologies. Since a concept like compassion is less likely to be measured quantitatively, most of the records found were qualitative in nature; only a few quantitative and mixed method studies were identified. This might also be attributed to the fact that digital health technologies in their current advanced form are relatively new, suggesting that research in this field is still evolving. It could also be attributed to compassion being assumed as an inherent value of nursing practice (CNA, 2017; CNA, 2015), suggesting that nurses are expected to honor and uphold compassion regardless of the practice setting and/or context of care (digitally supported vs. not). As more emerging technologies such as artificial intelligence and robotics continue to expand, it would be important to examine how existing and emerging technologies will shape nursing practice roles and their ability to sustain compassion (AMS, 2018; The Royal Society, 2006).

Range of Digital Health Technologies

Included studies have focused on a range of technologies that are becoming more mainstream in current healthcare systems. For example, EHR and telehealth have been used

globally and are also well integrated within the Canadian healthcare system. The focus on how to effectively use these technologies and other emerging technologies, such as AI and robotics as suggested by the AMS and The Royal Society reports, underscores the importance of examining the potential impact of these technologies on nursing practice.

The nursing profession's progress in informatics science provides unique opportunities for nurses to further expand on this success by anticipating and forecasting the impact of digital health technologies on nursing practice, knowledge development, future roles, and quality of nursing care, specifically with regard to the concept of compassionate care digital competence (AMS, 2018; CNA/CNIA, 2017; The Royal Society, 2006).

Defining Compassion in the Context of Digital Health

Overall, there is little attention to the concept of compassion in the context of digital health technologies within the scholarly nursing literature included in this review, as evidenced by the broad types of digital technologies used and the lack of a clear definition of compassion in the context of digital health.

The synthesis of findings against compassion attributes and antecedents defined by Taylor et al. (2017) revealed that scholars in the included studies have utilized similar terms/language associated with the general understanding of compassion, when they described nursing care, nurse-patient relationships and interactions, and strategies for realizing compassion and caring in the context of digital health tools. As shown in Appendix G, and Figure 1 and 2, it is also evident that there is no clear definition of what constitutes compassionate nursing care in digital health contexts. Therefore, a clear understanding of the concept of compassion may be missing among nurses and practices may lack the competencies that are required for the provision of compassionate care.

A number of authors discussed the significance of connections, communication, interaction, relationships, and presence in improving the quality of nursing care when using technological tools (Barbosa & Silva, 2017; Curtis & Brooks, 2020; Macdonald, 2008; Nilsson et al., 2010; Sandelowski, 2002; Tuxbury, 2013); however, none of these records specifically explored or used the term ‘digital health compassion’.

Rentmeester (2018) advised that three rules of thumb can be utilized to heed the humanity of persons in nurse–patient interactions while using electronic records, thus establishing a sense that the technology is there to aid in the process for both the nurse and the patient. Initially, nurses should spend the first few minutes with the patients without any electronic medium to allow the ethical relationship to form. Secondly, nurses should ensure to maintain eye contact as much as possible when using electronic devices as this is a key ingredient in making a connection with a patient. Lastly, it is important for nurses “to show patients the documentation of their records, if appropriate, to avoid a sense of alienation on the part of the patient” (Rentmeester, 2018, p. 4).

Nagel et al., (2017) suggested that “getting a picture” is an iterative process of knowing the patient by developing “a contextualized and holistic mental representation of the patient” when using remote patient monitoring devices (p. 71). The steps involved in this process are: entering the patient into the healthcare system, connecting with the patient, sharing and reviewing patient’s information, recognizing trends and patterns related to patient’s health conditions, recording and reflecting on the interactions and activities, navigating with technology over time, and transiting the patient out of the health care system (Nagel et al., 2017). As well, involving patients in their own care and ensuring that care within digital health contexts should

be patient-centered are critical to compassionate digital health, which is congruent with AMS (2018) recommendations.

Marchesoni et al. (2017) advised the adoption of four nursing values to provide compassionate care in a digitally enabled healthcare environment. These are: presence, appreciation, competence, and trust. Tuxbury (2013) identified presence as the highest form of call-and-response dialogue that could foster connections over time between a nurse and a patient. Barrett (2016) identified four subcategories to demonstrate nursing presence in the context of digital health: operational presence by providing technical support, clinical presence with direct patient-focused care, therapeutic presence by recognizing and responding to non-verbal cues, and social presence by being there for the patient. The terms "presence" vs. "telepresence" (Sävenstedt et al., 2004) or "online presence" (Varghese & Phillips, 2009), although focused on telehealth practices**,** suggest a beginning interest in examining how care and care providers' roles and interactions may be quite different within a physical or virtual context; however these concepts on their own do not provide a clear and comprehensive conceptualization of digital health compassion. Given the expansive use of digital health technologies across practice settings, it would be critically important to ensure that nurses continue to be engaged and connected with patients and that digital health tools serve to improve rather than obstruct the care nurses provide.

As shown in the WORD Cloud (Figure 2), it is evident that concepts such as nurse-patient relationship, communication, interaction, caring, and presence are central themes that could constitute compassionate nursing care in the digital health context. Some authors used terms, such as, "caring", "therapeutic communication", and "nurse-patient relationship". It could be argued that while these terms are complementary, they are commonly used within the general

nursing literature as they represent central values of nursing practice. In the included studies, only one record (Marchesoni et al., 2017) used the term “compassionate care” and provided a discussion of the values that reflect this level of care as inclusive of “presence, competence, appreciation and trust” in the context of using mobile devices. Such devices could be subsumed under digital health but do not refer to the entire broader span of digital health practice and “compassionate care”. Moreover, only one organizational report published by Associated Medical Services (AMS) used the term “compassionate care in digital health”, which was described as “not only including humanistic behaviors, but also the integration of human-centered technology and services in the healthcare system” (AMS, 2018, p. 11). AMS also forecasted that “expectations of compassionate care will evolve as patients will seek out connectedness, responsiveness, and empowerment to improve health conditions” (AMS, 2018, p. 4).

Although digital health technologies were the key focus of this review, the theme ‘digital health technology’ suggests that there is a need for examining compassion as it pertains to digital health practice where technology could impact relationships and interactions between care providers and recipients. Therefore, additional support is needed to define and articulate what compassionate care is in the context of digital health actually means. Furthermore, the theme on education and competence highlights the skills and training required for nurses to practice digital health compassion, pointing to the need for more specialized knowledge on digital health, related to the technology itself and to the use of the technology in the context of care. The third theme identified behaviors, values, and actions that could be adopted by nurses in the context of digital health to practice compassionate care. As shown in (Figure 1), the behaviors, values, and actions of the nurses are an essential component of providing compassionate care to patients when using

digital health technologies. These elements could be used to articulate the definition of digital health compassion. Based on the results from this review, a definition of digital health compassion in nursing does not currently exist. The preliminary synthesis completed in this review may serve as a beginning step toward defining digital health compassion in nursing for future research.

Strategies and Interventions to Promote Compassion in the Context of Digital Health

In recent years, ICT has transformed healthcare creating demands on healthcare providers including nurses to acquire new skills and competencies in informatics for them to be able to safely use digital health tools and assist healthcare consumers in adapting to digital health. Lynott et al. (2012) noted that current healthcare systems lack standardized training programs required for the provision of care services to patients in digitally enabled healthcare environments.

Given that nurses constitute the largest group of care providers in Canada, the CNA and CNIA (2017) in a joint position statement, affirmed that emerging technologies will provide new opportunities and approaches to nursing care delivery and emphasized the importance of nurses' engagement in the design, planning, implementation, and evaluation of digital health technologies. Furthermore, the statement underscored informatics as an essential competency that will enable nurses to provide safe practice within complex, digitally connected healthcare environments (CNA & CNIA, 2017). To that end, extensive work has been done to define informatics competency requirements and enhance nursing practice and future nurses' readiness for digital health practice (Booth, 2006; CASN, 2012; Nagle et al., 2020). These core informatics competencies (Appendix F) include information and knowledge management, professional responsibility and accountability, and use of ICT in the delivery of patient care (CASN, 2012).

Each of these competencies have a set of associated indicators to assist nurses and nurse educators in seeking essential learning. Despite these competency statements and indicators spanning a broad range of concepts, there is limited or inexplicit articulation and attention to the concept of compassion as it pertains to digital health. This concept is broadly explored under the terminology of "clinical judgment" and "not having the technology interfere with the nurse-patient relationship" within the core competency of professional responsibility accountability (CASN, 2012, p. 11). Such a description being stated too broadly without linking it to the potential impact of digital technology on nurses' ability to provide compassionate care suggests a need for more research and further consideration of these competencies. This is particularly important given the rapid pace of technological innovation and the unprecedented impact it has created within the practice environment in recent years. For instance, in 2020, the physical distancing and limitations for providing care within the traditional physical healthcare setting as a result of COVID-19 pandemic have brought compassion in the context of virtual/digital care to the forefront. In some instances, nurses were forced to think about creative ways such as using mobile phones and social media apps, to help patients and their families going through life altering experiences such as death and grief for a loved one. Such a response, although remarkable, did not have to occur this way as nurses were already dealing with stress related to the pandemic risks to themselves and their families. If nurses have had opportunities to think about virtual care and how their roles would be enacted within digital contexts beforehand, these experiences might have been improved. It is important to address how nurses could enact compassionate practice through a virtual environment, especially given that remote delivery of healthcare services and virtual healthcare systems are becoming mainstream for both providers and consumers, and no longer constrained to telehealth practice.

Given most of the reviewed literature has focused on compassion in the context of telehealth practice, it would be valuable to draw on this literature to identify a common framework for applying these concepts across different levels of nursing practice. It is also equally important to examine the impact of digital health on nurses' ability to sustain compassionate care. Several studies have suggested that the constant use of technology acts as a barrier between the nurse and patient (Granados-Pembertty & Arias-Valencia, 2013). As technology becomes more prevalent in Canadian healthcare, nurses will be required not only to develop technological or informatics competency but also to be able to maintain the ability to provide humanistic and caring practices. For this to occur, nurses are encouraged to employ reflection and self-assessment to examine the impact of technology on their day-to-day practice and their ability to remain connected or present when providing patient care. Johnson et al. (2014) developed a self-assessment tool with 58 items to be used by telenurses for analyzing their own communication and interpersonal skills. The assessment tool helped telenurses to follow the nursing process, to be patient-centered, to provide self-direction, feedback, and coaching, as well as create learning opportunities (Johnson et al., 2014).

A revised version of the entry-to-practice informatics competency statements for registered nurses in Canada could consider incorporating a clear definition of what compassionate nursing care in the context of digital health actually means, with specific indicator statements that account for such levels of virtual or digital nursing practice. Additionally, it would be important that future research examines the requirements, competencies, education and standards for digital health nursing compassion. Ultimately, it would be ideal if these are incorporated as a central element of nurses' informatics competency.

In summary, findings from this review suggest that compassionate care, which is a central concept in nursing practice, is not explicitly defined or incorporated in digital health contexts. Various key behaviors, actions, and values emerging in the literature and the preliminary synthesis presented in this thesis could serve to inform the development of the concept.

Chapter VI

Implications

Based on findings from this review, in the section below, specific implications for nursing education, practice, research and policy are presented:

Nursing Education

Enhancing the level of preparedness of nursing students in informatics and their ability to use information technologies upon entering clinical practice is vitally important (Fetter, 2009; Jetté et al., 2010; Kleib & Olson, 2015). However, more attention is needed to increase nursing graduates' ability to become more vigilant regarding the impact of excessive use of technology in the provision of compassionate care. While existing informatics competency lists fail to acknowledge compassion explicitly, nurse educators can play an important role in creating learning opportunities for their students in which they can link theoretical knowledge about compassion gained throughout the nursing curricula and link these to informatics learning or digital health practice (Booth, 2006; CASN, 2012; Foster & Hawkins, 2004; Nagle et al., 2020; Nixon, 2015; Spencer & Lunsford, 2010; Varghese & Phillips, 2009). Nurse educators can also continue to advocate for revising these competencies to incorporate compassion as a distinct competency or as an extension of informatics competencies.

Nursing programs can invest in financial and human resources for simulation learning that can enable the design, conduct, and debrief of simulation events; providing realistic and practical experiences to students on the concept of compassion and humanistic caring in the context of using digital health (Buckner & Gregory, 2011; Spencer & Lunsford, 2010). Nursing education programs can also collaborate with information technology developers to create training opportunities to help future practitioners acquire comprehensive knowledge of mobile

devices and effective strategies for maintaining presence at every level of nurse-patient interactions (Macdonald, 2008).

Nursing Research

More research is needed in relation to defining compassionate nursing care in the context of digital health. Further, research is needed to examine the evolution of nursing values and roles in the context of contemporary virtual healthcare (Nagel et al., 2013). Research could also explore the impact of emerging digital health tools on the nurse-patient encounters and to identify strategies that will help nurses in establishing relationships with patients (Duffy et al., 2010). Research is also required to identify effective measures to minimize distractions that nurses face in the provision of compassionate care. Additionally, research that examines patients' perceptions of compassionate care they receive would be equally important. While qualitative research is an appropriate method to examine the phenomenon of compassionate care, there is a need for more quantitative and mixed methods research. For example, survey methodology could be employed to explore nurses' perceptions of compassionate care and what it means to them across practice settings. This type of research may serve to understand the concept of compassionate nursing within the broader nursing population.

Moreover, future research can observe nurses' behaviors rather than relying on their self-assessment, for example, using a scoring instrument by a neutral observer to evaluate communication between the nurse and the patient (Johnson et al., 2014). These tools could help in the structured analyses of conversations between nurses and patients; contributing to the development of communication and interpersonal competence among nurses.

Nursing Practice

Nurses in clinical practice need to be vigilant and critically appraise the introduction of new technologies to determine if what is promised is delivered (Macdonald, 2008; Sandelowski, 2002). Nurses also need to continue advancing their informatics competency to effectively integrate digital health in their practice (CNA/CNIA, 2017) and to uphold professional values as stipulated in the Code of Ethics for Nurses (CNA, 2017). Although a clear definition of digital health compassion is yet to be articulated, these values are foundational to quality professional nursing practice that all nurses must uphold. Seeking educational opportunities to advance informatics competencies and participating in decisions related to digital health empowers nurses and increases their ability to advocate for better standards of care for digital health practice (CASN, 2012; Gomes et al., 2016; Lynott et al., 2012; Nagle et al., 2020; Rentmeester, 2018). It will also help nurses to focus their attention on the patient as opposed to learning how to use the technology in the context of care.

Nursing Policy

Examining the requirements, competencies, education, and standards for digital health nursing compassion is a priority policy issue (AMS, 2018). The existing CASN nursing informatics competencies do not adequately address the concept of compassion in digital health contexts. With the exponential and ongoing integration of digital health tools, it would be critically important to revise these competencies to reflect the changing pace of technology and incorporate compassion as a competency in itself or as an extension of these competencies.

Limitations

Strengths of the review included a comprehensive search strategy through various databases, standardized data screening and extraction procedures. One of the limitations of this review was the inclusion of English only studies. Relevant publications reported in languages

other than English could have been missed. Synthesis of literature offered in this review may have been further improved had there been a broader and more homogeneous literature available on the concept of the digital health compassion in nursing.

Conclusion

Ensuring patient centered care requires nurses to be cognizant of the impact of digital health tools on nurse-patient relationships, and patients' experiences with care. Results from this review expanded understanding of how compassionate nursing care in relation to digital health technologies is currently discussed in the literature, and it helped in identifying best practices to enhance compassionate nursing care in digital health contexts. Based on a review of this literature, the concept of digital health compassion remains unclear. The preliminary knowledge synthesis completed in this review provides research-based recommendations on how compassionate care and digital health can be incorporated into the practice and teaching of nurses and nursing students. Further research is needed to articulate the concept of compassionate nursing practice in digital contexts using a variety of research methods and in different practice settings.

Knowledge Dissemination

Findings from this review will be published in an open access journal such as the International Journal of Nursing Education, Nursing Education Today, or Computers Informatics Nursing. Results from this review will also be disseminated at relevant local conferences such as Dr. Shirley Stinson Nursing Research Conference, national conferences such as the Canadian Nursing Informatics Association Conference, CASN conferences, and international conferences such as Sigma Theta Tau research conferences.

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Appendix A

Search Strategy

Database: Ovid MEDLINE: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE® <1946-Present>		
	Search Terms	**Number of Records**
1.	nurse-patient relations/	35292
2.	Communication/ or health communication/	85754
3.	(patient adj1 nurse adj2 relationship).mp.	917
4.	Patient-Centered Care/	19252
5.	((person or patient* or client* or people or human) adj2 (centr* or center*)).mp.	68953
6.	(“compassionate care” or “compassionate healthcare”).mp.	952
7.	1or 2 or 3 or 4 or 5 or 6	182494
8.	computer*.mp.	809313
9.	((monitor or screen) adj4 (computer or internet or online)).mp.	3674
10.	(ehealth or e-health).mp.	6483
11.	(telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*).mp.	30902
12.	(eportal or e-portal or patient portal).mp.	712
13.	exp Computers, Handheld/ Computer Systems/ or information technology/	21163
14.	exp electronic health records/	19979
15.	(electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*).mp.	43336
16.	(virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled).mp.	222552
17.	((mobile or smartphone* or iphone* or android) adj2 (app or apps or applications*)).mp.	10504

18.	(mhealth or m-health).mp.	5139
19.	(digital adj2 technolog*).mp.	2911
20.	digital health.mp.	1844
21.	virtual healthcare.mp.	29
22.	Nursing Informatics/	1513
23.	(informatics adj2 nursing).mp.	1971
24.	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	1035004
25.	exp Nurses/	87934
26.	exp Nursing/	252298
27.	exp Education, Nursing/	83381
28.	future of nursing.mp.	1458
29.	nurs*.mp.	731578
30.	25 or 26 or 27 or 28 or 29	740006
31.	7 and 24 and 30	1926
32.	limit 31 to english language	1832

Database: Embase <1974-Present>		
	Search Terms	**Number of Records**
1.	exp nurse patient relationship/	32573
2.	(patient adj1 nurse adj2 relationship).tw,kw	946
3.	((person or patient* or client* or people or human) adj2 (centr* or center*)).tw,kw	102224
4.	(compassion* or compassionate care).tw,kw	13880
5.	1 or 2 or 3 or 4	147247
6.	computer*.tw,kw	379022

7.	((monitor or screen) adj4 (computer or internet or online)).tw,kw	4976
8.	(ehealth or e-health).tw,kw	7580
9.	(telemed* or telehealth or teleconferenc* or tele-med* or tele-health or tele-conferenc*).tw,kw	24448
10.	(eportal or e-portal or patient portal).tw,kw	1032
11.	exp Computers, Handheld/ or Computer Systems/ or information technology/	36290
12.	exp electronic health records/	17673
13.	exp Nursing Informatics/	1539
14.	(informatics adj2 nursing).tw,kw	930
15.	(electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*).tw,kw	62383
16.	(virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled).tw,kw	290738
17.	((mobile or smartphone* or iphone* or android) adj2 (app or apps or applications* or therapy or therapies)).tw,kw	8773
18.	(mhealth or m-health).tw,kw	4813
19.	digital health.tw,kw	1986
20.	virtual healthcare.tw,kw	35
21.	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20	735772
22.	exp Nurses/	177510
23.	exp Nursing/	357869
24.	exp Education, Nursing/	81784
25.	future of nursing.tw,kw	1426
26	nurs*.tw,kw	515541
27.	22 or 23 or 24 or 25 or 26	726751

28	5 AND 21 AND 27	1221
29.	limit 28 to english language	1192

Database: Scopus (Advanced Search)		
	Search Terms	**Number of Records**
	TITLE-ABS-KEY ((((patient W/1 nurse) W/2 (relation* OR communication* OR interaction*)) OR ((person OR patient* OR client* OR people OR human) W/2 (centr* OR center*)) OR ("compassionate care" OR "compassionate healthcare")) limit AND to AND article OR review) AND (LIMIT-TO (LANGUAGE , "English"))	1542
	(TITLE-ABS-KEY((monitor or screen or computer or internet or online)) OR TITLE-ABS-KEY((ehealth or e-health)) OR TITLE-ABS-KEY((telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*)) OR TITLE-ABS-KEY((eportal or e-portal or patient portal)) OR TITLE-ABS-KEY((electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*)) OR TITLE-ABS-KEY((virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled)) OR TITLE-ABS-KEY((mhealth or m-health)) OR TITLE-ABS-KEY(((mobile or smartphone* or iphone* or android) w/2 (app or apps or applications*))) OR TITLE-ABS-KEY((digital w/2 technolog*)) OR TITLE-ABS-KEY("digital health") OR TITLE-ABS-KEY("virtual healthcare") OR TITLE-ABS-KEY((informatics w/2 nursing))) AND (LIMIT-TO (LANGUAGE,"English"))	3609352
	TITLE-ABS-KEY ((nurs* OR (education W/2 nurs*) OR (future W/3 nurs*))) AND (LANGUAGE , "English"))	630154
	TITLE-ABS-KEY (((patient W/1 nurse) W/2 (relation* OR communication* OR interaction*)) OR ((person OR patient* OR client* OR people OR human) W/2 (centr* OR center*)) OR ("compassionate care" OR "compassionate healthcare")) AND (TITLE-ABS-KEY ((monitor OR screen OR computer OR internet OR online)) OR TITLE-ABS-KEY ((ehealth OR e-health)) OR TITLE-ABS-KEY ((telemed* OR telehealth OR teleconference* OR tele-med*	1236

	OR tele-health OR tele-conferenc*)) OR TITLE-ABS-KEY ((eportal OR e-portal OR patient AND portal)) OR TITLE-ABS-KEY ((electronic AND health AND record* OR electronic AND medical AND record* OR ehr OR clinical AND information AND system* OR healthinformation AND technolog*)) OR TITLE-ABS-KEY ((virtual OR mobile OR technology-assisted OR computer-based OR internet-based OR information AND technology OR web-based OR technology-mediated OR technology-enabled)) OR TITLE-ABS-KEY ((mhealth OR m-health)) OR TITLE-ABS-KEY (((mobile OR smartphone* OR iphone* OR android) W/2 (app OR apps OR applications*))) OR TITLE-ABS-KEY ((digital W/2 technolog*)) OR TITLE-ABS-KEY ("digital health") OR TITLE-ABS-KEY ("virtual healthcare") OR TITLE-ABS-KEY ((informatics W/2 nursing))) AND (nurs* OR (education W/2 nurs*) OR (future W/3 nurs*)) AND (LIMIT-TO (LANGUAGE , "English")) AND DOCTYPE (ar OR re) AND (LIMIT-TO (SUBJAREA , "NURS"))	

Database: APA PsycInfo <1806-Present>		
	Search Terms	**Number of Records**
1.	exp Communication/	302800
2.	exp Human Computer Interaction/	24519
3.	(patient adj1 nurse adj2 relation*).mp.	618
4.	((person or patient* or client* or people or human) adj2 (centr* or center*)).mp.	21870
5.	(compassionate care or compassionate healthcare).mp.	411
6.	1or 2 or 3 or 4 or 5	337612
7	exp Information Systems/ or exp Technology/ or exp "Information and Communication Technology"/ or exp Computer Applications/	218258
8.	computer*.mp.	146034
9.	((monitor or screen) adj4 (computer or internet or online)).mp.	2742
10.	(ehealth or e-health).mp.	1982

11.	(telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*).mp.	7032
12.	(eportal or e-portal or patient portal).mp.	145
13.	exp Digital Computers/ or exp Computers/ or exp Tablet Computers/ or exp Laptop Computers/	42438
14.	exp electronic health records/	825
15.	(electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*).mp.	4037
16.	(virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled).mp.	75904
17.	((mobile or smartphone* or iphone* or android) adj2 (app or apps or applications*)).mp.	2442
18.	(mhealth or m-health).mp.	1078
19.	(digital adj2 technolog*).mp.	2857
20.	digital health.mp.	282
21.	virtual healthcare.mp.	7
22.	(informatics adj2 nursing).mp.	80
23.	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	312222
24.	exp Nurses/	31302
25.	exp Nursing/	22201
26.	future of nursing.mp.	363
27.	nurs*.mp.	110052
28.	24 or 25 or 26 or 27	110052
29.	6 AND 23 AND 28	989
30.	limit 29 to english language	971

Database: Ovid HealthSTAR <1966-Present>		
	Search Terms	**Number of Records**
1.	nurse-patient relations/	35340
2.	Communication/ or health communication/	85202
3.	(patient adj1 nurse adj2 relationship).mp.	727
4.	Patient-Centered Care/	19180
5.	((person or patient* or client* or people or human) adj2 (centr* or center*)).mp.	51137
6.	("compassionate care" or "compassionate healthcare").mp.	721
7.	1or 2 or 3 or 4 or 5 or 6	163996
8.	computer*.mp.	582113
9.	((monitor or screen) adj4 (computer or internet or online)).mp.	2436
10.	(ehealth or e-health).mp.	3461
11.	(telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*).mp.	25565
12.	(eportal or e-portal or patient portal).mp.	468
13.	exp Computers/ or exp Computers, Handheld/	70730
14	exp Information Technology/ or exp Information Systems/ or exp Hospital Information Systems/	229534
15.	exp electronic health records/ or exp medical records systems, computerized	40111
16.	(electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*).mp.	33448
17.	(virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled).mp.	130116
18.	((mobile or smartphone* or iphone* or android) adj2 (app or apps or applications*)).mp.	6907

19.	(mhealth or m-health).mp.	2297
20.	(digital adj2 technolog*).mp.	1790
21.	digital health.mp.	715
22.	virtual healthcare.mp.	24
23.	Nursing Informatics/	1468
24.	(informatics adj2 nursing).mp.	1785
25.	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24	876324
26.	exp Nurses/	82616
27.	exp Nursing/	237708
28.	exp Education, Nursing/	73876
29.	future of nursing.mp.	1288
30.	nurs*.mp.	625075
31.	26 or 27 or 28 or 29 or 30	633122
32.	7 AND 25 AND 31	2030
33.	limit 32 to english language	1923

Database: CINAHL Plus with Full Text <1937-Present>		
	Search Terms	**Number of Records**
1.	(MH "Nurse-Patient Relations")	30145
2.	(MH "Communication+")	300475
3.	(patient w1 nurse w2 relation*)	158
4.	(MH"Patient Centered Care")	32960
5.	((person or patient or client or people or human) w2 (centr* or center*))	467669
6.	("compassionate care" or "compassionate healthcare")	1059
7.	S1 OR S2 OR S3 OR S4 OR S5 OR S6	765340
8.	(MH "Computer Systems+") OR (MH "Computer Communication Networks+") OR (MH "Computers, Hand-Held+") OR (MH "Computers, Portable+")	648964
9.	computer*.mp.	171098
10.	((monitor or screen) w4 (computer or internet or online))	353

11.	(ehealth or e-health)	16857
12.	(telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*)	23537
13.	(eportal or e-portal or patient portal)	6769
14.	(MH "Information Technology+") OR (MH "Technology+")	95969
15.	(MH "Electronic Health Records+") OR (MH "Patient Record Systems+") OR ("Clinical Record System+")	34709
16.	(electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*)	81611
17.	(virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled)	112618
18.	((mobile or smartphone* or iphone* or android) w2 (app or apps or applications*))	11252
19.	(mhealth or m-health)	15389
20.	(digital w2 technolog*)	1673
21.	“digital health”	890
22.	“virtual healthcare”	23
23.	(MH "Nursing Informatics")	3006
24.	(informatics w2 nursing)	231
25.	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24	960756
26.	(MH "Nurses+")	240197
27.	(future of nursing)	28342
28.	nurs*	968924
29.	S26 OR S27 OR S28	973211
30.	S7 AND S25 AND S29	10754
31.	limit 30 to scholarly peer-reviewed journals and english language	1027

Grey Literature Source: ProQuest Dissertations and Theses		
	Search Terms	**Number of Records**
1	(((patient w/1 nurse) w/2 (relation* or communication* or interaction*)) or ((person or patient* or client* or people or human) w/2 (centr* or center*)) or (“compassionate care” or “compassionate healthcare”))	1707
2	(monitor or screen or computer or internet or online) or (ehealth or e-health) or	34424

	(telemed* or telehealth or teleconference* or tele-med* or tele-health or tele-conferenc*) or (eportal or e-portal or patient portal) or (electronic health record* or electronic medical record* or EHR or clinical information system* or healthinformation technolog*) or (virtual or mobile or technology-assisted or computer-based or internet-based or information technology or web-based or technology-mediated or technology-enabled) or (mhealth or m-health) or ((mobile or smartphone* or iphone* or android) near/2 (app or apps or applications*)) or (digital near/2 technolog*) or “digital health” or “virtual healthcare” or (informatics near/2 nursing))	

3	(nurs* or (education near/2 nurs*) or (future near/3 nurs*))	47369
4	(((monitor OR screen OR computer OR internet OR online) OR (ehealth OR e-health) OR (telemed* OR telehealth OR teleconference* OR tele-med* OR tele-health OR tele-conferenc*) OR (eportal OR e-portal OR patient portal) OR (electronic health record* OR electronic medical record* OR EHR OR clinical information system* OR healthinformation technolog*) OR (virtual OR mobile OR technology-assisted OR computer-based OR internet-based OR information technology OR web-based OR technology-mediated OR technology-enabled) OR (mhealth OR m-health) OR ((mobile OR smartphone* OR iphone* OR android) NEAR/2 (app OR apps OR applications*)) OR ("digital health" OR (digital NEAR/2 technolog*) OR "virtual healthcare") OR (informatics NEAR/2 nursing)) AND subt.exact("nursing")) AND ((((patient w/1 nurse) w/2 (relation* OR communication* OR interaction*)) OR ((person OR patient* OR client* OR people OR human) w/2 (centr* OR center*)) OR ("compassionate care" OR "compassionate healthcare")) AND subt.exact("nursing")) AND ((nurs* OR (education NEAR/2 nurs*) OR (future NEAR/3 nurs*)) AND (subt.exact("nursing") AND la.exact("ENG")))	1581

Appendix B

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

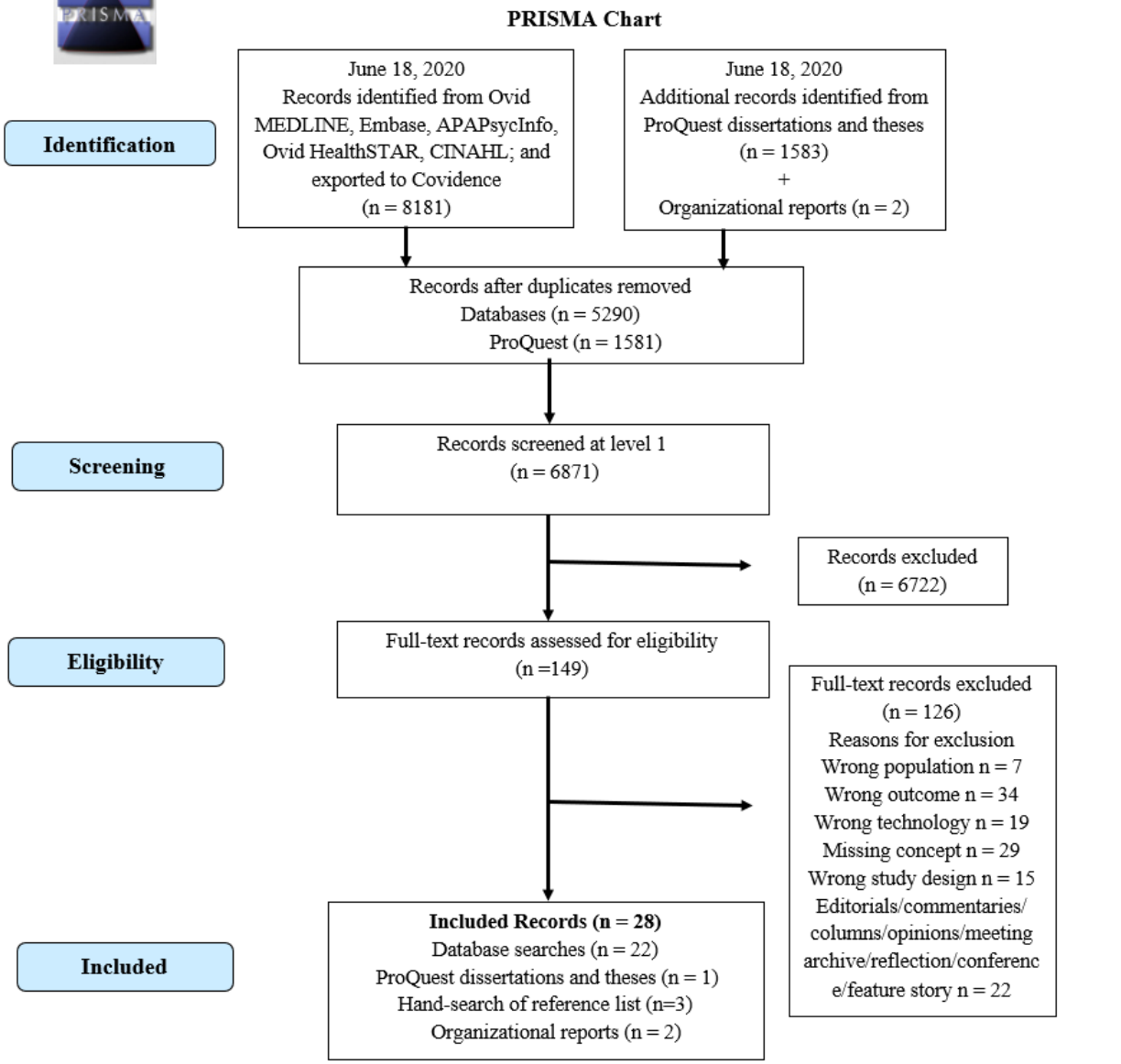
SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	i
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	ii - iii
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4-8
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	9 – 10
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	NA
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	11 – 12

Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	14
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix A: 54 - 63
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	13
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	13
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	13
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not completed
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	14 – 30
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Appendix C: 67 Appendix D: 68
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Appendix E: 86 – 121
Critical appraisal	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not completed

within sources of evidence			
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	14 - 30
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	14 - 30
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	31 - 39
Limitations	20	Discuss the limitations of the scoping review process.	42 - 43
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	40 - 43
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	43

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).
Source: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for scoping reviews (PRISMAScR): Checklist and explanation. Ann Intern Med. 2018; 169: 467–473. https://doi.org/10.7326/M18-0850.

Appendix C



Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., The PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Med 6(7): e1000097. https://doi.org/10.1371/journal.pmed1000097

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... & Hempel, S. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. Annals of Internal Medicine, 169(7), 467-473. https://doi.org/10.7326/M18-0850

Appendix D

List of Excluded Records with Reasons for Exclusion

Retrieved from Databases (n = 111 articles)

Alliex, S., & Irurita, V. F. (2004). Caring in a technological environment: How is this possible? *Contemporary Nurse, 17*(1-2), 32-43. https://doi.org/10.5172/conu.17.1-2.32

Reason for exclusion: Wrong technology

Specific digital health technology is not identified.

Almerud, S., Alapack, R. J., Fridlund, B., & Ekebergh, M. (2008). Beleaguered by technology: Care in technologically intense environments. *Nursing Philosophy, 9*(1), 55-61. https://doi.org/10.1111/j.1466-769X.2007.00332.x

Reason for exclusion: Wrong technology

Medical technologies such as cardiac monitor, ventilator, infusion pumps, height/weight monitor, instruments are discussed.

Almerud-Österberg, S. (2010). Visualism and technification-the patient behind the screen. *International Journal of Qualitative Studies on Health and Well-Being, 5*(2), 5223-5226. https://doi.org/10.3402/qhw.v5i2.5223

Reason for exclusion: Wrong technology

The technologies discussed are medical devices such as cardiac monitor, ventilator, infusion pumps, height/weight monitor, instruments.

Alshammari, F., Pasay-An, E., & Indonto, M. C. L. (2017). Competencies in nursing informatics in the Saudi Arabian context: A sequential explanatory study. *Philippine Journal of Nursing, 87*(2), 45-55. http://www.pna-pjn.com/competencies-in-nursing-informatics-in-the-saudi-arabian-context-a-sequential-explanatory-study/

Reason for exclusion: Wrong outcome

Discusses the impact of nursing informatics on the healthcare system and not on nursing care practices.

Anderson, D. C., Jackson, A. A., & Halpern, N. A. (2018). Informatics for the modern intensive care unit. *Critical Care Nursing Quarterly, 41*(1), 60-67. https://doi.org/10.1097/CNQ.0000000000000186

Reason for exclusion: Wrong technology

Focuses on the use of devices in ICUs, not specifically digital health technology.

Archibald, M. M., & Barnard, A. (2018). Futurism in nursing: Technology, robotics and the fundamentals of care. *Journal of Clinical Nursing, 27*(11-12), 2473-2480. https://doi.org/10.1111/jocn.14081

Reason for exclusion: Wrong technology

A discursive article - discusses the provision of humanistic care with the use of technology (does not specify medical or digital) and robots (not classified as digital technology).

Bagherian, B., Sabzevari, S., Mirzaei, T., & Ravari, A. (2017). Effects of technology on nursing care and caring attributes of a sample of Iranian critical care nurses. *Intensive & Critical Care Nursing, 39*, 18-27. https://doi.org/10.1016/j.iccn.2016.08.011

Reason for exclusion: Wrong technology

The type of technology is not specifically identified.

Bakken, S. (2001). Interactive health communication technology: Where do clinical nursing interventions fit into the picture? *Applied Nursing Research, 14*(3), 173-176. https://doi.org/10.1053/apnr.2001.24416

Reason for exclusion: Column

An international column

Barnard, A., & Sandelowski, M. (2001). Technology and humane nursing care: (ir)reconcilable or invented difference? *Journal of Advanced Nursing, 34*(3), 367-375. https://doi.org/10.1046/j.1365-2648.2001.01768.x

Reason for exclusion: Missing concept

The concept of digital health is missing.

Barton, A. (2010). Patient-centeredness and technology-enhanced care: Mutually exclusive or synergistic? *Clinical Nurse Specialist, 24*(3), 121-122. https://doi.org/10.1097/NUR.0b013e3181d828e0

Reason for exclusion: Wrong outcome

Discusses the impact of using ICT in the healthcare system and not on nursing care practices.

Birckhead, L. M. (1978). Nursing and the technetronic age. *Journal of Nursing Administration, 8*, 16-19. https://doi.org/10.1097/00005110-197802000-00003

Reason for exclusion: Wrong outcome

Discusses the impacts of technetronic age on the healthcare system but does not highlight its impact on the provision of care.

Bond, C., Stacey, G., Field-Richards, S., Callaghan, P., Keeley, P., Lymn, J., Redsell, S., & Spiby, H. (2018). The concept of compassion within UK media-generated discourse: A corpus-informed analysis. *Journal of Clinical Nursing, 27*(15-16),3081-3090 https://doi.org/10.1111/jocn.14496

Reason for exclusion: Missing concept

The concept of digital health technologies is missing.

Booth, R. G. (2006). Educating the Future eHealth Professional Nurse. *International Journal of Nursing Education Scholarship, 3*(1), 13. https://doi.org/10.2202/1548-923X.1187

Reason for exclusion: Missing concept

The focus on patient centered care is broad and likely in the context of consumer health informatics not compassion per se.

Braun, J. L., Baines, S. L., Olson, N. G., Scruby, L. S., Manteuffel, C. A., & Cretilli, P. K. (1984).The future of nursing: Combining humanistic and technological values.

Health Values: The Journal of Health Behavior, Education & Promotion, 8(3),12-15. https://pubmed.ncbi.nlm.nih.gov/10266403/

Reason for exclusion: Wrong technology

Compares the provision of care in the context of with and without technologies. The technology is not specifically identified as digital health technology.

Brown, J. (1992). Nurses or technicians? The impact of technology on oncology nursing. *Canadian Oncology Nursing Journal, 2*(1),12-17. http://canadianoncologynursingjournal.com/index.php/conj/article/view/562/562

Reason for exclusion: Wrong technology

Suggests strategies for minimizing the impact of technology on nursing, however medical technologies/devices such as administering chemotherapy, IVs, taking blood specimens, EKG are discussed.

Brunt, B. (2014). Robotics and nurses: Merging technology with the human touch. *Ohio Nurses Review, 89*(6),10-11. https://*www. ohnurses.org*

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. A review - discusses the benefits of using different types of robots in healthcare settings.

Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Risling, T., & Bamford, M. (2020). Nursing in the age of artificial intelligence: Protocol for a scoping review. *JMIR Research Protocols, 9*(4), e17490. https://doi.org/10.2196/17490

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening.A protocol for a scoping review.

Burkoski, V., Yoon, J., Hutchinson, D., Fernandes, K., Solomon, S., Collins, B. E., & Jarrett, S. R. (2019). Smartphone technology: Enabling prioritization of patient needs and enhancing the nurse-patient relationship. *Nursing Leadership, 32*(SP), 29-40. https://doi.org/10.12927/cjnl.2019.25816

Reason for exclusion: Wrong outcome

Discusses the impact of using smartphone technology in ICUs and not on nursing care practices.

Cashen, M. S., Bradley, V., Farrell, A., Murphy, J., Schleyer, R., Sensmeier, J., & Dykes, P. C. (2006). Exploring the impact of health information technology on communication and collaboration in acute care nursing. *Studies in Health Technology and Informatics, 122*, 575. https://www.ncbi.nlm.nih.gov/pubmed/17102325

Reason for exclusion: Missing concept

Discusses perceptions of providers regarding the impact of health information technology on the role of nurses and interdisciplinary communication in acute care settings. However, the article does not focus on the nurse-patient relationship/communication/interaction (concept of compassion is missing).

Clark, J. (2007). The impact of ICT on health, healthcare and nursing in the next 20 years. *Studies in Health Technology and Informatics, 128*, 95. https://www.ncbi.nlm.nih.gov/pubmed/17901631

Reason for exclusion: Wrong outcome
Does not discuss its impact on the provision of nursing care practices.

Cline, L. (2020). How electronic health records correlate with patient-centered care. *Nursing, 50*(1), 61-63. https://doi.org/10.1097/01.NURSE.0000615140.23834.06

Reason for exclusion: Wrong study design
Abstract was missing at the first stage of screening. The study design is the literature review.

Coffey, A., Saab, M. M., Landers, M., Cornally, N., Hegarty, J., Drennan, J., Lunn, C., & Savage, E. (2019). The impact of compassionate care education on nurses: A mixed-method systematic review. *Journal of Advanced Nursing, 75*(11), 2340-2351. https://doi.org/10.1111/jan.14088

Reason for exclusion: Wrong study design
Abstract was missing at the first stage of screening. The study is the mixed-method systematic review.

Colley, L. (2013). Student life - compassionate to the core. *Nursing Standard, 28*(7), 74. https://doi.org/10.7748/ns2013.10.28.7.74.s54

Reason for exclusion: Opinion

Cox, C. E., & Curtis, J. R. (2016). Using technology to create a more humanistic approach to integrating palliative care into the intensive care unit. *American Journal of Respiratory and Critical Care Medicine, 193*(3), 242-250. https://doi.org/10.1164/rccm.201508-1628CP

Reason for exclusion: Wrong outcome
Discusses the impact of electronic health records on the healthcare system and not on nursing care practices.

Dewar, B. & Mackay, R. (2010). Appreciating and developing compassionate care in an acute hospital setting caring for older people. *International Journal of Older People Nursing, 5*(4), 299-308. https://doi.org/ 10.1111/j.1748-3743.2010.00251.x

Reason for exclusion: Missing concept
Missing the concept of digital health technologies.

Downes, E., Horigan, A., & Teixeira, P. (2019). The transformation of health care for patients: Information and communication technology, digiceuticals, and digitally enabled care. *Journal of the American Association of Nurse Practitioners, 31*(3), 156-161. https://doi.org/10.1097/JXX.0000000000000109

Reason for exclusion: Wrong population
Abstract was missing at the first stage of screening. The target population is providers and not specifically nurses.

Dragon, N. (1993). Patient care in a technological age. *Australian Nursing Journal, 14*(1), 16-19. https://europepmc.org/article/med/16848250

Reason for exclusion: Wrong technology
The type of technology is not specified.

Fagerström, C., Tuvesson, H., Axelsson, L., & Nilsson, L. (2017). The role of ICT in nursing practice: An integrative literature review of the Swedish context. *Scandinavian Journal of Caring Sciences, 31*(3), 434-448. https://doi.org/10.1111/scs.12370

Reason for exclusion: Wrong study design
Abstract was missing at the first stage of screening. The study design is an integrative literature review.

Finkelstein, J., Knight, A., Marinopoulos, S., Gibbons, M. C., Berger, Z., Aboumatar, H., ... & Bass, E. B. (2012). Enabling patient-centered care through health information technology. *Journal of Communication in Healthcare, 7*(4), 255-262. https://doi.org/10.1179/175307614Y.0000000067

Reason for exclusion: Wrong population
Population is caregivers or health care professionals, and not specifically nurses.

Gephart, S. M. (2013). Using health information technology to engage patients in their care. *Online Journal of Nursing Informatics, 17*(3),1-6. http://ojni.org/issues/?p=2848

Reason for exclusion: Wrong outcome
Discusses the impact of using HIT on the healthcare system, and not on the nursing care practices.

Gerber, D. E., Beg, M. S., Duncan, T., Gill, M., Lee, S. J. C. (2017). Oncology nursing perceptions of patient electronic portal use: A qualitative analysis. *Oncology Nursing Forum, 44*(2),165-170. https://doi.org/10.1188/17.ONF.165-170

Reason for exclusion: Wrong outcome
Discusses the impact of PHR portal technology in an oncology setting; does not highlights impact on the provision of nursing care practices.

Glenn, S. (2002). Information and communication technologies (ICT) in nursing education: Is there a need for a more philosophical analysis? *Nurse Education Today, 22*(2), 99-101. https://doi.org/10.1054/nedt.2002.0753

Reason for exclusion: Editorial

Gomez, E. (2003). Tech talk: Web sites and online education offer guidance in maintaining boundaries.ONS News,*18*(8), 6.

Reason for exclusion: Editorial

Goossen, W. T. F. (2002). Human interaction. *Studies in Health Technology and Informatics, 65*(ck1, 9214582), 266-291.

Reason for exclusion: Wrong outcome
Compares the positive and negative effects of using technologies. It does not discuss the impact on the provision of care.

Granados-Pembertty, Y. Y., & Arias-Valencia, M. M. (2013). Being in front of the

patient: Nurse-patient interaction and use of technology in emergency services. *Investigacion & Educacion en Enfermeria, 31*(3), 421-432. http://www.scielo.org.co/pdf/iee/v31n3/v31n3a10.pdf

Reason for exclusion: Wrong technology

Discusses various levels of care and difficulties in nurse-patient interactions with the use of biomedical technology.

Grumme, V., Barry, C., Gordon, S., & Ray, M. (2016). On virtual presence. Advances in Nursing Science, 39(1), 48-59. https://doi.org/10.1097/ANS.0000000000000103

Reason for exclusion: Wrong study design - Literature review

Gulati, M., Minor, L., Smith, E., Reynolds, M., Harrington, M., Lambert, R., Stevenson, G., Bigio, D., & Cafeo, T. (2012). A systematic approach to enhance communication and optimize patient flow through the use of technology. Hospital Medicine 2012, April 1-4, San Diego, Calif.

Reason for exclusion: Meeting archive

Meeting: Hospital Medicine 2012, April 1-4, San Diego, Calif.

Hader, R. (2005). Forge the connection between technology and compassion. *Nursing Management, 36*(12), 4. https://search.proquest.com/docview/68891837

Reason for exclusion: Editorial

Halm, M. A., Alpen, M. A. (1993). The impact of technology on patients and families. *Nursing Clinics of North America, 28*(2), 443-457. http://europepmc.org/article/med/8516184

Reason for exclusion: Wrong technology

Discusses nursing interventions to improve the provision of care with the use of medical technologies in ICU.

Harrison, H. F., Kinsella, E. A., & DeLuca, S. (2019). Locating the lived body in client–nurse interactions: Embodiment, intersubjectivity and intercorporeality. *Nursing Philosophy, 20*(2), e12241-n/a. https://doi.org/10.1111/nup.12241

Reason for exclusion: Missing concept

Missing the concept of digital health technologies.

Hawkins, J. W. (1998). In a virtual world, let's not lose the person. Clinical excellence for nurse practitioners: *The International Journal of NPACE, 2*(6), 323. https://pubmed.ncbi.nlm.nih.gov/12596833/

Reason for exclusion: Wrong outcome

Discusses the changes in the healthcare system with the use of virtual technologies; does not highlight the impact on nursing practices.

Heale, R. (2018). Communication technology and healthcare. *Evidence Based Nursing, 21*(2), 36-37. https://doi.org/10.1136/eb-2018-102893

Reason for exclusion: Commentary

Hebert, M. & Benbasat, I. (1994). Adopting information technology in hospitals: The relationship between attitudes/expectations and behavior. *Hospital & Health Services Administration, 39*(3), 369-383. https://europepmc.org/article/med/10137056

Reason for exclusion: Missing concept

Discusses potential factors influencing the intent to use technology. The concept of compassion in the provision of care is missing.

Henderson, A. (2006).The evolving relationship of technology and nursing practice: Negotiating the provision of care in a high tech environment. *Contemporary Nurse, 22*(1), 59-65.https://doi.org/10.5172/conu.2006.22.1.59

Reason for exclusion: Wrong technology

Focuses mostly on the benefits of medical technologies used in ICUs.

Higgins, L. W., Shovel, J. A., Bilderback, A. L., Lorenz, H. L., Martin, S. C., Rogers, D. J., & Minnier, T. E. (2017). Hospital nurses' work activity in a technology-rich environment: A triangulated quality improvement assessment. *Journal of Nursing Care Quality, 32*(3), 208-217. https://doi.org/10.1097/NCQ.0000000000000237

Reason for exclusion: Missing concept

The concept of compassionate care is missing.

Hill, T. L. (2013). Caring and technology. *Online Journal of Nursing Informatics, 17*(3), 1-3

Reason for exclusion: Editorial

Hofmeyer, A., Toffoli, L., Vernon, R., Taylor, R., Klopper, H. C., Coetzee, S. K., & Fontaine, D. (2018). Teaching compassionate care to nursing students in a digital learning and teaching environment. *Collegian (Royal College of Nursing, Australia), 25*(3), 307-312. https://doi.org/10.1016/j.colegn.2017.08.001

Reason for exclusion: Missing concept

Teaching strategies to enhance compassionate care practices through an online compassion module. However, the article does not discuss the strategies to enhance the provision of compassionate care with the use of digital health technologies.

Hyysalo, S. (2007). Versions of Care Technology. *Human Technology, 3*(2), 228-247. https://doi.org/10.17011/ht/urn.2007282

Reason for exclusion: Wrong outcome

Discusses the uses of Wrist Care (an alarm and monitoring device) without its impact on the provision of care practices.

Jacobson, J. (2014). Health information technology: Bane or boon? *AJN, American Journal of Nursing, 114*(12), 18-19. https://doi.org/10.1097/01.NAJ.0000457401.30598.69

Reason for exclusion: Wrong outcome

Discusses the uses of HIT on the healthcare system without its impact on the provision of care

practices.

Jauhiainen, A., Saranto, K., & Tossavainen, K. (2006). Consumer-centered nursing with ICT: A futuristic viewpoint. *Studies in Health Technology and Informatics, 122*, 425. https://www.ncbi.nlm.nih.gov/pubmed/17102293

Reason for exclusion: Wrong outcome

Discusses the uses of ICT on healthcare systems without its impact on the provision of care practices.

Johns, C. (2005). Reflection on the relationship between technology and caring. *Nursing in Critical Care, 10*(3), 150-155. https://doi.org/10.1111/j.1362-1017.2005.00113.x

Reason for exclusion: Reflection

Jones, M., Hendricks, J. M., & Cope, V. (2012). Toward an understanding of caring in the context of telenursing. *International Journal for Human Caring, 16*(1), 7-15. https://ro.ecu.edu.au/ecuworks2012/745/

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. The study design is a literature review.

Kemp, J., Zhang, T., Inglis, F., Wiljer, D., Sockalingam, S., Crawford, A., Lo, B., Charow, R., Munnery, M., Singh Takhar, S., & Strudwick, G. (2019). Delivery of compassionate mental health care in a digital technology-driven age: A scoping review (Preprint). *Journal of Medical Internet Research, 22*(3), e16263. https://doi.org/10.2196/16263

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. The study design is a scoping review.

Kleiman, S., & Kleiman, A. (2007). Technicity in nursing and the dispensation of thinking. *Nursing Economics, 25*(3), 157. https://www.ncbi.nlm.nih.gov/pubmed/17802998

Reason for exclusion: Wrong outcome

Discusses the impact of technology on the healthcare system without its impact on the provision of care practice.

Koivunen, M., & Saranto, K. (2012). Nursing professionals' experiences of the facilitators and barriers to the use of telehealth applications: A systematic review of qualitative evidence. *JBI Database of Systematic Reviews and Implementation Reports, 10*(57), 3894-3906. https://doi.org/10.11124/01938924-201210570-00004

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. The study design is a systematic review.

Koivunen, M., & Saranto, K. (2018). Nursing professionals' experiences of the facilitators and barriers to the use of telehealth applications: a systematic review of qualitative studies. *Scandinavian Journal of Caring Sciences, 32*(1), 24-44. https://doi.org/10.1111/scs.12445

Reason for exclusion: Wrong study design
Abstract was missing at the first stage of screening. The study design is a systematic review.

Kranz, A. M., Dalton, S., Damberg, C., & Timbie, J. W. (2018). Using health IT to coordinate care and improve quality in safety-net clinics. *The Joint Commission Journal on Quality and Patient Safety, 44*(12), 731-740. https://doi.org/10.1016/j.jcjq.2018.03.006

Reason for exclusion: Missing concept
The nursing population is missing.

Krogh, G. V., & Nåden, D. (2011). The use of hermeneutic interpretation statements in EPR documentation to capture qualities of caring. *Journal of Clinical Nursing, 20*(23-24), 3523-3531. https://doi.org/10.1111/j.1365-2702.2010.03683.x

Reason for exclusion: Wrong outcome
Examines interpretations statements in documentation, before and after the implementation of an electronic patient record and the documentation. It does not discuss the impact of EHR on nursing practices.

Laliberte, L. (2008). E-documentation impacts patient care?, *RN, 71*(12), 10-12.

Reason for exclusion: Opinion

Lett, J., Shutes, J., & Miller, J. (2015). Interacting with the electronic medical record. *Caring for the Ages, 16*(1), 14. https://doi.org/10.1016/j.carage.2014.12.014

Reason for exclusion: Column

Locsin, R. C. (1999). Development of an instrument to measure technological caring in nursing. *Nursing & Health Sciences, 1*(1), 27-34. https://doi.org/10.1046/j.1442-2018.1999.00005.x

Reason for exclusion: Missing concept
The context of digital health technologies is missing.

Locsin, R., Purnell, M., Tanioka, T., & Osaka, K (2011). Human rights and humanoid relationships in nursing and complexity science. Nursing, caring, and complexity science: For human-environment well-being. Springer Publishing Company.

Reason for exclusion: Missing concept
The context of digital health technologies is missing.

Makic, M. B. F. (2017). Critical care connection nurses' caring behaviors. *Journal of PeriAnesthesia Nursing, 32*(4), 367-369. https://doi.org/10.1016/j.jopan.2017.05.006

Reason for exclusion: Wrong population
Study is based on patients' perspectives.

Markov, M., & Hazan, A. (2012). Advances in communication technology: Implications for new nursing skills. *Journal of Pediatric Nursing, 27*(5), 591-593. https://doi.org/10.1016/j.pedn.2012.07.004

Reason for exclusion: Column

Mataxen, P., & Webb, L. (2019). Telehealth nursing: More than just a phone call. *Nursing, 49*(4), 11-13. https://doi.org/10.1097/01.NURSE.0000553272.16933.4b

Reason for exclusion: Editorial piece

McBride, S., Tietze, M., Robichaux, C., Stokes, L., & Weber, E. (2018). Identifying and addressing ethical issues with use of electronic health records. *Online Journal of Issues in Nursing, 23*(1), 1-12. https://doi.org/10.3912/OJIN.Vol23No01Man05

Reason for exclusion: Wrong outcome

Discusses the impact of using EHR on healthcare system, does not discuss the implications on care practices.

McBride, D. L. (2012). The distracted nurse. *Journal of Pediatric Nursing, 27*(3), 275-276. https://doi.org./10.1016/j.pedn.2012.02.002

Reason for exclusion: Editorial

McGrath, M. (2008). The challenges of caring in a technological environment: Critical care nurses' experiences. *Journal of Clinical Nursing, 17*(8), 1096-1104. https://doi.org/10.1111/j.1365-2702.2007.02050.x

Reason for exclusion: Wrong technology

Technology discussed is regarded as the life-saving technology (medical technology) in Intensive Care Units.

Michael S. H., Villarreal P. M., Ferguson M. F., Wiler J. L., Zane R. D., & Flarity, K. (2019). Virtual reality-based resilience programs: Feasibility and implementation for inpatient oncology nurses. *Clinical Journal of Oncology Nursing, 23*(6), 664-667. https://doi.org/10.1188/19.CJON.664-667

Reason for exclusion: Wrong concept

Discusses the use of virtual reality to mitigate burnout among nurses.

Moore, R. (2019). Technology combined with expert, relationship-based care. *Nursing Management, 26*(3), 22-26. https://doi.org/: 10.7748/nm.2019.e1853

Reason for exclusion: Wrong outcome

Discusses the impact of telemonitoring on healthcare systems, and not its impact on the provision of care practice**s.**

Moore, S. M. (2000). Telehealth. A challenge to preserve nursing values. *Nursing Leadership Forum, 5*(2), 41-42. https://pubmed.ncbi.nlm.nih.gov/12004419/

Reason for exclusion: Wrong outcome

Discusses the impact of telehealth on healthcare systems, and not its impact on the provision of care practice**s.**

Mullan, J. (2005). Technology as an aid to the nurse-patient interaction at the bedside. A*JN American Journal of Nursing Supplement,105*(3), 39-51

Reason for exclusion: Wrong technology

Use of technology such as smart infusion pumps for medication administration.

Munro, J. (2011). Anchoring caring and compassionate skills in an undergraduate nursing curriculum. *Journal of Obstetrics and Gynaecology, 31*(SUPPL. 1), 50

Reason for exclusion: Abstract presented at the conference

Abstract was presented at the conference. Full-text could not be found.

Munyisia, E. N., Yu, P., & Hailey, D. (2010). The changes in caregivers' perceptions about the quality of information and benefits of nursing documentation associated with the introduction of an electronic documentation system in a nursing home. *International Journal of Medical Informatics, 80*(2), 116-126. https://doi.org/10.1016/j.ijmedinf.2010.10.011

Reason for exclusion: Wrong population

The population is caregivers, not specifically nurses.

Nash, B. A. (2014). Maintaining the art of nursing in an age of technology. *Ohio Nurses Review, 89*(6), 12-13

Reason for exclusion: Feature story

Needleman, J. (2013). Increasing acuity, increasing technology, and the changing demands on nurses. *Nursing Economic, 31*(4), 200. https://www.ncbi.nlm.nih.gov/pubmed/24069722

Reason for exclusion: Wrong outcome

Discusses the challenges faced by the healthcare system with the introduction of digital health technology, and not its impact on the nursing care practices.

Papadopoulos, I., Zorba, A., Koulouglioti, C., Ali, S., Aagard, M., Akman, O., ... & González-Gil, T. (2016). International study on nurses' views and experiences of compassion. *International Nursing Review, 63*(3),395-405. https://doi.org/ 10.1111/inr.12298

Reason for exclusion: Missing concept

The concept of digital health technologies is missing.

Papadopoulos, I., Zorba, A., Koulouglioti, C., Ali, S., Aagard, M., Akman, O., ... & González-Gil, T.(2016). Exploring nurses' meaning and experiences of compassion: An international online survey involving 15 countries. *Journal of Transcultural Nursing, 28*(3), 286-295. https://doi.org/10.1177/1043659615624740

Reason for exclusion: Missing concept

The concept of digital health technologies is missing.

Peck, M. L. (1992). The future of nursing in a technological age: Computers, robots, and TLC. *Journal of Holistic Nursing: Official Journal of The American Holistic Nurses' Association , 10*(2),183-191. https://doi.org/: 10.1177/089801019201000208

Reason for exclusion: Wrong outcome

Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Persson, J. (2017). A review of the design and development processes of simulation for training in healthcare – A technology-centered versus a human-centered perspective. *Applied Ergonomics, 58*, 314-326. https://doi.org/10.1016/j.apergo.2016.07.007

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. The study is a review.

Philip, R. M. (2010). Informatics is about patient care (not technology). *Alberta RN, 66*(6), 20.

Reason for exclusion: Opinion

Piscotty, R. J. Jr., Kalisch, B., & Gracey-Thomas, A. (2015). Impact of healthcare information technology on nursing practice. *Journal of Nursing Scholarship, 47*(4), 287-293.https://doi.org/10.1111/jnu.12138

Reason for exclusion: Wrong outcome

Discusses various aspects of using HIT in the healthcare settings; does not discuss the impact on nursing care practices.

Posner, T. N. (1994). Technological control and healing: An uneasy combination? *Australian & New Zealand Journal of Mental Health Nursing, 3*(2), 63-71.

Reason for exclusion: Wrong outcome

Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Price, A. M. (2013). Caring and technology in an intensive care unit: An ethnographic study. *Nursing in Critical Care,18*(6), 278-288. https://doi.org/10.1111/nicc.12032

Reason for exclusion: Wrong technology

Discusses the provision of care with the use of medical technologies such as dialysis machines, mechanical ventilator, central lines in critical care units.

Rouleau, G., Gagnon, M. P., Cote, J., Payne-Gagnon, J., Hudson, E., & Dubois, C. A. (2016). How do information and communication technologies influence nursing care? *Studies in Health Technology and Informatics, 225*(ck1, 9214582), 934-35. https://doi.org/doi:10.3233/978-1-61499-658-3-934

Reason for exclusion: Wrong study design

An overview of systematic review.

Rouleau, G., Gagnon, M. P., & Côté, J (2015). Impacts of information and communication technologies on nursing care: An overview of systematic reviews (protocol). *Systematic Reviews, 4*(75), 1-8. https://doi.org/10.1186/s13643-015-0062-y

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. A protocol of an overview of systematic reviews.

Rouleau, G., Gagnon, M. P., Côté, J., Payne-Gagnon, J., Hudson, E., & Dubois, C. (2017). Impact of information and communication technologies on nursing care: Results

of an overview of systematic reviews. *Journal of Medical Internet Research, 19*(4), e122. https://doi.org/10.2196/jmir.6686

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. An overview of systematic reviews.

Rygg, L. O., Brataas, H. V., & Nordtug, B. (2018). Introducing videoconferencing on tablet computers in nurse–patient communication: Technical and training challenges. *International Journal of Telemedicine and Applications, 2018*, 1-6. https://doi.org/10.1155/2018/8943960

Reason for exclusion: Wrong outcome

Discusses various aspects of using videoconferencing in the healthcare settings; does not discuss the impact on nursing care practices.

Sandelowski, M. (1998). Looking to care or caring to look? Technology and the rise of spectacular nursing. *Holistic Nursing Practice,12*(4), 1-11. https://doi.org/10.1097/00004650-199807000-00003

Reason for exclusion: Wrong technology

Focuses on the use of medical technologies such as ultrasonography, fetal monitoring, vital function monitoring, cardiac monitoring.

Schenk, E., Schleyer, R., Jones, C., Fincham, S., Daratha, K., & Monsen, K. (2018). Impact of adoption of a comprehensive electronic health record on nursing work and caring efficacy. *CIN: Computers, Informatics, Nursing, 36*(7), 331-339. https://doi.org/10.1097/CIN.0000000000000441

Reason for exclusion: Wrong outcome

Discusses impacts of pre and post-implementation of EHR but does not discusses impact on the provision of compassionate care.

Sharman, Z. (2006). Remembering the basics: Administrative technology and nursing care in a hospital emergency department. *International Journal of Medical Informatics, 76*, S222-S228. https://doi.org/10.1016/j.ijmedinf.2006.05.012

Reason for exclusion: Wrong outcome

Discusses various aspects of using PCIs in the healthcare settings; does not discuss the impact on nursing care practices.

Simpson, R. L. (2004). The softer side of technology: How IT helps nursing care. *Nursing Administration Quarterly, 28*(4), 302-305. https://doi.org/ 10.1097/00006216-200410000-00013

Reason for exclusion: Wrong outcome

Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Simpson, R. L. (2001). Compassion meets the computer age. *Nursing Management, 32*(1),13-14. https://doi.org/10.1097/00006247-200101000-00007

Reason for exclusion: Wrong outcome
Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Simpson, R. L. (2008). Caring communications: How technology enhances interpersonal relations, part II. *Nursing Administration Quarterly, 32*(2),159-162. https://doi.org/: 10.1097/01.NAQ.0000314544.52112.78

Reason for exclusion: Wrong outcome
Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Skiba, D. J. (2015). Reflections on NLN technology conferences: 10 Years and counting. *Nursing Education Perspectives, 36*(6), 422-424. https://doi.org/10.5480/1536-5026-36.6.422

Reason for exclusion: Editorial

Sossong, A. & Poirier, P. (2013). Patient and nurse perceptions of caring in rural United States. *International Journal for Human Caring, 17*(1), 79-85. https://doi.org/10.20467/1091-5710.17.1.79

Reason for exclusion: Missing concept
The concept of digital health technology is missing.

Smyth, D. (2017). Social technology: Helping or hindering communication in care? *International Journal of Palliative Nursing, 23*(11), 523. https://doi.org/ 10.12968/ijpn.2017.23.11.523

Reason for exclusion: Editorial

Stockmann, C., Gabor, O., DiVito-Thomas, P., & Ehlers, C. (2018). The use and intended outcomes of presence: A focus group study. *International Journal of Nursing Knowledge, 29*(1), 59-65. https://doi.org/10.1111/2047-3095.12153

Reason for exclusion: Missing concept
The concept of digital health technology is missing.

Strauss, B. (2013). The patient perception of the nurse-patient relationship when nurses utilize an electronic health record within a hospital setting. *CIN: Computers, Informatics, Nursing, 31*(12), 596-604. https://doi.org/10.1097/CIN.0r000000000000014

Reason for exclusion: Wrong population
The study focuses on patients' perceptions.

Strekalova, Y., Krieger, J., Kleinheksel, A. J., & Kotranza, A. (2017). Empathic communication in virtual education for nursing students: I'm sorry to hear that. *Nurse Educator, 42*(1), 18-22. https://doi.org/10.1097/NNE.0000000000000308

Reason for exclusion: Wrong concept
Discusses strategies adopted by nursing students to communicate empathically.

Strudwick, G., Impey, D., Torous, J., Krausz, R. M., & Wiljer, D. (2020). Advancing e-mental health in Canada: Report from a multistakeholder meeting. *JMIR Mental Health, 7*(4), e19360. https://doi.org/10.2196/19360

Reason for exclusion: Meeting archive

9th Annual Canadian E-Mental Health Conference meeting.

Su S., Mallapaty A., & Shih J. A. (2018). Increasing provider use of patient-centered EMR behaviors in a quality improvement project. *Journal of Allergy and Clinical Immunology, 141*(2 Supplement 1): AB268

Reason for exclusion: Wrong population

The population is providers and not specifically nurses.

Tantacharoenrat, C., Prasopkittikun, T., Rungamornrat, S., & Limprayoon, K. (2018). Use of a user-friendly tablet application to communicate with pediatric patients on mechanical ventilators. *Aquichan, 18*(3), 275-286. https://doi.org/10.5294/aqui.2018.18.3.3

Reason for exclusion: Missing concept

The concept of compassion is missing.

Thorup, C. B., Bundgaard, K., & Pedersen, P. U. (2019). Transformation of health professional/patient caring relationships through information and communication technologies used in telemedicine: a scoping review protocol. *JBI Database of Systematic Reviews and Implementation Reports, 17*(4), 470-478. https://doi.org/10.11124/JBISRIR-2017-003661

Reason for exclusion: Wrong study design

Abstract was missing at the first stage of screening. A protocol for scoping review.

Tunlind, A., Granström, J., & Engström, Å. (2015). Nursing care in a high-technological environment: Experiences of critical care nurses. *Intensive & Critical Care Nursing, 31*(2), 116-123. https://doi.org/10.1016/j.iccn.2014.07.005

Reason for exclusion: Wrong technology

Discusses nurses' experiences of using medical technologies (dialysis machines, pumps, cardiac monitors, invasive catheters etc.) in intensive care units - considering high-tech devices as a barrier to patient-centered care.

Ujhely G. B. (1974). Current technological advances and the nurse-patient relationship. *Journal of the New York State Nurses Association, 5*, 25-28

Reason for exclusion: Wrong outcome

Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

van der Cingel, M. (2010). Compassion in nursing practice, the significance for older persons with a chronic disease...Fourth European Nursing Congress. *Journal of Clinical Nursing, 19*, 112

Reason for exclusion: Missing concept
The concept of digital health technologies is missing.

Winstanley, H. D. (2014). How to bring caring to the high-tech bedside. *Nursing, 44*(2) 60-63. https://doi.org/10.1097/01.NURSE.0000437472.15004.42
Reason for exclusion: Editorial piece

Yesenofski, L., Kromer, S., & Hitchings, K. (2015). Nurses leading the transformation of patient care through telehealth. *JONA: The Journal of Nursing Administration, 45*(12), 650-656. https://doi.org/10.1097/NNA.0000000000000279
Reason for exclusion: Wrong outcome
Discusses administrative, regulatory, legal concerns and agreements for using telehealth.

Yu, P., Zhang, Y., Gong, Y., & Zhang, J. (2013). Unintended adverse consequences of introducing electronic health records in residential aged care homes. *International Journal of Medical Informatics, 82*(9), 772-788. https://doi.org/10.1016/j.ijmedinf.2013.05.008
Reason for exclusion: Wrong outcome
Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Yurkovich, N. J. & Hawthorne, D. (1995). Are science and caring compatible? *Canadian Nurses, 91*(11), 49
Reason for exclusion: Commentary

Retrieved from ProQuest Dissertations and Theses (n = 15 dissertations and theses)

Austin, S. I. (1997). *Self-reported competency in performance of computer literacy skills for nursing among baccalaureate nurse educators and self-reported integration of these skills into the curriculum through teaching practice.* https://search.proquest.com/docview/304350326
Reason for exclusion: Wrong outcome
Discusses various aspects of using computers in the healthcare settings; does not discuss the impact on nursing care practices.

DeFazio, J. (2018). *Teaching compassionate care: Nurse educators' perspectives.* https://search.proquest.com/docview/2043510748
Reason for exclusion: Wrong technology
Technology is not specifically identified as digital health technology.

Grant, J. L. (2003). *A question of balance: Ethical dilemmas for nurses.* https://search.proquest.com/docview/305241210
Reason for exclusion: Wrong outcome
Discusses various aspects of using technology in the healthcare settings; does not discuss the impact on nursing care practices.

Lohri-Posey, B. S. (1996). *Student nurses' lived experiences as compassionate healers to suffering patients.* https://www.elibrary.ru/item.asp?id=5591734

Reason for exclusion: Missing concept

The concept of digital health technology is missing.

Maniscalco, J. R. (2012). *Promoting patient centered technology for immunization records: Educational resource pamphlet for adults*

Reason for exclusion: Missing concept

The concept of providing compassionate care is missing.

Mathew, A. (2017). *Senior nursing students' description of caring from their experience: A qualitative research.* https://search.proquest.com/docview/1880564223

Reason for exclusion: Missing concept

The concept of providing compassionate care in the context of digital health technologies is not discussed.

Mays, R. J. (2012). *Can compassionate care be documented in the electronic medical record?* https://search.proquest.com/docview/1330669085

Reason for exclusion: Wrong outcome

Discusses various aspects of using EMR in the healthcare settings; does not discuss the impact on nursing care practices.

McDonald, P. (2000). *Nurse practitioners' perceptions of caring*

Reason for exclusion: Missing concept

The concept of digital health technologies is missing

Nasseri, L. (2015). *Using telehealth as a vehicle to explore nurses' professional identities: A qualitative exploratory study.* https://pdfs.semanticscholar.org/56fa/729590a92643948ebb80efdfdbe330435d27.pdf?_ga=2.225985818.1449226932.1595309728-877567405.1590163396

Reason for exclusion: Missing concept

The concept of compassionate care is missing

Peters, M. A. A. (2003). *Compassion: An investigation into the experience of nursing faculty.* https://doi.org/10.20467/1091-5710.10.3.38

Reason for exclusion: Missing concept

The concept of compassionate care is missing

Pucino, C. L. (2013). *Understanding the transformation of compassion in nurses who become patients.* https://etda.libraries.psu.edu/files/final_submissions/8716

Reason for exclusion: Missing concept

The concept of compassionate care is missing

Threatt, R. M. C. (2017). *Incorporating caring competencies in the academic setting through simulation.* https://search.proquest.com/docview/1914681570

Reason for exclusion: Wrong technology

Technology is not specifically identified as digital health technology

Waidley, E. K. (2019). The importance of patients' perceptions of technology: Reminders for nursing care delivery. *The Journal of Continuing Education in Nursing, 50*(6), 263-267. https://doi.org/10.3928/00220124-20190516-06

Reason for exclusion: Wrong population

The study focuses on patients' perceptions.

Walker, M. S. (2020). *The experiences and expressions of compassion among experienced critical care nurses.*

Reason for exclusion: Missing concept

The concept of compassionate care is missing.

Young, A. A. (2015). *Exploring the concept of compassion in nursing: A qualitative study.* https://search.proquest.com/docview/1669973838

Reason for exclusion: Missing concept

The concept of compassionate care is missing.

Appendix E

Extraction of Included Records

Qualitative Studies

1. Author/ Year/ Title/ Country	**Barbosa & Silva (2017)** **Nursing care by telehealth: What is the influence of distance on communication?** **Brazil** **Source: Databases**
Study aim	To evaluate the perception of nurses regarding interpersonal communication while providing care via telehealth.
Method	A descriptive and qualitative study supplemented by interview using a questionnaire comprising of open questions (7 interviews)
Population	Nurses working in telehealth for at least six months (n=7)
Setting	Hospitals providing telehealth services
Core Concepts; Definitions; Attributes (as identified by the study author)	Care involves harmonizing interpersonal relationships, transforming environments, and respecting the socio-economic and cultural differences of people. Nurse-patient communication - A complex process of understanding and sharing both sent and received messages, since the content of these messages as well as the way in which they are received, influences the present and future behaviors of the nurse and patient.
Technology used	Telehealth - A communication tool for nurse
Key findings	Four categories emerged: Category 1: Understanding the importance of communication Sub-category 1: Proper communication (A basis for quality in healthcare in order to avoid errors of conduct) Sub-category 2: Identifying communication barriers (Factors that hinder the communication process) Category 2: Interpersonal relationship interfering with communication - (Factors that together are essential for good communication, such as: personal affinities; understanding the importance of teamwork; willingness to communicate; trust; and prior acquaintance with other healthcare professionals) Category 3: Communicating through technology Sub-category 1: Technology makes it easy to practice (Ease that technology has brought to their daily practice) Sub-category 2: Understanding the factors that hinder distance communication (Such as slow internet, lack of knowledge regarding this technology among

	patients, difficulty to convey confidence or even safety at a distance, and belief that the distance itself hinders interactions) Sub-category 3: Identifying non-verbal signs by using telehealth (Signs that could complement verbal communication) Category 4: Learning the communication process Sub-category 1: The importance of learning verbal and non-verbal communications (Identifying the learning needs for the communication process) Sub-category 2: Learning the importance of telehealth
Strategies / implications	Professional trainings on: Understanding of the communication process in the context of new technologies Acquiring interpersonal communication skill Enhancing interpersonal relationships Understanding non-verbal signals with the use of tele-healthcare Strategies to overcome communication barriers encountered in "at a distance" environment

2. Author/ Year/ Title/ Country	**Barrett (2016)** **Rethinking presence: A grounded theory of nurses and teleconsultation** **United Kingdom** **Source: Databases**
Study aim	To develop a theory that offered an evidence-based insight into the use of teleconsultation by nurses.
Method	A constructivist grounded theory method supplemented by semi-structured interviews (17 interviews) and memo-writing
Population	Nurses (manager, specialists, staff nurses, charge nurses, project support nurse, teleconsultation nurses, senior critical care nurses) with the experience of using teleconsultation
Setting	Various clinical areas in hospitals or clinics
Core Concepts; Definitions; Attributes (as identified by the study author)	Care in teleconsultation - The use of video to facilitate real-time, remote interaction between practitioners and patients Nurse-patient interactions - Creating a channel of communication Video-mediated communication
Technology used	Teleconsultation via Skype, FaceTime in clinical areas

Key findings	Core category identified was 'Nursing Presence' Four subcategories of nursing presence were identified: Operational Presence - Provision of operational, organizational, technical support Clinical Presence - Performance of clinical roles including specific tasks, objectives and activities associated with direct patient-focused care Therapeutic Presence - Provision of reassurance and support, development of the nurse-patient relationship, recognizing and responding to non-verbal cues, offering comfort and reassurance to patients and Social Presence - Being with the patient , social interaction Three influencing factors were identified to achieve presence: Enablers - influencing factors acted upon the ability and extent to achieve nursing presence e.g. value of sight Constraints - Elements that limited the degree of presence that nurses can offer e.g. technical failures. Compensation - Strategies put in place by nursing staff or others to mitigate the constraints of teleconsultation and optimize the degree of presence delivered. e.g. education for staff, patient and care givers, and the enhanced frequency of interaction facilitated by teleconsultation.
Strategies/ implications	Developing understanding of teleconsultation is required with particular emphasis on how presence develops during single interactions or over a period of time. Trainings on enhancing compensation strategies to optimize the quality and value of interaction

3. Author/ Year/ Title/ Country	**Curtis & Brooks (2020)** **Digital health technology: Factors affecting implementation in nursing homes.** **England** **Source: Hand search of reference lists**
Study aim	To identify the factors that enable nurses to implement digital health technology in nursing homes and to co-design a nurse-led stepped process supporting the effective implementation of digital health technology innovations in nursing homes.
Method	An appreciative inquiry research methodology supplemented by loose conversational interviews (20 interviews)
Population	Nursing home managers and nurses n=20
Setting	Five nursing homes

Core Concepts; Definitions; Attributes (as identified by the study author)	Humanized care - Placing the patient at the center of care and including compassion as the core element. Person-centered care - Encouraging people to participate actively in managing their health and provide access to health information.
Technology used	Handheld devices- Smartphones and tablets
Key findings	Three broad themes emerged: Improving communication - Access to patients' information improves the efficiency and accuracy of internal and external communications. Engaging with digital health technology and retaining humanized care - The use of effective digital health technology to enhance personalized care that would encourage staff to support digital innovation. Introducing digital health technology and protecting data security - Successful digital health technology implementation would enhance the quality of nursing care, provided that the introduction process, cost, security, and management were all carefully considered. Formulation of the LAUNCH (Leadership of digitAl health technology Uptake among Nurses in Care Homes) process model - a nurse-led, stepped approach supporting digital health technology implementation in nursing homes. The process involves three steps; launching digital health technology, sustaining engagement, and transforming care.
Strategies / implications	Improvements in digital health technology implementation rely on factors such as Effective staff training - Training nursing home staff to use DHT was regarded as essential in the transition from paper-based to digital systems, with training tailored to individual staff's needs. Supplier support - DHT suppliers could provide 24/7 support to nursing homes in various formats, such as troubleshooting guides, telephone helplines and fast-response emergency visits. Data security measures - Introducing data security measures with the implementation of digital health technology to enhance the quality of nursing care, provided that the introduction process, cost, security, and management were all carefully considered.

4. Author/ Year/ Title/ Country	**Gaudet (2016)** **Electronic documentation and nurse-patient interaction** **United States** **Source: Databases**

Study aim	To describe nurse-patient interactions as demonstrated in verbal and nonverbal reciprocal communication and to explore the nurses' beliefs about bedside electronic documentation and interacting with their patients.
Method	A micro-ethnography supplemented by passive participant observation (24 observations), audio-taping of nurse-patient interactions, and informal, semi-structured interviews with nurses (2 interviews).To support data analysis, The Theory of the Dynamic Nurse-Patient Relationship was applied as an organizing framework.
Population	Registered Nurses (n=14)
Setting	Three units in an urban academic, research, and teaching, health care facility
Core Concepts; Definitions; Attributes (as identified by the study author)	Nurse-patient interaction-The relationship established between the nurse and patient through verbal and non-verbal communication. Patient-centered care-Humanizing care that meets the patient's needs
Technology used	Electronic medical record including electronic documentation
Key findings	Nurses acknowledged that they need to share their attention between the patient and the computer. They stated that prioritizing patients' needs while completing the required electronic documentation was demanding. The 3 themes are summarized as "interruptions," "a game of tag," and "machine-like interactions."
Strategies / implications	Understanding the adaptation of caregiving necessitated by electronic documentation will have a positive impact on developing systems that interface seamlessly with nurses' workflow and encourage patients' active participation in their care.

5. Author/ Year/ Title/ Country	**Jones & Richards (2013)** **The impact of nursing students' use of electronic health records in the home settings** **United States** **Source: Databases**

Study aim	To explore the perceptions of senior undergraduate nursing students and perceptions of home care clients regarding the use of a new electronic health record and its impact on client care and communication.
Method	A qualitative exploratory study design supplemented by survey (20 respondents) comprising of 5-point Likert scale items and open-ended questions
Population	Senior-level undergraduate nursing students (n=20)
Setting	Home care settings
Core Concepts; Definitions; Attributes (as identified by the study author)	Nurse-client communication: An interaction between the nurse and client to enhance the provision of client-focused nursing care. Client-focused nursing care - Providing nursing care based on the comprehensive client assessment findings.
Technology used	Electronic health record
Key findings	Providing students with the opportunity and time to become familiar with the use of computers during client care in the educational environment allows them to move more comfortably from a computer-focused visit to client-focused nursing care.
Strategies / implications	The academic EHR could fill the gap in learning to better prepare the students for meeting the market needs and to be successful in healthcare

6. Author/ Year/ Title/ Country	**Lynott et al. (2012)** **Communication and the electronic health record training: A comparison of three healthcare systems** **United States** **Source: Databases**
Study aim	To explore various health record training programs conducted in different clinical sites
Method	A descriptive focused ethnographic approach supplemented by participants' observations
Population	Nurses attending trainings in different clinical sites (exact number of participants no mentioned)

Setting	Five different clinical sites such as primary care and ambulatory care settings
Core Concepts; Definitions; Attributes (as identified by the study author)	Patient-provider communication: A connection maintained between the nurse and the patient through good communication
Technology used	Electronic health record
Key findings	Only one health system had formalized communication training in their class, the other two systems emphasized only the software and data aspects of the HER
Strategies / implications	Current health systems training is not standardized and does not incorporate content regarding communication with the patient. Better models of training-education need to be established, with the almost universal usage of EHRs in primary care settings. Communication trainings in EHR could be the part of primary care nurse practitioner education programs.

7. Author/ Year/ Title/ Country	**Marchesoni et al. (2017)** **Technologies in older people's care: Values related to a caring rationality** **Sweden** **Source: Databases**
Study aim	To interpret values related to care and information communication technologies connected to the practice of good care
Method	A qualitative descriptive and interpretive study using semi-structured interviews (12 interviews)
Population	Staff nurses (n=12)
Setting	Two care facilities for older people
Core Concepts; Definitions; Attributes (as identified by	Care - A relational and societal matter Caregivers-care receiver's interactions without disturbance - a prerequisite for ensuring contentment and satisfaction of the care receivers

the study author)	
Technology used	Smartphone - A personal digital tool used for providing safe and individualized handling of prescribed medications
Key findings	Four values were identified to provide compassionate care: Presence - Focusing on the person behind the illness, making the care receiver content and satisfied, interacting with the care receiver without disturbance, time-releasing technology. Appreciation - Getting approval and appreciation from next-of-kin, being listened to, being seen as someone who can contribute. Competence - Knowing what and how to document, being skilled in non-verbal language, having knowledge in diseases and managing symptoms. Trust - Working without feeling stressed, being able to trust their employer, working in a calm environment, evaluating critically
Strategies / implications	Before implementation of technology, reflectively examine the goal of care that technology hopes to support. Discussions and on-going dialogues on the appropriate choice of technology to improve practices.

8. Author/ Year/ Title/ Country	**Nagel et al. (2017)** **Getting a picture - A grounded theory of nurses knowing the person in a virtual environment Canada** **Source: Databases**
Study aim	To explicate the processes of how nurses come to know the person using RPM, one form of telehealth technology used in a virtual environment
Method	A constructivist grounded theory method supplemented by initial interviews (n=22) + second interviews (n=11) = (n=33), and observational experiences (n=5) along with memoing, freewriting, and methodological notes.
Population	Nurses using RPM in 7 different settings Registered Nurses (n=15) Nurse Educators (n=4) Nurse Managers (n=3)

Setting	Acute care facilities / hospital-based telehealth programs (n=10) Community health agencies (n=11) Tele-health support agency (n=1)
Core Concepts; Definitions; Attributes (as identified by the study author)	Knowing the person was used to reflect an appreciation of a holistic and comprehensive understanding of the individual that transcends physiological and emotional aspects of care and includes broader influences in health, such as social structures, environment, and agency of the person. Patient-centered care - Creating collaborative partnerships with the patient to support the patient's self-management of his or her health condition. Connecting with the person - A blend of interpersonal engagement between nurse and the person, an intact link through technology, and requirements of skill and knowledge to use technology by both the nurse and person.
Technology used	Remote Patient Monitoring (RPM)
Key findings	Getting a picture evolved as the core category to a theoretical conceptualization of nurses. It is regarded as having an image or visualizing the person in a holistic sense. Represent integrated and iterative processes nurses engaged in to develop a contextualized and holistic mental representation of the person. Entering In (Recruiting and admitting to program, Obtaining consent) Connecting with the person (Having a face-to-face, Making the connection [plugging in], Building and maintaining relationships, Being in synch) Sharing and reviewing information (Reading the person, Programming parameters and questions, Collaborating with others, Having faith in the information) Recognizing trends and patterns (Establishing baselines, Comparing and contrasting, Responding to alerts, Doing a recheck) Recording and reflecting (Contextualizing the person, imagining the person, documenting interactions and activities) Putting pieces together over time (Knowing over time, navigating technology) Transitioning out (Transferring care, Discharging from program)
Strategies / implications	Trainings on: Performing activities such as navigation of technology, making inter-personal connections, and developing a mental image for getting a picture of a person Telephone consultation, assessment and decision-making required to develop the necessary skills in telehealth. Advanced preparation of technological know-how, knowing the person, and different communication skills adaptation

9. Author/ Year/ Title/ Country	**Nilsson et al. (2010)** **Swedish District Nurses' experiences on the use of information and communication technology for supporting people with serious chronic illness living at home – a case study** **Sweden** **Source: Hand search of reference lists**
Study aim	To describe two District Nurses' (DN) experiences of using information and communication technology (ICT) to communicate with chronically ill people in their homes.
Method	A qualitative case study design supplemented by semi-structured interviews that were performed before, during and after the implementation of the electronic messaging program
Population	District Nurses (n=2)
Setting	Healthcare centers
Core Concepts; Definitions; Attributes (as identified by the study author)	Caring relationship - A relationship maintained by keeping a balance between simultaneously professional and private with the ill person and their family. Nurse-patient interaction - The interaction between patient and nurse that is central in caring, and mutual interaction is probably no less important when communication occurs via computers. Trusting relationship - To show or ask for trust implies being more open to oneself and to another person, and helping to improve another person's quality of life Knowing the ill person - Ensuring individual care, which includes continuous contact and a sense of closeness in the nurse-patient interaction.
Technology used	Electronic messaging program - A computer program called Rexnet and mobile phones with an internet connection were used. The program comprised different virtual rooms, and enabled the District Nurses to communicate with the ill person through receiving text messages from and sending text messages to the ill person from anywhere
Key findings	Following themes and categories emerged: **Before the implementation of technology:** **Theme 1**- Striving for a trusting relationship **Category 1** - Mediating of security through interaction - To make the ill person feel secure, and **Category 2** - Working for accessibility - Nurses striving to become accessible to the patients

	After the implementation: **Theme 2**- Achieving a more trusting relationship **Category 1**- A facilitator for nursing care - Being accustomed to ICT in order to facilitate the nursing care. **Category 2** - Increased accessibility - A more direct form of communication with the ill person by using ICT, presenting a more realistic view of the situation and eliminating the second-hand information given by others
Strategies / implications	The technology could be clinically appropriate and that the users could be given proper training and support Assisting nurses with the use of Information and Communication Technology by providing support for technical problems.

10. Author/ Year/ Title/ Country	**Nixon (2015)** **Perceptions of nurses using mobile devices at the bedside** **United States** **Source: ProQuest Dissertation and Theses**
Study aim	To explore lived experiences of nurses who use mobile devices at the bedside
Method	A qualitative hermeneutic phenomenological study supplemented by semi-structured face-to-face interviews (20 interviews) and field notes.
Population	Registered Nurses (n=20)
Setting	Medical-surgical units of 2 large urban hospitals
Core Concepts; Definitions; Attributes (as identified by the study author)	Nurse-patient relationship - Maintaining the human connection between the nurse and the patient Relationship centered care - A care model using a holistic approach to create a trusting relationship between the nurse and the patient Quality nursing care - Providing quality care to patients including hands on care, thoughtful care, and compassion. This also includes communicating with families as well as other caregivers or patient advocates.
Technology used	Mobile devices - Technologies which allow instant, secure, and remote access to care providers when needed to review patient information such as mobile computers, iPads, and iPhones
Key findings	Five themes emerged: Theme 1: Recognize benefit to patient (Focused on identifying the benefits of using mobile devices to provide patient care) Subcategories - Better access to information and Increased mobility for nurses Theme 2: Improve workflow (Improving nurse's workflow with the use of mobile devices)

	Theme 3: Support use of mobile devices (Supporting the use of mobile devices to deliver care) Theme 4: Recognition of disadvantages (Identifying disadvantages of using mobile devices such as insufficient speed of mobile technology, potential to breach confidentiality etc.) Theme 5: Anticipated advances in technology (Impact of mobile technology on the provision of care)
Strategies / implications	Using mobile devices to deliver care should be incorporated into nursing curriculum Educating nurses on: The benefits of using mobile devices The sociotechnical systems which are used within work settings to perform various technological functions to accomplish goals and objectives within the organization [A sociotechnical work system consist of personnel subsystems that interact with technological subsystems. The technological subsystem consists of tools and software which perform the work]. Training nurses on: The use of mobile devices prior to working in hospital settings.

11. Author/ Year/ Title/ Country	**Pors (2018)** **Digital displacements in patient-professional relations - Four modes of organizational patient involvement** **Denmark** **Source: Databases**
Study aim	To examine the relational consequences of electronic patient records based on co-produced data from pregnant women's IT supported self-reporting. The analysis unfolds how the clinical encounter between patient and midwife is reconfigured in the digitized society.
Method	A grounded theory analysis based on observations, interviews (15 interviews), and field notes
Population	Midwives (n=15)
Setting	Antenatal care unit
Core Concepts; Definitions; Attributes (as identified by the study author)	Patient-centered healthcare - The involvement of patients in their own care Patient-professional relationship - The sharing of information between the patient and professional (midwife)

Technology used	Electronic patient records
Key findings	The use of technology and co-produced data displace tasks and relations between healthcare professional and patient. The analysis shows that four modes of organizational patient involvement are enacted: 1) **Involvement in administrative tasks** - Involving the patient through traveling tasks for the medical record is partly being distributed to the patient. 2) **Involvement in professional resistance** - The midwives enjoy not having to spend their scarce consultation time on these rather mundane administrative tasks that take time from the important work of establishing a relationship with the pregnant woman. 3) **Individualized involvement: T**he midwives often turn the screen toward the patient, so that the patient can approve the information registered. Moreover, the midwives express that they have the impression that the patients enjoy making a contribution and want to get involved: 4) **Homogenized involvement** of patients that tends to categorize the pregnancy roughly as either "normal" or "abnormal.": The act of showing (acknowledgement) is connected to the task of strengthening the individualized and personalized encounter.
Strategies / implications	Training related to the provision of effective nursing care with the use of technology

12. Author/ Year/ Title/ Country	**Sävenstedt et al. (2004)** **Being present in a distant room: Aspects of teleconsultations with older people in a nursing home** **Sweden** **Source: Hand search of reference lists**
Study aim	To elucidate qualities in the communication in the professional encounter between nurses and elders assisted by nursing staff in the teleconsultations.
Method	A phenomenological hermeneutic method supplemented by interviews (Registered Nurses, n=2, and Nursing Staff, n=5)
Population	Registered Nurses (n=5) and Nursing Staff (n=15) who were most experienced in using the technical equipment
Setting	Registered Nurses were at a distance from older people in a nursing home

Core Concepts; Definitions; Attributes (as identified by the study author)	Telecare - Use of modern communication technology that facilitates interactive communication at a distance between care providers and care receivers Presence - An important concept for understanding the meaning of caring conversations Telepresence - The subjective experience of being together with a person in one place when one is geographically situated in another (Knudsen, 2002) Teleconsultations - A glimpses of the experience of being in the other's room with a feeling of providing nursing presence.
Technology used	Teleconsultations
Key findings	Following themes and subthemes were identified: Theme 1: Promoting aspects of presence at a distance (Feelings of high intersubjectivity and feelings of "being with" each other) Subtheme 1: Promoting an atmosphere of security (Feelings that were connected to their ability to be in control of and manage the videophones, as well as knowing and being at ease with the person with whom they were communicating) Subtheme 2: Being familiar (Ability of the staff to create an atmosphere of togetherness with the patient, as well as his or her ability to use the unfamiliar technical equipment in the familiar environment of nursing home) Subtheme 3: Experiencing transparency (A sense of presence and reality in the communication, even though it is mediated through technical devices. The aspects of transparency may include hearing, quality of sound, quality and size of picture) Subtheme 4: Being interested (Discussing the topics of patients' interests) Theme 2: Perceiving presence at a distance (A glimpses of feelings of physically being in the other's room and as glimpses of feelings of having inter-subjective relations with actors in the communication triad) Subtheme 1: Being connected in a triad (Establishing contact with a person at the other end, knowing that that person had recognized your presence as a person who is communicating with you) Subtheme 2: Being attentive (The provision and experience of attention that is connected to perceiving presence) Subtheme 3: Being in the other room (The experiences of glimpses of being in the same room as the person at the other end) Subtheme 4: Being close over time (Developing emotional ties, acquiring a deeper knowledge of each other's personal life, and sharing experiences beyond the issues of the professional encounter) There is a relation between the concept of telepresence and nursing presence. This relation seems to mean that the better the experience of telepresence in teleconsultations is, the more likely it is that nursing presence can occur. With

	familiarity, safety, transparency, and interest, it is possible to achieve nursing presence in teleconsultations with elders.
Strategies / implications	Well-equipped technology with the spatial dimensions could increase the experience of presence in the other room compared to other media of remote communication

13. Author/ Year/ Title/ Country	**Tuxbury (2013)** **The experience of presence among telehealth nurses** **United States** **Source: Databases**
Study aim	To gain knowledge about the ways that nurses experience presence during interactions with patients using telehealth technology
Method	A qualitative descriptive design supplemented by semi-structured interviews (6 interviews) and field notes
Population	Registered Nurses (n=6) with at least 1 year of experience using telehealth technology and working in telehealth
Setting	Three home care agencies that utilized telehealth technology
Core Concepts; Definitions; Attributes (as identified by the study author)	Presence - A reciprocal flow of openness in the dialogue between a nurse and a patient Humanistic nursing - "Being-there-for and being-there-with" relationship that may exist between a nurse and a patient Nurse-patient interactions - A step-wise process of communication between a nurse and patient. These steps may include call, response, choosing, meeting, and relating.
Technology used	Nonvideo telehealth technology
Key findings	The preceding steps of call, response, meeting, choosing, relating, and presence were identified to demonstrate presence during interactions via non-video telehealth technology. Call - Either the nurse or the patient may initiate the call Response - For a call-and-response dialogue to occur, the call made by one of the persons must have a response made by the other person Choosing - Both the person choose to participate in the dialogue Meeting - The beginning of the act of nursing Relating - Open, available, and knowable to each other

	Presence - The highest form of the call-and-response dialogue, fostering connections between the nurse and patient that extend over time
Strategies / implications	Training on the identification and analyzation of steps that could be adopted in telehealth nurse-patient interactions.

14. Author/ Year/ Title/ Country	**Varghese & Phillips (2009)** **Caring in telehealth** **United States** **Source: Databases**
Study aim	To explore and describe the perceptions of advanced practice nurses (APNs) about caring while providing primary care using telehealth technology.
Method	A naturalistic inquiry methodology supplemented by semi-structured interviews (13 interviews)
Population	Advanced Practice Nurses (n=13) providing primary care using telehealth technology
Setting	Various primary healthcare units such as family medicine, geriatric, pediatric, psychiatric, and oncology
Core Concepts; Definitions; Attributes (as identified by the study author)	Caring - A central concept of nursing Online presence - Maintaining human-to-human connection through virtual visits
Technology used	Telehealth - Using interactive video, visual, audio, and data telecommunication for healthcare delivery, diagnosis, consultation, treatment, and transfer of medical data.
Key findings	Advanced Practice Nurses conveyed caring to their telehealth patients by : Category 1: Being with them Theme 1: Initiating the process (Mailing patients information about themselves and their organizations prior to the virtual meeting) Theme 2: Listening to their patients (Attempting to hear what patients are saying) Theme 3: Communicating with them (Verbal and non-verbal conversations between the APNs and their patients through the medium of telehealth technology)

	Theme 4: Staying connected (A process used to extend connection beyond the time and space of virtual visit e.g., mailing out information, calling and following up with patients) Category 2: Personifying the images (The caregiver and the patient appear to each other as images interacting in a screen) Category 3: Possessing certain attributes (The qualities of APNs necessary to promote caring in telehealth such as Honesty (Telling the truth about a situation) Dependability (Fulfilling the promises made with the patients) Competence (Ability to identify and manage patients' needs) Empowerment (Educating patients about their disease process and the measures to manage their situations) Intentionality (Investing extra efforts to boost the effects of the strategies to provide care) The major constructs that emerged from the data formed a model of how APNs conveyed caring in telehealth practice by a) being with their patients, and b) personifying their patients' images; and c) having certain characteristics that helped them to convey caring
Strategies / implications	Incorporating knowledge regarding telehealth practices into nursing curricula to prepare nurses for the provision of nursing care via telehealth. Training on effective ways for computer-mediated communication.

15. Author/ Year/ Title/ Country	**Campbell & Rankin (2017)** **Nurses and electronic health records in a Canadian hospital: examining the social organization and programmed use of digitized nursing knowledge** **Canada** **Source: Database**
Study aim	To examine transformations in a professional nurse's work associated with her engagement with a hospital's electronic health record (EHR) which is being updated to integrate professional caregiving and produce more efficient and effective health care
Method	An institutional ethnography supplemented by observational data and interview (1 interview)
Population	Nurse (n=1)

Setting	Patient care unit of the research hospital
Core Concepts; Definitions; Attributes (as identified by the study author)	Nurse-patient interactions - Connections that exist between the nurse and the patient
Technology used	Electronic health record
Key findings	The EHR materializes and generalizes the ruling relations across institutionally located caregivers; its authorized information stabilizes their knowing and acting, shaping health care toward a calculated effective and efficient form
Strategies / implications	Participating in the EHR's practices, nurses adopt its ruling standpoint; a transformation needs more careful analysis and debate.

Quantitative Studies

16. Author/ Year/ Title/ Country	**Gomes et al. (2016)** **Connecting professional practice and technology at bedside** **United States** **Source: Database**
Study aim	To identify the attitudes and beliefs of nurses practicing at the bedside related to the implementation of the EHR and their subsequent ability to integrate professional nursing activities in their practice; - To examine the relationship between amounts of time spent in the patient's room and professional nursing activities; and -To explore whether change had occurred in professional nursing activities and nursing engagement pre- and post-implementation of the EHR.
Design	Quasi-experimental – Interventions/trainings, purposive sampling
Method	Methods included use of an Attitudes and Beliefs Assessment Questionnaire, Nursing Engagement Questionnaire, and Rapid Modeling Corporation's personal digital assistants for time and motion data collection

Population	Nurses (n=81) working 12-hour day-shifts from eight medical-surgical units across four hospitals in two states were included at baseline and about half of those nurses (n = 40) 6 months post EHR implementation from October 2010 through April 2011.
Setting	36 hospital medical-surgical units within 17 health systems across 15 states
Core Concepts; Definitions; Attributes (as identified by the study author)	Human-to-human caring practices (Caritas Processes) - to foster communication and interactions between the nurse and the patient, which, in turn, promotes authentic emotional support, decreases anxiety, and facilitates healing. Patient-centered care - Individualizing care as per the patient's unique needs. Relationship-based caring - Practices adopted to enhance relationship-based caring behavior categories
Technology used	Electronic Health Records - A digital health tool to improve patient safety and satisfaction while lowering the cost of care.
Description of interventions or control conditions (For experimental studies - may not be mentioned in few studies)	Trainings consisted of online modules, in-person classroom, practice in a non-live environment, and passing basic proficiency tests.
Outcome variables (if different from core concepts)	----
Conceptual framework / theory / model	Watson's THC and the Relationship-Based Care model, and the Theory of Planned Behavior (TPB) was used to guide this study
Key findings	A significant difference in normative belief between nurses with less than 15 years' experience and nurses with more than 15 years' experience ($t21 = 2.7$, $P = .01$).

	Nurses spent less time at the nurses' station, less time charting, significantly more time in patients' rooms and in purposeful interactions, time spent in relationship-based caring behavior categories actually decreased in most categories. Nurses' engagement scores did not significantly increase.
Strategies / implications	Identifying potential factors related to electronic health record deployment that could create shifts in nursing time spent across care categories. Identifying ways to spend more time on relationship-based caring behaviors (listening to patient, being with patient, patient priority, planning care, caring environment, emotional support, spiritual support).

17. Author/ Year/ Title/ Country	**Duffy et al. (2010)** **Point of care documentation - Impact on the nurse patient interaction** **United States** **Source: Database**
Study aim	To understand if EMR documentation has led to a decrease in appropriate eye contact and verbal communication with patients
Design	Experimental – Effectiveness of electronic documentation, population was randomly selected
Method	The simulation team reviewed the videotape from the nurse-patient interaction to determine where the nurse focused his/her attention during the encounter. Using a stopwatch the team timed where the nurse focused his/her eyes during the encounter using the categories of on the patient, on the electronic record, or on some other device in the room. In addition, the team measured the time the nurse spent verbally communicating with the patient.
Population	Registered Nurses (n=24) have previous experience with training in a simulated environment
Setting	23-hour admissions unit, a rehabilitation unit, and a general medical unit of a teaching hospital
Core Concepts; Definitions; Attributes (as identified by	Nurse-patient interaction - The visual and verbal communication between the nurse and the patient. Caring environment - An environment created to enhance the nurses' visual and verbal interactions with patients

the study author)	
Technology used	Electronic medical record
Description of interventions or control conditions (For experimental studies - may not be mentioned in few studies)	The participants were divided into 2 groups. The first group used the POC electronic medical record (15participants) and the group used the paper documentation (9 participants), and both were asked to perform an admission of a patient. The admission process was analyzed to measure the amount of verbal and visual communication between the nurses and the patient in a simulated patient care environment. A simulated medical record was created in our EMR test environment
Outcome variables (if different from core concepts)	------
Conceptual framework / theory / model	------
Key findings	The results showed that although nurses using EMR point-of-care (POC) documentation had longer encounters with patients, they averaged 50% less visual and verbal interaction with their patients than did nurses using paper documentation in the patients' room. EMR POC documentation does have its advantages in patient safety; however, POC documentation also has the potential to impact the nurse-patient relationship by reducing the verbal and visual interactions between the nurse and the patient. The total length of interaction with the patient was different between the EMR POC documentation and paper documentation groups (P = .001). The EMR POC documentation group had a longer average length of interaction than did the paper documentation group, the mean length of interaction was 20.1 and 10.6 minutes respectively, and the median length of interaction was 18.8 and 10 minutes, respectively. The median percentage of looking at the patient was higher in the paper documentation group than in the EMR POC documentation group (54% vs 35%, P = .0292).The median percentage of time talking with the patient was marginally significantly higher in the paper documentation group than in the EMR POC documentation group (43% vs 25%, P =.0613). This pilot study showed that the paper documentation group

	spent less total time interacting with the patient with higher percentage of the time looking at the patient (statistically significant) and talking with the patient (marginally significant), indicating that this group of nurses may develop more of a connection with the patient by looking at them and talking with them for much of their interaction with the patient. To try and assess the potential benefit of a nurse's visual and verbal communication, we asked the patient/actor and a research assistant to review the video tapes and rate their satisfaction with the nurse-patient encounter. The reviewers rated their satisfaction with the paper documentation higher than the nurses documenting in the EMR More than 50% of the nurses in the EMR POC group and 100% of the nurses using paper documentation utilized a block pattern of interaction with the patient. In these encounters, nurses would focus on the patient and engage the patient in conversation for a period of time and then refer to the medical record to document information, check the admission checklist, or process information from the patient.
Strategies / implications	Further research is recommended to explore the impact of EMR POC on the nurse- patient encounter and to identify strategies that will help nurses experience the benefits of EMR POC documentation without the barriers to establishing the nurse-patient relationship.

18. Author/ Year/ Title/ Country	**Johnson et al. (2014)** **Improvement of communication and interpersonal competence in telenursing-development of a self-assessment tool** **Sweden** **Source: Database**
Study aim	To develop a self-assessment tool aiming to raise tele nurses' awareness of their communication and interpersonal competence, and highlight areas in need of improvement.
Design	Nonexperimental
Method	Instrument development, Validation assessment using the method Content Validity Index The process to determine content validity was done in two stages; the development stage and the assessment stage. The development stage started with a literature search. The assessment stage was separated into two phases, assessment by an expert group and assessment and test by tele nurses. The tele nurses also participated in consensus discussions. The thorough development process of the telenursing self-assessment tool was used by tele nurses in order to become aware of their unique communication and interpersonal competence when analyzing their own conversations with patients/callers

Population	Experts (specially trained nurses who operated National Medical Advisory Service 1177) (n=10) and experienced Tele nurses (n=10)
Setting	Telehealth care setting
Core Concepts; Definitions; Attributes (as identified by the study author)	Patient-centeredness - A bio-psychosocial view of the patient's health problem. Communication competence is defined in terms of specific tasks, such as effective questioning skills when interviewing patients
Technology used	Telecommunication including phone calls
Description of interventions or control conditions (For experimental studies - may not be mentioned in few studies)	-----
Outcome variables (if different from core concepts)	A self-assessment tool with 58 items, to be used by tele nurses when analyzing their own communication and interpersonal skills, was developed. The items were sorted into five sections according to the nursing process.
Conceptual framework / theory / model	----
Key findings	A self-assessment tool with 58 items, to be used by tele nurses when analyzing their own communication and interpersonal skills, has been developed. The self-assessment tool helps the tele-nurse to follow the nursing process, to be patient-centered, and it is meant to provide self-direction, feedback, and coaching, as well as create learning opportunities. Ten of the items had a lower S-CVI/Ave value than 08 after the first assessment and were all removed or revised. Due to comments from the experts, other items were also refined or pooled together. After the second

	assessment the S-CVI/Ave was 091, which is above requirement. The S-CVI/Ave as rated by tele nurses for relevance was 085 and 092 for the level of understanding. **The nursing process in telephone advice nursing** **Assessment** Assessment of the patient's health problem, needs and purpose of the call Interviewing the caller Listening to symptomatic signs, such as wheezing Listening to other background sounds **Nursing diagnosis** Determining actual or potential health problems Prioritizing of urgency Prioritizing of the patient's needs Some of the NANDA diagnoses could also be applicable **Setting goals** Decide the desired outcomes of the call For instance, the caller will receive enough knowledge to be able to perform self-care For instance, the caller will go to the emergency department **Planning** Is made in collaboration with the caller, for example how the patient will get to the emergency department **Intervention** Medical information Self-care advice Health education Support Health promotion Mediation of contact with other health care settings Ordering of an ambulance **Evaluation** Making sure that the nurse and caller agree on the plan of action Checking that the caller understands the plan of action Checking the caller's opinion Checking the outcome by follow-up calls **<u>Examples of items from the telenursing self-assessment tool</u>** **Opening the call** Introduces herself/himself clearly by name and title Friendly tone of voice **Listening and assessing** Expresses empathy, for instance through words, voice or intonation Keen to the caller's feelings and confirms or names these Talks about the caller's thoughts/fears/ worries regarding the health problem **Defining diagnosis and goals, planning and intervention**

	Informs and explains according to the caller's needs and wishes Conducts a dialogue with the caller about plausible causes for the health problem Establishes a plan of action together with the caller, which both feel will work **Evaluation and conclusion** Gives clear information about symptoms that the caller should look out for Gives clear information about what the caller should do if the symptoms occur **Overall issues** A friendly demeanor throughout the whole conversation Avoids a paternalistic* attitude
Strategies / implications	Structured analyses of conversations with patients/callers, is one way to increase tele-nurses' awareness of their unique communication and interpersonal competence. The tool can contribute to the development of communication and interpersonal competence in telephone advice nursing. In the future, the self-assessment tool could be developed and used as a scoring instrument by a neutral observer to evaluate communication training and education in the field. Further development of the tool may provide an objective scoring instrument for evaluating communication training and education in the field.

Mixed Method Studies

19. Author/ Year/ Title/ Country	**Misto et al. (2018)** **Nurses' perception of the impact of electronic documentation on the nurse-patient relationship** **United States** **Source: Database**
Study aim	To examine staff nurses' perception of the impact of electronic documentation in the presence of the patient on the nurse-patient relationship
Method	Mixed method study design
Design	A survey (276 respondents) and open-ended interviews (31 interviews) were conducted with novice and expert nurses. Descriptive statistics were used to summarize the demographic information and responses to the survey items. Correlations between the matched positive and negative items were determined. Content analysis was used to analyze the open-ended questions
Population	Registered nurses (n=276) who provided direct patient care and were trained in using the EMR

Setting	Community teaching hospital
Core Concepts; Definitions; Attributes (as identified by the study author)	Nurse-patient interaction - Effective verbal and nonverbal communication between the nurse and patient Nurse-patient therapeutic relationship - Maintaining a connection between the nurse and patient
Conceptual framework / theory / model	-------
Technology used	Electronic medical record documentation
Key findings	Overall scores on the survey ranged from 2.16 to 4.29. Mean scores by content area included communication (M = 3.01), therapeutic relationship (M = 2.92), patient interaction (M =3.081), and flow of care (M = 3.38). The overall mean score of the positive items was 3.04, while the overall mean of the negative items was 2.99. Comparisons of the matched positive and negative items revealed that overall scores were similar. Correlations between the matched positive and negative scores ranged from 2.79 to 5.13; the majority were greater than 3.0 (15 out of 18), and all but 2 were statistically significant. Both novice and expert nurses identified strategies that they used to ensure they were “maintaining the connection” to patients during electronic medical record documentation. 1) **Strategies to maintain the therapeutic relationship:** Avoid turning back to the patient, adjusting the screen to the patient's eye level, sitting right next to the patient to make them feel comfortable and personable. 2) **Learning a different approach:** Pause between questioning and interviewing, to check/inquire if the patient is comfortable, or giving them attention or asking them to expand on an answer helps give them attention. **3) Apologize:** Try to turn to the side of the patient, apologize first and explain the reason for not making direct eye contact the whole time while documenting on a computer screen, and reassure listening. 4) **Documentation, where it happens:** It is preferred not to document in room, to avoid missing the transient twinge and the clues of body language.
Strategies / implications	Strategies for maintaining a connection could be recommended for incorporation in curricula

Discussion Papers

20. Author/ Year/ Title/ Country	**Buckner & Gregory (2011)** **Point-of-care technology - Preserving the caring environment** **United States** **Source: Databases**
Study aim	To improve the safety and quality of care provided through health information technology in the health care system
Population	Nurses
Core Concepts; Definitions; Attributes	Caring - A central focus of the nursing profession Humanized interactions - The individualized interactions to help maintain a caring presence Patient-centered focus - A unique focus on keeping the patient at the center of care
Type of technology used	Mobile communication device **-** The health information technology used at the point of care to enhance the process of nurse and patient interactions
Key findings	Caring behaviors in the technology-rich environment: **Make the most of each interaction opportunity** **Maintain presence** Listen actively Maintain eye contact Give attention to small details Communicate genuine concern **Minimize the impact of technology** Minimize sights and sounds of technology Manipulate physical presence of machine Use humor in an appropriate way to humanize interactions Interact verbally while performing technology-related tasks **Individualize interactions** Give attention to small details Respond to individual preferences Speak to patient when entering room to silence alarms Maintain positive, kind, caring demeanor **Support a caring work environment** Remember that "caring begets caring" Provide personal support to co-workers Focus on teamwork and supportive work relationships **Communicate and "market" technology to patients carefully** Provide careful, understandable explanations for the use of each type of

	technology Address possible patient misperceptions Privacy is guarded Communication is enhanced Increased information available for decision-making Staff do not use for gaming, emails, social media, etc. **Control verbal and nonverbal responses when technology frustrations arise** Sighing Cringing Negative gestures and comments **Attend to physical design features** **Consult nurse informaticists**
Strategies / implications	A supportive work teams, access to technology and information experts, sensitivity training and participation in design processes are going to be essential to the future of nursing practice. Nursing education must continue to prepare students for the technology driven practice settings of modern health care. with the emphasis for keeping patient at the center of care. Students should be provided increasing opportunities to practice these behaviors using simulation. Simulation allows students to practice documentation and communication skills simultaneously and gives an opportunity for students to practice decision making, critical thinking, and problem solving. Nurse educators need more resources for simulation including the increased financial and staff resources needed to design, conduct, and debrief simulation events. Electronic medical record systems that are both realistic and practical for educators must also be more readily available and cost-effective.

21. Author/ Year/ Title/ Country	**Nagel et al. (2013)** **Knowing, caring, and telehealth technology - Going the distance in nursing practice** **Canada** **Source: Database**
Study aim	To illuminate the dynamic and evolving nature of nursing practice in relation to the use of telehealth and to highlight gaps in nursing knowledge specific to knowing the person in a virtual environment

Population	Nurses
Core Concepts; Definitions; Attributes	The concept of knowing both in the context of how the nurse comes to integrate knowledge into professional practice and how the nurse comes to appreciate the uniqueness of persons receiving care. Caring - A central tenet of nursing practice Nurse-client relationship - An authentic connection between the nurse and person
Type of technology used	Telehealth and telecommunications via remote patient monitoring, videoconferencing, mobile communication devices
Key findings	Telehealth technology provides a medium to mutually exchange information between the person and the nurse, however, the degree and depth to which communication can be shared varies greatly from one form of telehealth technology to another. The modality of telehealth technology plays a significant part in determining what the nurse can "see" of the patient. The nurse has the capacity to control therapeutic use of Self, and to use knowledge and expertise to modulate knowing and caring in a given situation, and could use these same qualities in a virtual environment
Strategies / implications	With the increasing use of telehealth technology the nurses might seek to re-examine the degree to which a person needs to be known, or what aspects of the person needs to be known, to provide care. Adaptation of telehealth technology to nursing practice necessitates the acquisition of requisite knowledge, skills, and aptitude to successfully transform this modality of practice into appropriate, effective, and safe means of health care delivery. Compelling reasons for nurses to actively engage in knowledge development to support integration of telehealth technology into nursing practice may include: (a) Necessity to illustrate the capacities in which nurses come to know the person through technology, as current perceptions of nursing care are based largely on traditional ideological, philosophical and theoretical ideals of knowing; (b) Expansion of the body of nursing knowledge related to use of telehealth technology in the delivery of nursing care to both demonstrate utility of technology and to inform competency development in nursing practice. (c) Generation of empirical evidence in relation to nursing values and contemporary contexts of healthcare delivery, to inform development of policies governing use of telehealth technology, guide education of future nurses, and enlighten the public on the dynamic evolution of the nursing role.

22. Author/ Year/ Title/ Country	**Rentmeester (2018)** **Heeding humanity in an age of electronic health records: Heidegger, Levinas, and Healthcare** **United States** **Source: Databases**
Study aim	To adopt and demonstrate meaningful use of electronic health records.
Population	Nurses
Core Concepts; Definitions; Attributes	Nurse-patient interactions - The interactions between the nurse and patient to establish an interpersonal relationship Humanistic connection - A direct connection with another person on an ethical level requires face-to-face contact, as such contact establishes a link between the individual qua individual, and not simply as just another person
Type of technology used	Electronic health records
Key findings	Three rules of thumb can be utilized to heed the humanity of patients during nurse–patient interactions. First and foremost, nurses should spend the first few minutes with their patients without any electronic mediation whatsoever to allow the ethical relationship to form. This goes against the current all-too-common tendency of getting the templated questions out of the way first and then moving on to the real purpose of the visit. Second, when integrating electronic devices be sure to maintain eye contact as much as possible as this is a key ingredient in making an empathetic connection to a patient. This takes a certain skill on the part of nurses and likely requires training, but if nurses are committed to establishing the ethical environment of the work setting, then such training should be welcomed. At last, nurses should show patients portions of their EHRs, if appropriate, to avoid a sense of alienation on the part of the patient. This establishes a sense that the computer is there to aid in the process for both the nurse and the patient, as opposed to being merely a technological instrument devoted exclusively to accuracy and efficiency on the part of the nurse.
Strategies / implications	The three rules of thumb for nurses could be a starting point to maintain respect for patient dignity with the use of electronic devices.

23. Author/ Year/ Title/ Country	**Spencer & Lunsford (2010)** **Electronic documentation and the caring nurse-patient relationship** **United States** **Source: Databases**
Study aim	To discuss the use of simulation as a means to incorporate electronic documentation into the caring nurse-patient relationship.
Population	Nursing Educators
Core Concepts; Definitions; Attributes	Caring behaviors - The behaviors demonstrated by nurse to facilitate the nurse-patient relationship and promote healing. Nurse-patient interaction - Nurses' interactions with patients for the purpose of exchanging information, discovering something, or building a relationship; while a collaborative interchange is characterized by complex, interdependent work toward a mutual goal.
Type of technology used	Electronic point-of-care documentation
Key findings	Electronic documentation at the point of care can enhance the caring nurse-patient relationship by improving communication and access to information and ultimately streamlining documentation to allow nurses to spend more time with patients. Nurse educators could adopt simulation techniques in nursing curriculum. The simulation techniques could enhance caring communication, information access, and time-saving elements among nursing students.
Strategies / implications	Educators must find creative ways to weave information management and high-tech documentation into crowded nursing program curricula, while promoting a focus on the caring nurse-patient relationship. Simulation scenarios provide the opportunity for students to engage in a scripted human interaction that can then be linked to human experiences with healthcare.

24. Author/ Year/ Title/ Country	**Sandelowski (2002)** **Visible humans, vanishing bodies, and virtual nursing: Complications of life, presence, place, and identity** **United States** **Source: Databases**
Study aim	To explore place and presence in telenursing

Population	Nurses
Core Concepts; Definitions; Attributes	Caring - A behavior enhanced by attentive gaze, heart-felt listening, and comforting touch. Presence - Just being there or fully available to patients Telepresence - The feeling that we (nurse and patient) are together
Type of technology used	Telecommunications and computer-mediated technologies used for telephone conversations and videoconferencing
Key findings	Telenursing practices eliminate the proximate body as the primary channel of communication. As telephone incline users toward interactions involving the communication of information, nurses must work around the telephone to convey the fullness of attentive care. Nurses have an interest in determining how tele-technologies can be used to maximize health benefits and to enhance the felt presence of the nurse, but they also have an interest in understanding how these technologies can undermine the presence of the nurse.
Strategies / implications	Tele-health practices not only call for nurses to reconceptualize presence, place, and human bodies in nursing, but also to explore how these practices could be improved to provide nursing care.
25. Author/ Year/ Title/ Country	**Foster & Hawkins (2004)** **The therapeutic relationship: Dead or merely impeded by technology?** **Canada** **Source: Databases**
Study Aim	To explore the requisite knowledge and skills competences essential for the formation of the therapeutic relationship
Population	Nurses
Core Concepts; Definitions; Attributes	Therapeutic relationship - It is not merely an intellectual activity, but rather is dependent on practitioners' abilities to make and maintain personal/professional relationships with his/her patients. Knowing the patient - Understanding patient's needs by establishing, developing, and maintaining strong therapeutic relationship Caring - An effort to ensure that the needs of the vulnerable people are fully acknowledged
Type of technology used	Electronic patient records, smart cards

Key findings	A useful framework developed by the Registered Nurses Association of Ontario (2002) was adapted to raise awareness of the necessary requisite knowledge and skills competences required to establish, develop, and maintain effective therapeutic relationship. **Requisite Knowledge:** Knowledge of psychological theories and information gathering , Knowledge of interpersonal and development theory Knowledge of diversity influences and determinants Knowledge of the person Knowledge of health/illness Knowledge of broad influences on health care and healthcare policy Knowledge of systems **Skills Competencies** Self-knowledge and self-awareness Empathy and respect Observation and listening skills Awareness of boundaries and referral skills The taxonomy was developed by the authors to assist in the assessment of a performance of understanding in the reality of clinical practice, rather than the artificiality of the classroom. According to the 'performance of understanding', nurses are expected to undertake an activity, such as a therapeutic intervention, under supervision, within their clinical setting, allowing nurses to demonstrate their knowledge, understanding and skills relating to that activity. A 'performance of understanding' assessment tool designed specifically for use in the reality of clinical practice, rather than the artificiality of the classroom lends itself to the effective assessment of a therapeutic relationship.
Strategies / implications	Nurse education and training may need to move away from the objective study of physiology and treatment of disease to the more therapeutic study of the relationship process. This will focus not only on the qualities and skills required for building relationships, but also on the sequencing of the process, awareness of the possible impediments to the process and preparation and planning for the termination of the process.

26. Author/ Year/ Title/ Country	**Macdonald (2008)** **Technology and its effect on knowing the patient - A clinical issue analysis** **Canada** **Source: Databases**
Study aim	To outline the importance of knowing the patient and describe how investment in technology can support this important concept.
Population	Nurses
Core Concepts; Definitions; Attributes (as identified	Knowing the patient: Knowing the patient's typical pattern of responses and knowing the patient as a person Nurse-patient relationship: A relationship in which the nurse had a sense of what the illness meant to the patient, the nurse planned interventions specific to the patient's needs and patients felt as if the nurse knew and cared about them.

by the study author)	
Type of technology used	Electronic health records Personal digital assistants
Framework	Framework of issue analysis
Key findings	Knowing the patient is important for several reasons: Knowing the patient is essential to nurses' clinical judgment, decision making, and the individualizing of care. When nurses had the time to get to know patients and when patients felt that the nurses knew them, difficulty rarely occurred in encounters and relationships. The establishment of the nurse-patient relationship was considered to be care and required that the nurse get to know the patient. Knowing the patient is a necessary element of the caring relationship. Factors that contributed to this knowing were: time, continued patient contact, in-depth nursing experience, collaboration among nurses, and the establishment of nurse-patient-family relationships. Additionally, technology has been identified as a way of knowing patient.
Strategies to improve compassion / implications of the research	Recommendations to facilitate the knowing of the patient: Nurses could talk and listen to patient no matter what is the task they are performing. Use open-ended questions to invite patients from sharing their thoughts Develop work patterns that are flexible rather than routine Nurses mentor one another in these practices Healthcare providers and policy makers come together and collaborate on designing frameworks of care that most closely reflect what each wishes to achieve Implications for practice: Nursing education programs need to collaborate with information technology development programs to introduce potential practitioners to how computer software is developed and to the importance of nursing presence at every level of development Nurses who are presently practicing need to be vigilant and critically appraise the introduction of new technologies to determine if what is promised is delivered .

Organizational Reports

27. Author/ Year/ Title/ Country	**Associated Medical Services (2018)** **Compassion in a technological world - Advancing AMS' Strategic Aims Canada** **Source: Organizational Report**
Purpose	To sustain the learning and practice of compassionate care, and to champion the transformative impact of technology on 'human-side' of healthcare
Population	Nurses
Core Concepts; Definitions; Attributes	"Compassionate care", which is described as "not only including humanistic behaviors, but also the integration of human-centered technology and services in the healthcare system." (AMS, 2018, p.11) AMS also forecasted that "expectations of compassionate care will evolve as patients will seek out connectedness, responsiveness, and empowerment to improve health conditions" (AMS, 2018, p.4)
Type of technology used	Different digital technologies (current and future technologies) such as smart phones, telemedicine, remote monitoring, robotics, and AI
Key points	Strategies that could be adopted in the technology-rich environment: Make the most of each interaction opportunity Minimize the impact of technology Individualize interactions Support a caring work environment Control verbal and nonverbal responses when technology frustrations arise Addressing digital or health literacy gaps Creating a myriad of new policy and regulatory considerations Healthcare professionals working alongside of technology
Strategies / implications	A supportive work teams, access to technology and information experts, sensitivity training and participation in design processes are going to be essential to the future of nursing practice. Nursing education must continue to prepare students for the technology driven practice settings of modern health care. with the emphasis for keeping patient at the center of care. Students should be provided increasing opportunities to practice these behaviors using simulation. Simulation allows students to practice documentation and communication skills simultaneously and gives an opportunity for students to practice decision making, critical thinking, and problem solving.

	Nurse educators need more resources for simulation including the increased financial and staff resources needed to design, conduct, and debrief simulation events. Electronic medical record systems that are both realistic and practical for educators must also be more readily available and cost-effective.

28. Author/ Year/ Title/ Country	**The Royal Society (2006)** **Digital healthcare: The impact of information and communication technologies on health and healthcare** **United Kingdom** **Source: Organizational Report**
Purpose	To discuss the impact of information and communication technologies on health and healthcare
Population	Nurses
Core Concepts; Definitions; Attributes	Caring - The behaviors demonstrated by nurse to facilitate the nurse-patient relationship and promote healing.
Type of technology used	Mobile phones, smart devices, electronic health records
Key findings	Electronic health records can enhance the caring nurse-patient relationship by improving communication and access to information and ultimately streamlining documentation to allow nurses to spend more time with patients. Nurse educators could adopt simulation techniques in nursing curriculum. The simulation techniques could enhance caring communication, information access, and time-saving elements among nursing students.
Strategies / implications	Educators must find creative ways to weave information management and high-tech documentation into crowded nursing program curricula, while promoting a focus on the caring nurse-patient relationship.

Appendix F

CASN Nursing Informatics Entry-to-Practice Competencies

Link: https://www.casn.ca/wp-content/uploads/2014/12/Infoway-ETP-comp-FINAL-APPROVED-fixed-SB-copyright-year-added.pdf

Nursing Informatics Core Competencies and Indicators
Core Competency 1: Information and Knowledge Management **Uses relevant information and knowledge to support the delivery of evidence informed patient care.**
1. Performs search and critical appraisal of on-line literature and resources (e.g., scholarly articles, websites, and other appropriate resources) to support clinical judgement, and evidence-informed decision making.
2. Analyses, interprets, and documents pertinent nursing data and patient data using standardized nursing and other clinical terminologies (e.g., ICNP, C-HOBIC, and SNOMEDCT, etc.) to support clinical decision making and nursing practice improvements.
3. Assists patients and their families to access, review and evaluate information they retrieve using ICTs (i.e. current, credible, and relevant) and with leveraging ICTs to manage their health (e.g. social media sites, smart phone applications, online support groups, etc.).
4. Describes the processes of data gathering, recording and retrieval, in hybrid or homogenous health records (electronic or paper), and identifies informational risks, gaps, and inconsistencies across the healthcare system.
5. Articulates the significance of information standards (i.e. messaging standards and standardized clinical terminologies) necessary for interoperable electronic health records across the healthcare system
6. Articulates the importance of standardized nursing data to reflect nursing practice, to advance nursing knowledge, and to contribute to the value and understanding of nursing.
7. Critically evaluates data and information from a variety of sources (including experts, clinical applications, databases, practice guidelines, relevant websites, etc.) to inform the delivery of nursing care.
Core Competency 2: Professional Responsibility Accountability **Uses ICTs in accordance with professional and regulatory standards and workplace policies.**
8. Complies with legal and regulatory requirements, ethical standards, and organizational policies and procedures (e.g. protection of health information, privacy, and security).

9. Advocates for the use of current and innovative information and communication technologies that support the delivery of safe, quality care.
10. Identifies and reports system process and functional issues (e.g. error messages, mis-directions, device malfunctions, etc.) according to organizational policies and procedures.
11. Maintains effective nursing practice and patient safety during any period of system unavailability by following organizational downtime and recovery policies and procedures.
12. Demonstrates that professional judgement must prevail in the presence of technologies designed to support clinical assessments, interventions, and evaluation (e.g., monitoring devices, decision support tools, etc.).
13. Recognizes the importance of nurses' involvement in the design, selection, implementation, and evaluation of applications and systems in health care
Core Competency 3: Information and Communication Technologies **Uses information and communication technologies in the delivery of patient/ client care.**
14. Identifies and demonstrates appropriate use of a variety of information and communication technologies (e.g., point of care systems, EHR, EMR, capillary blood glucose, hemodynamic monitoring, tele-homecare, fetal heart monitoring devices, etc.) to deliver safe nursing care to diverse populations in a variety of settings.
15. Uses decision support tools (e.g. clinical alerts and reminders, critical pathways, web-based clinical practice guidelines, etc.) to assist clinical judgment and safe patient care.
16. Uses ICTs in a manner that supports (i.e. does not interfere with) the nurse-patient relationship.
17. Describes the various components of health information systems (e.g., results reporting, computerized provider order entry, clinical documentation, electronic Medication Administration Records, etc.).
18. Describes the various types of electronic records used across the continuum of care (e.g., EHR, EMR, PHR, etc.) and their clinical and administrative uses.
19. Describes the benefits of informatics to improve health systems, and the quality of interprofessional patient care.

Appendix G

A Matrix Examining Records for Similarities and Differences Against Three Attributes of Compassion

		Attributes and Antecedents According to Taylor et al.		
Included Records Author/Title	**Concepts Similar to Compassion as Defined by the Authors of Included Records**	**Connection** Proximity Exposure In-attendance Attentiveness Presence Active communication skills Understanding Imagination Recognition Identification Information Professional role	**Humanistic Response** Comprehension, Advanced communication & clinical listening skills, Confidence and ability to manage difficult situations, Genuine/ authentic/ natural desire, Connection, Self-reflexive, Selfless-ness, Esthetic knowing, Instinct/intuition, Cultural understanding, Engagement, Involvement, Interconnectiveness	**Action** A capability to act, Authority to act, Knowledge of appropriate response(s), An environment that enables response, Emotional energy.
Barbosa & Silva (2017) Nursing care by telehealth: What is the influence of distance on communication?	Harmonizing interpersonal relationships, transforming environments, and respecting the socio-economic and **cultural differences of people**. Nurse-patient **communication -** A complex process of	✔	✔	

	understanding and sharing both sent and received messages, since the content of these messages as well as the way in which they are received, influences the present and future behaviors of the nurse and patient.			
Barrett (2016) Rethinking presence: A grounded theory of nurses and teleconsultation	Nurse-patient interactions - Creating a **channel of communication** i.e. video-mediated communication	✔		✔
Curtis & Brooks (2020) Digital health technology: Factors affecting implementation in nursing homes.	**Humanized care** - Placing the patient at the center of care and including compassion as the core element. Person-centered care - Encouraging people to **participate actively** in **managing their health** and provide access to **health information**.	✔	✔	
Gaudet (2016) Electronic documentation and nurse-patient interaction	Nurse-patient interaction-The relationship established between the nurse and patient through verbal and non-verbal **communication.** Patient-centered care-**Humanizing care** that meets the patient's needs	✔	✔	

Jones & Richards (2013) The impact of nursing students' use of electronic health records in the home settings	Nurse-client **communication** - An interaction between the nurse and client to enhance the provision of client-focused nursing care. Client-focused nursing care - Providing nursing care based on the comprehensive client assessment findings.	✔	✔	
Lynott et al. (2012) Communication and the electronic health record training: A comparison of three healthcare systems	Patient-provider **communication** - A **connection** maintained between the nurse and the patient through good communication	✔	✔	
Marchesoni et al. (2017) Technologies in older people's care: Values related to a caring rationality	Caregivers-care receiver's interactions without disturbance - A prerequisite for ensuring contentment and satisfaction of the care receivers			
Nagel et al. (2017) Getting a picture - A grounded theory of nurses knowing the person in a virtual environment Canada	Knowing the person was used to reflect an **appreciation** of a holistic and comprehensive **understanding** of the individual that transcends physiological and **emotional aspects** of care and includes	✔	✔	✔

	broader influences in health, such as **social structures**, **environment**, and agency of the person. Patient-centered care - Creating collaborative partnerships with the patient to support the patient's **self-management** of his or her health condition. **Connecting** with the person - A blend of interpersonal **engagement** between nurse and the person, an intact link through technology, and requirements of skill and **knowledge** to use technology by both the nurse and person.			
Nilsson et al. (2010) Swedish District Nurses' experiences on the use of information and communication technology for supporting people with serious chronic illness living at home – a case study	Caring relationship - A relationship maintained by keeping a balance between simultaneously professional and private with the **ill person** and their family. Nurse-patient interaction - The interaction between patient and nurse that is central in caring, and mutual interaction is probably no less	✔	✔	

	important when **communication** occurs via computers. Trusting relationship - To show or ask for trust implies being more **open to oneself** and to another person, and helping to improve another person's quality of life. Knowing the ill person - Ensuring individual care, which includes continuous contact and a sense of closeness in the nurse-patient interaction.			
Nixon (2015) Perceptions of nurses using mobile devices at the bedside	Nurse-patient relationship - Maintaining the **human connection** between the nurse and the patient. Relationship centered care - A care model using a holistic approach to create a trusting relationship between the nurse and the patient. Quality nursing care - Providing quality care to patients including hands on care, thoughtful care, and compassion. This also includes **communicating** with families as well	✔	✔	

	as other caregivers or patient advocates.			
Pors (2018) Digital displacements in patient-professional relations - Four modes of organizational patient involvement Denmark	Patient-centered healthcare - The involvement of patients in their own care. Patient-professional relationship - The sharing of **information** between the patient and professional (midwife).	✔		
Sävenstedt et al. (2004) Being present in a distant room: Aspects of teleconsultations with older people in a nursing home	**Presence** - An important concept for **understanding** the meaning of caring conversations Telepresence - The **subjective experience** of being together with a person in one place when one is geographically situated in another Teleconsultations - A glimpses of the **experience** of being in the other's room with a feeling of providing **nursing presence.**	✔		
Tuxbury (2013) The experience of presence among telehealth nurses	**Presence** - A reciprocal flow of openness in the dialogue between a nurse and a patient **Humanistic nursing** - "Being-there-for and being-there-with" relationship	✔	✔	

	that may exist between a nurse and a patient Nurse-patient interactions - A step-wise process of **communication** between a nurse and patient.			
Varghese & Phillips (2009) Caring in telehealth	Online presence - Maintaining human-to-human **connection** through virtual visits	✔	✔	
Campbell & Rankin (2017) Nurses and electronic health records in a Canadian hospital: examining the social organization and programmed use of digitized nursing knowledge	Nurse-patient interactions - **Connections** that exist between the nurse and the patient.	✔	✔	
Gomes et al. (2016) Connecting professional practice and technology at bedside	Human-to-human caring practices- To foster **communication** and interactions between the nurse and the patient, which, in turn, promotes **authentic emotional support**, decreases anxiety, and facilitates healing. Patient-centered care- Individualizing	✔	✔	✔

	care as per the patient's unique needs. Relationship-based caring - Practices adopted to enhance relationship-based caring behavior categories.			
Duffy et al. (2010) Point of care documentation - Impact on the nurse patient interaction	Nurse-patient interaction - The visual and verbal **communication** between the nurse and the patient. Caring environment - An **environment** created to enhance the nurses' visual and verbal interactions with patients	✔	✔	✔
Johnson et al. (2014) Improvement of communication and interpersonal competence in telenursing-development of a self-assessment tool	Patient-centeredness - A bio-psychosocial view of the patient's health problem. **Communication** competence is defined in terms of specific tasks, such as effective questioning skills when interviewing patients	✔	✔	
Misto et al. (2018) Nurses' perception of the impact of electronic documentation on the nurse-patient relationship	Nurse-patient interaction - Effective verbal and nonverbal **communication** between the nurse and patient Nurse-patient therapeutic relationship -	✔	✔	

	Maintaining a **connection** between the nurse and patient			
Buckner & Gregory (2011) Point-of-care technology - Preserving the caring environment	Humanized interactions - The individualized interactions to help maintain a caring presence. Patient-centered focus - A unique focus on keeping the patient at the center of care.			
Nagel et al. (2013) Knowing, caring, and telehealth technology - Going the distance in nursing practice	The concept of knowing both in the context of how the nurse comes to integrate **knowledge** into **professional practice** and how the nurse comes to appreciate the **uniqueness of persons** receiving care**.** Nurse-client relationship - An **authentic connection** between the nurse and person	✔	✔	✔
Rentmeester (2018) Heeding humanity in an age of electronic health records: Heidegger, Levinas, and Healthcare	Nurse-patient interactions - The interactions between the nurse and patient to establish an interpersonal relationship **Humanistic connection** - A direct **connection** with another person on an ethical level	✔	✔	

	requires face-to-face contact, as such contact establishes a link between the individual qua individual, and not simply as just another person			
Spencer & Lunsford (2010) Electronic documentation and the caring nurse-patient relationship	Caring behaviors - The behaviors demonstrated by nurse to facilitate the nurse-patient relationship and promote healing. Nurse-patient interaction - Nurses' interactions with patients for the purpose of exchanging **information,** discovering something, or building a relationship; while a collaborative interchange is characterized by complex, interdependent work toward a mutual goal.	✔		
Sandelowski (2002) Visible humans, vanishing bodies, and virtual nursing: Complications of life, presence, place, and identity	Caring - A behavior enhanced by attentive gaze, heart-felt listening, and comforting touch. **Presence** - Just being their or fully available to patients Telepresence - The feeling that we	✔		

	(nurse and patient) are together			
Foster & Hawkins (2004) The therapeutic relationship: Dead or merely impeded by technology?	Therapeutic relationship - It is not merely an intellectual activity, but rather is dependent on practitioners' abilities to make and maintain personal/professional relationships with his/her patients. **Knowing** the patient - **Understanding** patient's needs by establishing, developing, and maintaining strong therapeutic relationship Caring - An effort to ensure that the needs of the vulnerable people are fully acknowledged	✔	✔	
Macdonald (2008) Technology and its effect on knowing the patient - A clinical issue analysis	**Knowing** the patient: Knowing the patient's typical pattern of responses and knowing the patient as a person Nurse-patient relationship: A relationship in which the nurse had a sense of what the illness meant to the patient, the nurse planned interventions specific to the patient's needs and patients felt as if the nurse knew and cared about them.		✔	

AMS (2018) Compassion in a technological world - Advancing AMS strategic aims.	Compassionate care not only including **humanistic behaviors**, but also the integration of human-centered technology and services in the healthcare system. AMS also forecasted that expectations of compassionate care will evolve as patients will seek out **connectedness**, responsiveness, and empowerment to improve health conditions.		✔	
The Royal Society (2006) Digital healthcare: The impact of information and communication technologies on health and healthcare.	Patient-focused healthcare-Giving patients more choice about how, when and where they receive treatment.			
Total number of papers addressing the concept	-	23	20	5